NUTRITION EDUCATION PROCEDURES TO EMPHASIZE THE IMPORTANCE OF A DAILY FOOD GUIDE FOR EGYPTIAN PEOPLE

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NUTRITION EDUCATION PROCEDURES TO EMPHASIZE THE IMPORTANCE OF A DAILY FOOD GUIDE FOR EGYPTIAN FARM PEOPLE

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CHAPTER I

INTRODUCTION

In Egypt whether the family is nuclear or extended it is the main unit on which the society is based. As a rule family size is different, large in villages and limited in towns and cities. Each individual within the family has his own role and tasks. It is important to know that living in a modern society makes it necessary to learn many different tasks. Learning well brings satisfactions and rewards, while learning poorly brings unhappiness and social disapproval.

Each individual has developmental tasks which he is expected to be able to carry out at various ages. If these tasks are not achieved at the proper time, he will not achieve well, and may fail in those tasks yet to come (19). All the members of the family like to live in peace. The parents are the head of the family, but usually the father has more influence than other family members.

The Egyptian farm family is a cooperative unit, and the ties between all the family members are very strong. For instance in the village the farmer works in his field and his children help him. Also, his wife may work with him and she has her own tasks. In addition she takes care of the children, and the animals which are very important in their life. Also, she takes the food to her husband and children in the field. Most of the time the children go to school and after they return, they help the father in the fields. By this way the children learn through education and experiences.

In the cities, family life differs from that of the village people. Women have an opportunity to work like men and have equal rights with men. They work in several fields such as teaching, business, research, politics and other fields. Besides this work, a woman is a good housewife. The relationships and the ties between the family members are, in general, very strong. In cities a high percentage of people are educated. Children have improved chances to attend good schools for a long period of time. The child begins school when he is six years old. But before this age he can go to a private school such as nursery and kindergarten.

Culture, religion, and economic factors have an effect on the family life. For example there are certain kinds of food which are forbidden to eat in Islam religion. One of these foods is pork. There are certain occasions and festivals in which special kinds of foods are used. For example, in El Eid El Saghir dried fish, cakes, biscuits, and candy are eaten. This kind of food is common among all the families. Another celebration is called Sham El Nessim which marks the beginning of spring. In this feast colored eggs, onions, and salted fish are eaten.

In Egypt there are many varieties of vegetables and fruits. Also meat, poultry, and fish are present. But for those foods which are of high biological value, economic factors interfere and cause the use of them to be quite limited. The agricultural year is divided into three seasons. In winter season, wheat, clover, barley, beans, onions and lentils are the main crops. The second season lasts from mid-January to mid-June and cotton, rice, sugar-cane, seasame and millet are the main crops. By the beginning of July the Nili season starts, and throughout this season, rice and maize are the main crops. Wheat, the principle winter crop, accounts for fourteen per cent of the crop area and makes up 9.3 per cent of the money value of agricultural yield. Sugar-cane is the only

source of raw material used in the manufacturing of sugar in the United Arab Republic. Legume crops such as viva faba, lentils, lupins, fenugreek and chickpeas are grown. The first two crops are outstanding for their high nutritional value, especially in protein. Citrus fruits, grapes, bananas, mangoes, dates and guava are the principle fruits. Fresh vegetables of many kinds and varieties are available on the market all through the year in the United Arab Republic. Among the principle crops grown--potatoes, tomatoes, peas, watermelons, and cucumbers--are exported to foreign markets. Also, fish is found in a large amount at the seashores. The people who live there like fish and perhaps eat it five times a week. There is no fixed season for sea fishing except for tuna and sardines, which are caught only in summer and winter. Almost all the fish caught is locally consumed. In 1954 appreciable quantities of shrimp began to be exported, in frozen form, to foreign countries.

In Egypt there are certain kinds of industries like cereal products which are made into pastes and biscuits and provide starch, dextrin and other by-products. Cane-sugar manufacturing and associated industries provide a wide variety of products including perfumes, vinegar, glacial acetic acid, yeast and wax. With the wide variety of crops grown in the United Arab Republic, the food preservation industry has assumed a significant position.

Dairy products provide a wide range of food materials including pasteurized and dehydrated milk, soft and hard cheese, butter, yoghurt and ice cream. Meat preservation is carried out on a small scale, largely by Italian and Greek butchers who prepare ham, bologna, and sausage for foreign residents in the larger cities. These products do not have a wide demand since Moslems eat only fresh meat.

In general there are three classes of people--high, middle and low

class. People of the high class have the economic ability to eat any kind of meat daily, but those of the middle class afford it only three times a week, while those of the low class eat it once a week, or perhaps once every two weeks. The income of the family is an important factor in the family life. It has a great effect especially on the foods. But the fact that they have much money does not mean that they always have a good diet.

To have an adequate diet people should know how to select the various kinds of foods and in the proper amounts recommended daily. In one family one can see differences in the individual preferences for some kinds of food. If individual preferences were permitted it would be somewhat difficult and more costly. In most cases, parents do not pay much attention to likes and dislikes of their children but cook the food in a way commonly accepted by all. In this way the children gradually become accustomed to the common kinds of food and the usual way of preparing them. In most families when the child reaches the age of four or less, he sits at the same table as the older family members and eats the same kind of foods. But in a few families there are special kinds of food for children in addition to the original foods.

The problem of malnutrition is well developed among the low income people. Their income is not enough to keep themselves in a good nutritional condition. So among these groups one can find several diseases caused by deficient diets. Also, their knowledge about nutrition and adequate diet is very limited. But the most important factor which affects their life is the economic one. This factor forces the people to eat an inadequate diet whether they know the principle for good nutrition or not. If they have no money and they know how to select a variety of food, this knowledge will not help them. The diet of the lowest income

group, especially in villages, consists mainly of the consumption of bread. Eating bread will supply them with calories and satisfy their appetites. For example the main meal in the farmer's diet may be bread and onion only, or bread and cheese, or bread and curd. From this meal, which is the dinner or the main meal, one can see how the farmer is malnourished. The new generation follows the same diet pattern because they eat like their fathers so the nutritional status becomes worse. So, they develop certain kinds of dietary deficiency diseases like pellagra which is an endemic disease in Egypt. It is a widespread disease in the Delta Area and other areas where maize is the principle cereal, whereas rickets and osteomalacia are commonly seen in those areas of the Middle and Upper Valley where calcium intake is low. Pellagra in Egypt is associated with the high consumption of maize and with poverty, which restricts the type of food stuffs available in the diet. This disease is uncommon along the coast and in southern Egypt where millet, wheat and dates replace maize as a staple diet. Therefore, it is important to start a nutrition education program for these people in order to show them the importance of adequate diet in relation to good health. Educational efforts should be put forth to stimulate better food habits and more adequate dietary intakes for all. Before changing present food habits of any group it is important to know the cultural meaning of food to them in order to plan a sound education approach. It is also important to know that many major health problems are the result of poor food habits. An educational program is needed to improve food selection which will result in adequate diets and improved health for all the people. Good food habits should be acquired early in life when possible.

The homemakers are the persons who are responsible for feeding the family, so the information about nutrition should be directed to them.

However, the men of the family need to understand why a variety of foods are necessary to keep their family members well and happy. It is necessary to motivate these people to accept basic nutrition principles by giving them valuable evidence of their worth through a variety of experiences. Various kinds of techniques can be used to teach these people the facts about nutrition and good health such as charts, posters, pictures and slides. One of the most effective ways is by animal feeding demonstration. There is no one way or method to teach nutrition. The method must fit the individual or group needs, and depends on age, economic status, cultural background and locality.

It is recognized that the village families will need to grow many of the foods which their diets lack in order to be able to have them. Seed is available for planting spinach, carrots, sweet potatoes, green peppers, wheat and corn. Date trees and citrus fruit trees are common as well as guava.

Even though economic factors play a part in processing food, these can be overcome if farmers can be encouraged to cultivate the kind of plants and trees which furnish necessary calories and nutrients needed for their health and happiness.

The purpose of this study is to develop methods and tools for use in nutrition educational programs for the village people in Egypt. It is believed that when they realize the value of a wide variety of easily grown food materials in prevention of poor health and the promotion of increased well-being they can produce and will use these foods for their families.

It is assumed that: (1) Methods of nutrition education can be developed which can be understood by illiterate people; (2) Village people can be convinced of the worth of an adequate varied diet to their health

and happiness; (3) Seed and garden plots can be obtained to grow the variety of foods needed for health; (4) Even though the economic level of many of these people is low they can grow or obtain sufficient amounts and varieties of food to prevent deficiency diseases.

Although it is recognized that the use of large amounts of highly refined cereal grains (corn and wheat, especially) does not encourage good nutrition the promotion of using whole grain cereal products will probably take a long period of time. However, an attempt will be made to demonstrate to these farm people the importance of eating whole grain products in the prevention of pellagra and other deficiency conditions.

CHAPTER II

REVIEW OF LITERATURE

Need for Nutrition Education

Food stamp plans, combined with free school lunch and milk programs, have been developed on a national basis to provide partial solutions to undernutrition in the midst of abundant food supplies.

Warning Signs:

Several indications that widespread nutrition problems exist in Egypt are: (1) About one-fourth of the people are well fed, about one-half are fairly well fed; and one-fourth are poorly fed. (2) Dietary deficiency diseases, particularly pellagra in the Delta, were sufficiently prevalent to demonstrate the existence of extremely poor nutrition.

Nutrition is not an academic matter but a practical consideration concerning every single person in the country--producers, processors, marketers, consumers, nutrition experts--everyone. Each meal must be planned according to economy, nutrients, and palatability. For such planning the housewife must have diet instructions expressed in everyday language. With these in mind, the author formulated a daily food guide for low income people in Egypt. This plan tends to serve as a guide for planning adequate nutrition. This guide was developed with the thought of safeguarding the adequacy of the diet, and at the same time, permitting the flexibility in the choice of food.

Dr. Wilder spoke of the need to improve the nutritional quality of

staple foods which were often used in diets of families with low incomes:

> It is impossible, even for experts, to plan nutritionally good diets for less than twenty cents a day when the sugar, flour, rice and edible fats have had most of their minerals and vitamins removed by methods of refining (12, p. 223).

The Food and Nutrition Board of the National Research Council and the Council of Foods and Nutrition of the American Medical Association have reviewed the policies and principles of enrichment at intervals. The following statements were issued in 1961:

> The endorsement of the following is affirmed: the enrichment of flour, bread, degerminated corn meal, and white rice, the retention of restoration of thiamine, riboflavin, niacin, and iron in processed food cereals; the addition of vitamin D to milk, fluid skim milk, and nonfat dry milk; the addition of iodine to table salt. The protective action of flouride against dental caries is recognized and the standardized addition of flouride to water is endorsed in areas in which the water supply has a low flouride content (8, p. 125).

The meaning of food to people

Nutrition means good food and plenty of it. Alice Keliher urged that nutritionists must think a great deal about the emotional factor in food habits. She said:

> We can point out to people that they ought to eat vegetables, but they won't eat them if they hate them. In meeting the problem with children in the schools we need to accustom them to participate in growing, cooking, and working with foods in order to build up readiness for them (12, p. 226).

The deliberation of the National Nutrition Conference led to the formulation of the following twelve basic recommendations: (1) The use of allowances as a yardstick. (2) Translation of these allowances into everyday food and appetizing meals suitable for families and individuals at different economic levels. (3) Survey of what people are doing like production of food, processing, storing, cooking, growing of food and how to improve it. (4) More education of doctors, dentists, teachers, social

service workers, public health nurses, nutritionists, and dietitians. (5) Mobilization of every educational method to spread the new knowledge of nutrition. (6) Mobilization of all neighborhood, community, state, and national organizations and services that can serve to raise the nutritional level of people. (7) Vigorous and continued attack on the fundamental problems of unemployment, insecure employment, and inadequate incomes to raise the standard level. (8) Use of practical devices like school lunch programs which will bring nourishing, adequate meals to those who are not able to afford them. (9) Improve food distribution, including processing, marketing, packaging and labeling. (10) Encourage greater production of food than needed. (11) Especially for low income people, encourage them to grow and conserve food at home. (12) Improvement of the nutritive value of food products by enrichment (12).

Dr. John R. Murlin traced the development of nutrition education through these different phases:

(1) The composition phase--of what do our foods consist?
(2) The digestability phase--which foods are most easily digested?
(3) The calories phase--how much energy does food contain, and how much does the body require?
(4) The biological phase--which foods are of greatest biological value? (12, p. 227)

In the conference held on December, 1952, there was renewed emphasis on nutrition education. Various delegates spoke of improvements in diet, which had resulted in a more productive population, with higher purchasing power and higher consumption. A large number of the American people live long lives and maintain good health because they have been taught the importance of "The Basic Four" and have consumed enriched staple foods.

Dr. W. H. Sebrell, Jr., M.D., the Director of the National Institutes of Health, Public Health Service, in addressing the opening session of

the conference, told the delegates about world food dilemmas, citing Asia, Central America, and Africa as areas with inadequate protein intake--a serious dietary defect. He suggested the planting of high-protein crops, plus fortification of cereal-potato diets with manufactured nutrients (37).

This conference advocated continuous studies of the nutritional status and food habits of the people as a useful tool in determining exactly what nutrition problems were. Also the conference requested legislation which would place strict regulations on emulsifiers, stabilizers, moisteners, preservatives, fumigants, antioxidants, antibiotics, and other ingredients added to food in the production, processing, and packing stages. Sebrell (37) advocated expanded surveys on the nutritional status of foreign populations, as has already been begun by the USDA and the Food and Agriculture Organization of the United Nations.

The National Nutrition Education Conference, April 1-3, 1957

This conference included the word "education" in the title to show the importance of education to the problems of nutrition. The aims of this conference were to stimulate and motivate people to improve their food habits. This, of course could be done through education.

National survey indications

Although the survey showed that sizeable segments of the population had diets poor in certain nutrients--especially calcium, vitamin C, vitamin A, thiamine, and riboflavin--it was reassuring to find very few households with diets extremely low in these nutrients.

In classification of diets, the first one-third of diets were classed as "poor", but now the "poor" classification included only about one-tenth of the households. This is due to the enrichment program and other

factors like improved economic conditions, new developments in food technology and marketing, and the effect of nutrition education.

In evaluating the needs of nutrition education, the members of this conference concluded that: (1) High-income families need education for nutrition as well as do middle and low-income families. When working with higher income groups, nutritionists perhaps do not need to emphasize protein and niacin-nutrients found in higher cost foods--but do need to emphasize thiamine as a nutrient needed in these diets. (2) Nutrition problems continue to exist, despite economic well-being and availability of nutritive food. These problems affect old people, teenagers, pregnant women, and preadolescents. (3) It is possible to obtain a nutritionally adequate diet for even less money than families were already spending. (4) Modify existing food habits in order to achieve better diets. (5) A new influence upon nutrition education was a consideration of the cultural aspects of eating patterns (32).

The Nutrition Education Conference, January 29-31, 1962

In this conference nutritional needs of children and problems related to emotional aspects of their food habits were discussed. It was advised that young people need to be taught how to balance their food intake with energy needs, and also they need to be taught the importance of the kinds of carbohydrate in the diet.

Dr. Leverton mentioned the importance of linoleic acid as a nutrient, suggesting to the conference that some attention be given to the use of corn, cottonseed, or soybean oil in salad dressing or in cooking. Also, she emphasized the importance of milk (12).

Malnutrition is a World Problem

Nutrition educators have considerable responsibility in making known

to the public the extent of world food needs and their significance to all human beings.

In the world food situation it is important to consider if there is enough food to go around, and if there will be enough in the face of the growing population. The future depends upon how well food production can be maintained in relation to the growing population. Also, whether foods can be distributed from lands of abundance to places of scarcity and from seasons of abundance to times of inadequacy.

The world food situation presents these two basic aspects: (1) Diets are nutritionally adequate in the thirty industrialized nations of the temperate Northern Area. (2) For most of the seventy less developed countries in the semitropical Southern Asia, there is shortage in proteins, fats, and total calories, so the diets are nutritionally inadequate (12).

Closing nutritional gaps can be done by increasing food production. Major problems affecting food production are: (1) Low income per capita. (2) High ratio of population to land. (3) Lack of chemical fertilizers.

The "Food for Peace" program represents a major effort by the United States of America to work toward decreasing the food gap. Short term food programs are only a stopgap measure. Long-range efforts to improve the total economy of a nation, together with education of the people, must be a primary goal for aid programs.

Enterprises will have a far reaching effect on the nutrition of people through economic development, dietary improvements, and nutrition education.

The meaning of malnutrition

Malnutrition is described simply as the lack of enough food. But in

some areas the primary problem is shortage of good quality protein, while in other countries it is a vitamin deficiency. Malnutrition leads to a high infant mortality rate. The mortality rate of a child one to four years is more indicative of the nutritional level of the country than is the infant mortality rate. This is due to the fact that these older children do not have the protection of mothers' milk and are exposed to the family's food--or lack of it. The mortality of infants from poor nutrition is complicated by deaths due to poor sanitation.

Excess or imbalance of nutrients may also cause major health problems. In Somaliland, some nomadic tribesmen daily use 2.5 to 4.0 and even up to 9.0 liters of milk per day, thus acquiring an excessively high intake of protein, fat and calcium. Such intakes apparently do not cause health problems.

Food and politics

Millikan and Rostow have stated that it is likely a misconception that revolt and political instability within less developed countries result largely or directly from hunger (31).

Dr. Earl Heady stated that:

> Peace or not, depends more on sustained general economic development, with opportunities in other vectors of consumption space, than on food alone. Hence, we direct our efforts to the extent to which food from the United States can serve either positively or optimally in promotion of sustained economic development of less advanced countries (12, p. 248).

Improving the health and productivity of people in underdeveloped countries through better food is probably one of the first steps toward improving their economy.

The effects of protein malnutrition

Protein malnutrition is caused by diets high in carbohydrates and

poor in quality and quantity of protein. Kwashiorkor is a disease due to protein malnutrition. Dr. N. W. Scrimshaw said that the children who have Kwashiorkor are retarded nearly four years in bone formation when they reach school age. Also he said that retardation in physical growth and malnutrition is associated with retarded intellectual performance. Kwashiorkor is a world-wide problem of protein malnutrition which leads to some questions like: (1) What is the minimum of protein requirement? (2) What proportion must be furnished from animal protein? (3) Can vegetable mixtures be developed that will meet the protein needs for growth, reproduction, and maintenance? (12).

Hypertension and coronary heart disease

Every country with its food habits offers an opportunity to study the results of eating regimes as they have affected generations of people. There is a relationship between the diet and coronary heart disease which is a health problem in the United States. Diets rich in protein, especially animal protein, are high in cholesterol and fats containing saturated fatty acids. When such diets are low in carbohydrates and fiber they may result in a high level of blood cholesterol in middle-aged people--an age group with high incidence of arterioschlerotic heart disease.

Lactation

Breast feeding of infants in the United States appears to be declining in frequency, whereas in many other countries it is the main way to nourish babies over a long period of time. Jolliffe indicated, in a large-scale investigation in Southern India, that permissive breast feeding was usually carried on uneventfully and was continued for two or three years (21). Gopalan found, also in India, that lactation up to two years

was usual in the lower socio-economic groups, while among well-to-do mothers, 80 per cent were unable to breast feed for six months. In many countries, employment of women was cited as an interfering factor (17).

Dental caries

In less remote areas becoming touched by civilization, dental disease is increasing. Children up to age five and pregnant and lactating women have priority for foods essential for mineralization. Reduction in the use of sugar and sugar products are the main cause of reduction in the rate of dental caries. An increased tooth resistance due to favorable conditions in the earliest posteruptive malnutrition of the enamel surface may have been a factor (12). In Sweden, several researchers investigated the effect of sucrose supplements in varying forms on the teeth. It was found that sucrose did foster the development of caries, but that the form in which it was taken was a factor to be considered. Caries rates were highest with sticky sweets that adhere to the teeth (20).

New ways to meet dietary needs

The problem of meeting the need for an adequate supply of amino acids at a minimum cost using little or no animal products has led to an intensive study of a number of foods and combinations of foods, as well as the supplementary amino acids. Outstanding sources of high-protein foods are flours derived from cottonseed, peanuts, sorghums, and soybeans. In Guatemala, Incaparina, a highly nutritious mixture, was developed. In Indonesia a product called Saridele has been developed. Also, attention was directed to the rise of fish flour as a source of concentrated protein of good quality. The nutritive value of cereal supplemented with essential amino acids, such as lysine added to wheat flour, is another possibility for improving the quality of the diets. Dr. Esther Phipard

has quoted Dr. Scrimshaw as follows:

> There are obviously a great many different useful sources of protein for the prevention of protein malnutrition in technically underdeveloped areas. Milk must still be considered of first importance, and, of course, increased production of cheese, eggs, and meat should be encouraged. For some regions, fish flour or meat meals may be practical new sources of animal proteins. Oilseed meals such as those from sesame, peanut, sunflour, legumes such as soy, cowpea, and chickpea, and concentrates of leaf protein may be of major value in one area or another (12, p. 257).

Practical programs for improving nutrition

One of the most significant is the school-lunch program. School lunches around the world present widely different pictures; in no two places will the menus be the same.

In Japan a full meal of bread, milk, and a side dish of meat, soybeans, potatoes, fat, and oil, thickened with wheat flour or starch has been described by the Ministry of Education. This diet provides total calories of 647 and 27.7 grams of protein.

In Iraq, the menu in the school lunch includes a hard-cooked egg, samoon (a native bread), an orange, okra, an onion or a cucumber plus reconstituted milk furnished by UNICEF (12).

In a school lunch if there is a desire to emphasize the use of fish as a means of improving protein consumption, it is helpful for the children to learn a good deal about fish. And also, trips to the fish markets should be made. By these ways the pupils learn about different fish available. Thus the school feeding programs around the world are serving the nutritional needs of children while exploring new ways of meeting those needs.

Milk distribution schemes throughout the world are helping to improve the health of mothers and babies. Also children and adults can be helped toward better diets while they are learning the importance of

nutrition. It is important to make sure that good meals are served in the canteens.

Teamwork in improving nutrition

It is necessary to work as a team in improving the nutrition of the people. For instance a home economist, a dairy expert, a poultry specialist, an agricultural expert, an extension worker, a soil scientist, nutritionist, and dietitions working as a team find it easy to know the nutritional problems.

A team of workers such as those engaged in a nutrition survey may include physicians, dentists, nutritionists and dietitians, food technologists, biochemists, statisticians, and nurses. The value of teamwork in ascertaining an overall view of the nutrition problems of a country is well illustrated by the program of investigation followed by the Interdepartment Committee on Nutrition for National Defense.

International Nutrition Education Conference

The International Seminar on Education in Health and Nutrition held in Bagui, the Philippines, October 13 to November 3, 1955, was an effort to help peoples around the world to improve their nutrition. This conference was sponsored by the Food and Agriculture Organization, and it included forty-eight participants from twenty-two countries and territories (12).

Cultural forces

Burgess has outlined conditions which seem to militate against the success of health or nutrition improvement programs as follows: (1) Lack of cooperation, among the personnel of the various services. (2) Lack of adequate explanation of the purpose and methods of functioning of the

available health and nutrition services. (3) Lack of the knowledge of economic and practical limitations of the village household. (4) Lack of sympathy with the beliefs (4).

Attitudes and Food Habits

In order to establish good food habits, people must be able to learn, and there must be people able to teach them. Two ways of communication is of the essence.

The meaning of food

Food is essential for both the body and the spirit. Food can be endowed readily with meaning and attitudes that are indeed "the body and the soul" of the person who partakes of or rejects the food available to him. As a person is less healthy or more healthy, not only will the food attitudes, needs and uses change, but also the availability of the individual to offer and receive communications, to learn, and to teach changes to others as well (3).

Principles of interaction

Part of the problem for every person who would communicate better food habits to a person who wants to learn about the use of food is posed by the nature of knowledge itself. It is essential for the health educator to ascertain both the fact and the attitudinal values that are attached by the given individual or groups, to food and to knowledge about food. Interview is a method by which one not only finds out where the learner is, as to content and to feeling about food, but also the way through which communication from the learner to the professional person and back, can flow. Each interview, whether short or long, is a chance not only to gather data but to communicate knowledge and attitudes that

will strength the individual's ability to use food well.

Food--an intimate association

The health educator must possess an intellectual understanding and emotional insight regarding the meaning of food if she wants to establish paths of communication with the subject. Food is always associated with intimacy. The feeling of intimacy, the sense of relationship to another human being, some of the implications of trust or distrust are detected by an individual through the handling and use of food.

The wise food therapist will explore the food habits of a subculture in a community. She has to observe the practices and experienced patterns in the individual's use of food before she makes recommendations for change. Her objective is to use the meanings of intimacy, the relations of food to feeling of security, protection, strength, and power in ways that will bring out the assets. She needs to develop the person's food interests and capacities while she helps diminish those self-destructive trends that are expressed through inhibition or competitive displacement.

Teaching the individual about food

(1) Help the person to know that there are more things to learn about food than he had in his childhood. (2) Show the subject that the food usage becomes more meaningful when one sees it as a substance of great range, flexibility, and choice. (3) Teach the person skills in using food exchange. Such skills allow the patient to learn that almost any diet can be made up from a choice of wide variety, that there are many sources of the essential nutrients. (4) Avoid, and help the individual to avoid, designations for foods that stimulate feelings of inadequacy, false pride, or competitiveness, such as "hot dogs are only for

teenagers," and "salads are only for the ladies" (5). People are different, and their differences are to be respected but not exploited. One learns to like foods all of one's life, but what is age-appropriate must be respected as well as that which is nutrient-appropriate (6). It is important not to confuse people by non-specific generalities (7). Start where the individual or group is. What does the individual like? The generalities of knowledge of both cultural values and the individual and family variations of those values only have meaning in the light of the specifics of the given individual with whom one is dealing (8). Keep in mind that human beings learn slowly and need repeated opportunities to learn. Meet the disinterest, the resistance to change, the argument that good health is a matter of common sense rather than scientific knowledge, with data and illustrations just beyond the point of resistance and within the stream of the "positives" of the individual or group involved (9). Indicate to the person or the group the positive factors in the foods they are already using and how new knowledge will enrich or simplify the present food problem (10). Expect and anticipate the objections that will come when you offer dietary change (11). It is undoubtedly easier to establish good food habits early than it is to change those once established (22).

Food habits--an anthropologist's view

The people of different societies live, to some degree, in separate cultural worlds. Recognizing the significance of cultural differences, for one thing, means that much effort must be made to understand the other fellow. Here are some anthropologic conclusions about culture:

> It consists of values, attitudes, habits, and customs that are acquired by learning. This learning starts with the earliest experiences of the child. Much of it is not

> deliberately taught by anyone. Some of it is largely unconscious because it is so thoroughly internalized (14, p. 336).

The fact that culture is learned means that it is subject to change, and this is the most optimistic fact about human behavior. Some aspects of culture change readily, other especially basic values and beliefs, change more slowly and sometimes with great difficulty.

Problems in changing cultures

If it is desired to introduce change in people's behavior, it is wise to study carefully the existing cultural beliefs before undertaking the project. Social research has demonstrated the existing cultural differences within modern American society. These sub-cultural variations may be regional, religious, rural as contrasted with urban, occupational, or based on social class differences.

Food is always defined culturally. The same plant may be defined as edible by one society, inedible by another. Food is primarily a matter of cultural definition for most people, with the possible exception of specialists in the nutritional area. There is considerable symbolism associated with particular items of the diet. Mead has said:

> In most societies, food is the focus of emotional associations, a channel for interpersonal relations, for the communication of love or discrimination or disapproval; it usually has a symbolic reference (14).

Food habits become deeply imbedded in the personalities of people raised in a particular cultural pattern.

Food is one of the basic media through which attitudes and sentiments are communicated to the child. The family meal situation is one of the most important events in producing morale or a sense of unity. Certain foods, eaten early in life, become associated with these family sentiments. The family eating together in privacy, also becomes a major value

in some societies. Food may be eaten at certain times of the day primarily for satisfying hunger; other meals have a strong symbolic content. If it is desirable to understand the dietary culture of any group, it is important to study the patterning of meals and the meaning of each meal in the life of the people.

The problem of changing food habits becomes more complex when the values of the people to be influenced are different from those of the dietitian. If the diets of certain groups need to be changed or to be improved, then it is important to understand the food culture of the people involved.

Symbolism of food

Much effort has been used in certain parts of Asia to correct dietary deficiency resulting from overwhelming reliance on polished rice. The attempt has failed because the whiteness of the rice is highly valued, leading to a rejection of much more healthful unpolished rice. Also introduction of wheat in the form of dark bread leads to rejection, while white bread is accepted in these areas. Recognition of the cultural value of whiteness can lead to experimentation which may produce an acceptable type of rice which still contains the vital nutritional values. It is important to try to bring about changes that are in keeping with the established food habits of the people and which are acceptable within the framework of their value system. The aim of the nutritionist should be to set up a situation in which people will pleasantly and easily eat the right foods. Change probably can be more easily introduced in a meal which is not the focus of deep family sentiments than in one which is. In urban areas, lunch may be a more opportune time to introduce dietary improvement than dinner.

There is always danger that an expert will introduce changes largely on the basis of his own cultural experiences. This may lead to a failure to recognize the total patterning of the culture which is being modified (14).

Children's views of food

Food habits may be defined as those culturally standardized sets of behavior in regard to food which are manifested by individuals who have been reared within a given cultural tradition (26). The child's attitudes toward food may be formed early in his life and may influence him later. While family relationships may serve as a primary influence on a child's eating habits, also; the traditions, values and norms of his culture and subculture may affect him.

There are many methods and techniques to use in studying food habits, like: detailed summaries of food intake, group and individual behavior, group and individual meal patterns, questionnaires, and personal interviews.

In 1958, at the request of the Austin, Minnesota, school authorities, the Minnesota State Department of Health agreed to conduct a family extension survey of the health facilities, resources, and needs of that community's schools (25). So students in the public schools were asked to keep a record for three days of their eating habits and snacking patterns. The sample consisted of 481 boys and 558 girls; their ages ranged from ten to 22 years. About 57 per cent were from white collar homes, and only about 15 per cent could be classified as having a professional, semi-professional, or managerial parenthood. Analysis of the nutritional adequacy of these diets by the health department staff indicated that 44.6 per cent could be considered good; 31.77 per cent fair,

and 23.62 per cent poor.

With respect to snacks about 77.18 per cent could be classified as frequent snackers, 12.43 per cent as habitual snackers, and less than 3 per cent reportedly never snacked. On the whole, males tend to snack somewhat less than females. They preferred fruits, vegetables, candy, cookies, white milk, and carbonated beverages as snacks. There are no significant relationships between frequency of snacking and age or body build. But urban children prefer candy and carbonated beverages more than the people in the country. Children were classified in seven classes according to their father's occupation. Moreover, children whose father's occupation placed them in class I, III and IV preferred fruit and vegetables as a snack, while those in class II, V, VI and VII preferred candy. Over 88 per cent listed milk as a basic component of the meal. Potatoes, bread, meat, butter, and eggs followed by cereals, vegetables and fruits are mentioned by ten per cent. Carrots, corn, peas, beans, spinach, cabbage, lettuce, and celery were mentioned less frequently. In the case of meats, hamburger and steak seemed to be preferred; veal and lamb were not listed. The reason for the selection of such foods was primarily concluded in terms of general health, such as "It's good for you," or "It makes you strong". Adult beverages, such as coffee, tea and liquor, were usually listed in terms of family preference, i.e. "Dad or Mom likes it." It is important to evaluate the nutritional accuracy of the students' responses.

Although this fairly high reliance on health and nutritionally related reasons may seem educationally gratifying, it is not unexpected in view of the setting in which the test was administered. While over 60 per cent of these reasons were adjudged by a trained nutritionist to be nutritionally accurate, there also appeared to be considerable reliance

on erroneous or mis-information like "butter is good for bones and teeth," or "potatoes build good skin," and/or community or family rationalizations and folklore, like "spinach will make you strong like Pop Eye," and "fish provides brain food." There was considerable evidence that the consumption of these foods, green and yellow vegetables, beef, pork, poultry, seafoods, and salads, would draw praise because they were eaten despite being disliked. This was also true of hot dishes and adult beverages. On the other hand yellow vegetables were listed for health reasons like "they are good for the eyes," and "they are good for your digestion." Also the children were asked to list foods they thought would constitute a "good" or "poor" breakfast, noon meal, and evening meal.

Breakfast: Milk, toast, cereal and eggs tended to dominate both types of meals, although they were mentioned much less frequently in the poor one. As a part of good breakfasts, orange juice, cocoa, ham, eggs, bacon, orange, fruit juice, and buttered toast were mentioned.

Noon Meal: Spinach, coffee, water, liver, candy, eggs, tea, ice cream, sour milk, cheese, green beans, asparagus, cottage cheese, buttermilk, and dry toast were the components of the poor one.

Evening Meal: Beef, steak, peas, ice cream, mashed potatoes, chicken, vegetables, roast beef, french fries, carrots, pie, dessert, bread or rolls, and beans were mentioned more frequently as part of a good evening meal. The poorer meal appeared somewhat more likely to lack a salad, dessert, bread or milk (25).

The attitudes toward food of both children and adults influence to a large extent their food intake and their nutritional status. McCarthy (28) compares children's preferences for food to those of their parents. Others have studied the relationship of children's eating habits to

general child-rearing practices in the home and to the emotional characteristics of the children. Studies made by Lowenberg and by Neely indicated that children prefer crisp, raw vegetables to the softer cooked vegetable (10). Miller concluded that familiarity is a factor in the acceptance of vegetables. Also the method of preparation will affect the child's attitude towards food. A study was done at Iowa State University Nursery School in 1957 and 1958 to see the effect of methods of preparation on the choices and consumption of vegetables by pre-school children. The subjects for the study were 53 children with ages ranging from 32 to 64 months. The home backgrounds of these children were different in regard to eating experiences. Their previous experience with food undoubtedly would have influenced their behavior during this study. Each child was offered a choice of four methods of preparation of each vegetable. Four different choices were offered the children. As representative green vegetables, green beans and asparagus were selected, while rutabagas and carrots were chosen for the yellow vegetables. The green vegetables were prepared as buttered julienne, buttered grated, raw, and creamed. Each child was offered the choice between four preparations of one vegetable. The observations from this study indicate that the children preferred raw preparation. The au gratin preparations for green vegetables were preferred more than were creamed vegetables. There was great variation between individuals in the choices they made and in the consistency of their choice. So it is difficult to make any general statement to the effect that children like or dislike any one method of preparing vegetables (10).

Cultural and Behavioral Factors in Nutrition Education

The first experience of eating solid food will differ according to

the culture. The culture enters into the food experience, shaping, emphasizing, even choosing the significant factors for defining that experience. For instance if the child is a Tikopia, he will get premasticated food, warmed with the mother's body warmth, partly digested through her salivary juices, his mother will put it directly to his mouth with her lips. In the United States of America the child will get the food with a metal spoon, introduced into a mouth which has never experienced anything so solid or hard. Lee indicated that:

> Culture may present food mainly as a means for the stilling of hunger, or of getting nutrition, or as the way to psychosomatic health; it may regard eating as a duty or a virtue, or as gustatory pleasure, or as a social or a religious communication (23, p. 166).

The emphasis on the family meal may be so great as to overshadow other aspects. In Athens, during the last war, the population was starving and felt cold, so the Red Cross gave them hot soup in a hot room. However, many people asked to be given the food to take home, where they could eat it cold, in a cold room, as a family group. An instance of almost exclusive emphasis on the social aspect of the situation of food ingestion is found among the Arapesh of New Guinea, as described by Margaret Mead (29). Here food and feeding, in its entire process, from production or gathering to consumption, is regarded primarily as a medium for social warmth and intercourse; and this view of food affects the nutritional pattern, as it makes for gross inefficiency from our point of view in food production (23).

The ideal distribution of food, writes Margaret Mead, is for each person to eat food grown by another, eat game killed by another, eat pork from pigs that have been fed by people at a distance (30). Mead calculated that the Arapesh spends about one-third of his time in high energy-consuming travel, which is unnecessary. So the Arapesh are under-

nourished. In this society the exchange of food does not mean the introduction of variety but rather of social intercourse. Also there are societies where the customs of sharing special or excess food influenced diet in other ways: The way in which the individual reacts to food is influenced by the factor of culture. The feeling of satiety, and the taste of food, or if a person has an appetite for it, depends on the culture of the individual. The Ifugao of Luzon eat sweet potato without pleasure, but eating rice arouses their appetites. People in the Middle East cannot achieve satiety unless they have eaten bread with or without accompanying food. Also what people recognize as food depends on the culture. For instance Ifugao eat crickets and flying ants which they fry in lard. They eat red ants and water bugs and a variety of beetles. These foods are not recognized as food by countries which have a different culture. Also the culture dictates in what form one can consume food. Whether a person satisfies his appetite or not depends--beyond the economic factor--on the culture. Also, according to the culture one decides which part of the animal he is going to eat and according to the culture he has no choice. For example, among the Zulu of South Africa, when a sacrificial ox is killed, a year after the death of the head of the family, the entire kin group assembles, and each individual is given a prescribed part of the ox, according to age, sex, and relationship to the family. Need or personal preferences are not taken into account. A Greek regards bread as appetizing at all meals as well as at snacks, and in many countries where meals end in sweet desserts, many Greeks take a bite of bread at the very end. There are certain foods served for different occasions during the year. For example the food of Lent among Orthodox and Catholic Christians is limited to fish, dairy products, and vegetable foods; the lamb or the ham on Easter; the Christmas goose; the

Thanksgiving turkey; the Sunday dinner; the special Friday evening meal of the Orthodox Jews; the Bairam lamb preceded by the day-long fasts of Ramadan. All of these dietary choices are made for the individual by his culture. A culture factor of great importance is expressed in the symbolic aspect of food: to people throughout the Middle East, bread is the staff of life, having a significance which verges on the religious. In the Egyptian villages described by Ammar

> ...it is profane to put bread on the ground, all fallen crumbs must be picked up lest they be stepped upon, and any bread that falls on the ground must be kissed before it is removed from harm's way (2, p. 169).

Here a man heard with horror the tentative suggestion that one could have a meal without bread; and Ammar tells of two women who were divorced by their husbands, mainly for seldom providing them with fresh bread. Here, as in many areas of the Middle East, without bread a meal is impossible, because bread itself is the meal and all "food" is only an accompaniment, something to dip the bread in, or a relish. So any attempt to affect diet must deal with the cultural factors in dietary choice (23).

Behavioral factors in nutrition education

Success in the selection and use of educational techniques depends largely on the educator's ability to analyze the problem considering both the concerns, wants, and interests of the person. In making such an analysis, there is a tendency to think primarily in terms of the objective nature of the teaching situation, resources available, and the kind of information or content to be taught. For example, major attention may be devoted to the kind of diet, the types and amounts of food in the kind of diet, how much time is available, and what information materials are available. Even more important, however, is an analysis of the dynamics of the situation: what the person is concerned

about, what the diet means to him in terms of his concern, whether he believes the diet is important, and how he receives the diet as related to his past eating practices. Groups that may appear on the surface to be very similar in composition may also differ from a dynamic point of view. There may be wide variation in terms of the concerns, interests, or attitudes of the members or in the amount of information they bring to the group itself. The members in the group may also differ in their reasons for participating. Some may be eager to learn, others feel indifferent to the meeting and still others resent being put into the group situation. Two similar groups are seldom likely to have the same pattern of underlying concerns or the same general orientation to the problem of the meeting. So the technique used successfully in one situation may "fall flat" in an apparently similar situation if the technique used has not been selected or developed with full consideration of the interests, concerns, and attitudes of the group.

The "growing-edge" of the student

The technique or approach used in an educational situation must be selected in terms of the "growing-edge" of the student, where he now stands in knowledge, attitudes, and behavior relative to the specific problem at hand. Allport has observed that the target should always be the growing-edge of the student. It is true that at a given time no two students have precisely the same growing-edge. One has more knowledge than another, one has read the assigned textbook, another has not. The identical point made by a teacher may strike fire in one student and leave another cold (1). Success in selecting either content or method may depend wholly on the adequacy of whatever analysis one can make of the person's knowledge, attitudes, and behavior. It is important to know

the person's eating habits and try to fit the new diet into the practices that already exist. One educator recognizes that it is easier to get a mother to add a carrot to the daily potato soup than it is to get her to start making a new kind of vegetable soup. This means it is important to determine the growing-edge of the patient in terms of the information he already has and the points of similarity between his present diet and the one to be learned. Knowing this, it is possible to focus the information provided more specifically in terms of the change necessary. The patient will then have less new information to learn and will be able to fit the new information more meaningfully into his current eating practices. His eating habits will not be completely disrupted. Until the person recognizes the importance of the diet, no amount of information is likely to prove effective in motivating him to follow it voluntarily. The person has to know that there is a direct relationship between what he eats and getting well, before he is likely to adopt the new diet. People themselves are the most effective educators. Together they are more likely than is the teacher to find meaningful solutions to the problems they face. They excell in finding ways to translate scientific knowledge or concepts into action. Students are often able to communicate with fellow students far more effectively than the instructor. What one patient says may have personal meaning to another. Change in the way of acquiring and applying new approaches does not come easy. Although one tries very hard there is a tendency to fall back into old practices and overlook new principles that are fundamental to success. Learning to apply new approaches or techniques that help to maintain a closer relationship with the learner and that help better to understand his attitudes and feelings requires practice as well as knowledge. The techniques of education are likely to be most effective when they are oriented toward developing a

closer and more dynamic union between the educator and the person to be educated. For education to be effective, it must be a two-way process (22).

Learning by doing through teaching

One of the most effective methods of learning a simple or complex skill or behavior is through doing, with instruction from an able person. Establishing administrative and operational responsibility is, therefore, one of the first and important steps in conducting an upgrading program. The supervisor acting as an instructor or a teacher of other supervisors will expect to see acceptable results from the people taught. Achievement will be visible when: (a) the supervisor thoroughly understands all aspects of the work for which she is responsible; (b) she is able to communicate effectively with persons in her work situation; and (c) she can teach. The supervisor should feel confident that she can teach the people how to develop a skill or behavior by using the four-step procedure. These steps are: (a) prepare the learner for the lesson; (b) present the skill by demonstrating it; (c) ask the learner to perform the skill; and (d) follow-up the learner on his regular duties. Before the teaching of simple skills can be effective, there must be good communication and rapport between the teacher and the student.

There are many ways to teach an individual. One way--and the most difficult--is through knowledge itself. Another and more easily used motivating device deals with biologic or organic motives. These include hunger, thirst, and persistant noxious stimulation, such as unfavorable temperature conditions and primary likes and dislikes. A third way deals with social motives. One aspect is the gregarious nature of most persons which can be used in motivation. Prestige is another factor. Age and

sex differences affect motivation. Another factor in motivation is security. It deals with an individual's learning power as related to the desire for personal and national security. A last category deals with so-called autonomous activities, such as self-motivation, self-satisfaction, recreation, and ideals.

Some ways for teaching

(1) The buzz session: The use of the buzz session is a good technique for quickly getting individuals and small groups thinking as a part of a large group. In this technique the large group is divided into small groups of four or six people and each group is asked to record its specific response to a specific question and report before the whole group.

(2) Brainstorming: The following are five guide lines to use in brainstorming. (a) Judgment is ruled out; (b) any ideas may be presented; (c) quantity is wanted; (d) "hitch-thinking" is allowed; that is, if you can add to other's ideas, feel free to do so; (e) make each point specific.

(3) Group discussion: The leader must ordinarily do some preplanning and yet not make decisions for the group. He must be a motivator and summarizer. The use of specialists in conjunction with the group is common. The question-answer technique is easy to organize. Demonstrations may be performed. The field trip is always interesting for seeing specifics and/or seeing an action in progress (35). Also, the use of discussion-decision methods and the lecture method are very helpful. They are similar in all aspects except the method of group leadership. They are different with respect to the following variables: (a) Leaders relation to group: a nutritionist may assume a leadership role in both

of the two methods. In the discussion-decision method she supplied the specific technical information, and did so by opening problems for discussion. In this way she gave the students some of the responsibility for the direction of the discussion. Through discussions the group expressed their needs. (b) Group participation and involvement: Both of the two methods led to different results in terms of group participation. In the lecture, the leader kept the floor throughout the meeting, holding any discussion from the group to a minimum, without refusing a student's contribution when it was offered. But in the discussion-decision, the leader stimulated discussion early in the meeting. By this method the students were encouraged to contribute ideas and were led to feel that they had a responsible role in helping themselves and other students. (c) Goal-setting and decision-making: In the discussion-decision method there was a goal for personal action, but in the lecture, the students did not have a definite goal on which to act. It would have been quite possible to have asked for a decision following the lecture. In the lecture the pupils had no chance to express their motivation regarding the various alternatives to action. By participation in the discussion the group had already taken the first step away from passive listening to active doing (34).

Use of instructional aids

Working with the actual materials being described or discussed is far better than studying a description of them. If the real device is complicated, a mockup may be used to advantage. A flip-chart is helpful for quick and ready reference in presenting large prepared materials. Such charts can be easily moved from one location to another. The giant scratch pad, a variation of the flip-chart, may be used at any location

to describe a simple operation or list simple steps of a procedure. The use of the felt-tip pen is excellent for diagramming or listing information with a small group. Slides and films are effective for motivation and bringing information to the group. Other materials to be used are the flannel board, posters, and prepared charts. Schroeder concluded:

> Have faith in yourself. Your work is important. As you lead, teach, help, and work with others, you will continually have revealed to you the meaning of the words of the famous psychologist, William James, who said: 'Sow an action and you reap a habit, sow a habit and you reap a character, sow a character and you reap a destiny (35, p. 580).

An effective presentation demands three steps in preparation: (a) determine your object--what do you want your audience to do after the presentation is over; (b) outline the subject matter-list only the basic points necessary to accomplish the objective; and (c) visualize each point. About 82 per cent of our impressions are gained through sight, and visual aids make use of sight. One can increase the retention of the people for any subject by using the actual objects. Real objects affect all the five senses. If it is impossible or impractical to use the real object, then a model is used. Life-size models can be used when there is difficulty in keeping actual materials i.e., a piece of steak. Miniature models are practical when one is talking about objects too large to use in a meeting. Enlarged models are necessary when the real thing is too small for the audience to see the detail. The "active graphic" ranks high as an effective visual. The common chalkboard is still one of the more effective of the active graphics. Flannel boards have been widely used because they allow those without ability to draw or write well to use readily-made materials. With them, a background of flannel or similar napped material serves as a base for cutouts (9).

Motivation in health education

Motivation is a significant factor in all education, especially in health education. Here it means how to get people to do the things you want them to do for the sake of their health. To educate the public effectively it is not enough to present the facts correctly and clearly, but it must be changed by motivation. Dr. Galdston, the Executive-Secretary, Medical Information Bureau, The New York Academy of Medicine, said:

> Education always occurs in the individual as he is stimulated to develop his potentialities, and increase his understanding. It follows, therefore, that the best kind of teaching is that which approaches the individual in terms of his immediate situation and which, through an analysis of his problems and the provision of appropriate corrective measures, leads him to greater knowledge, broader understanding, more effective skills, and more rewarding attitudes. In addition to intimacy of association, it is essential that there be continuity of contact so that each educative experience is reinforced by those which follow them (16, p. 745).

Exogenous motivation is motivation by artifice, and its operations are seen most clearly in the practices of the huckster. The health educator may be more scrupulous than the huckster about the overall and ultimate good of what he has to sell, but his fundamental procedure is about the same. One of the outstanding characteristics of exogenously motivated health education is its tendency to push people around. It is frequently more righteous than informing. Upon a goodly portion of the population it has the effect summed up in the vulgar expression "I say it's spinach and to hell with it." The normal individual is both physically and psychologically a motile being. Any new force brought to bear upon him is confronted with the other forces already in operation, and the result may be other than anticipated and desired. The individual is seen to be subjected to complex and continuously varying patterns of inborn motivations. A health education rests upon the assumption that

people prize health, that they are eager to be healthy. So the health educator can talk to individuals in terms such as "to be healthy do so and so," or "if you want to remain healthy, don't do so and so," or "if you want to regain your health, follow such and such instruction." It is important to speak in terms of health, or to be more precise, sometimes in terms of health and more often in negative health terms i.e., of disease. It is true that without health the individual either fails to achieve his "fulfillment" or does it badly. There does not appear to be among the basic drives one that can be described as a drive to be healthy, but among our basic drives there are some which involve the expenditure of self and sacrifice of health. To achieve fulfillment, to be successful in the business of living, the individual needs to be healthy. It is important to know that the health educator's opportunities are not to teach health, but to teach the individual how to attain his immediate goals. Since to attain the goal of health is essential, then part of the lesson must deal with health. The goals of the individual always differ and change according to dynamic psychology.

Also, there are endogenous motivations which retard, impede, and deflect the individual's progression. One notice of this is people's resistance to change, in their clinging to superstitions and to old wives' beliefs and practices, and in their susceptibility to quackery. Health education, to be effective, must appreciate the negative as well as the positive endogenous motivations and must take account of them in its plans and activities (16).

Functions of Nutrients

Food energy

A person could die for lack of a particular food nutrient other than

energy with no feeling of hunger. In the human body, when the food is absorbed and becomes a part of the blood it is available for any purpose. The energy is replenished during the recovery period. The heat associated with muscular activity is a waste product. Heat is not a food nutrient. The common statement that the primary purpose of carbohydrates is to furnish calories is not wholly true. Heat from outside our bodies cannot replace the heat produced by the oxidative reactions in normal metabolism. All organic nutrients can serve the body as sources of energy. The main sources of energy are the carbohydrates, fats, and proteins. Carbohydrates--sugars and starches--are about 98 per cent digestible and therefore furnish energy equivalent to a little more than four calories per gram. One gram of dietary fat makes available to the body nine calories. The body does not oxidize protein completely but eliminates in the urine a residue of the protein molecule in the form of urea, creatinine, and uric acid. If the total carbohydrate, fat, and protein in the food are known, the total available calories contained in it can be estimated. Heat represents the energy available for the maintenance of body temperature. Some of the energy that is represented by this reaction may take the form of muscular activity. Heat must be supplied continuously to maintain body temperature, and heat must be eliminated to prevent a rise in it.

> Basal metabolism is defined as the energy expenditure of the body under specific conditions. It represents the energy needed to maintain body temperature and for all vital processes not under voluntary control, such as the heart beat and respiratory mechanisms (38, p. 44).

Basal metabolism is reduced by sleep to the extent of ten per cent or more. Basal metabolism requires that the subject be awake. The newborn infant has a low basal metabolism, but the rate increases rapidly within a few weeks to a level higher than at any other time. The basal

metabolic rate of women is about eight per cent lower than for men. The basal metabolism may be reduced 50 per cent in cases of severe and prolonged undernutrition. The basal metabolism is higher than normal in hyperthyrodism, fever, and in leukemia and other diseases. The human body eliminates its heat chiefly by radiation and conduction and by the evaporation of water from the skin and lungs. Children's energy requirements are relatively greater than those of adults because of their greater muscular activity, and a higher basal metabolism. Much more food is required to provide for normal energy metabolism than for all other purposes combined (38). There are many factors which affect the total energy requirement of the body. One of these factors is activity. Activity and the intake of food increase the total calorie requirement above the basal rate. Also the environmental temperature is another factor in heat production (6).

> The daily energy requirement of children one to six years old may be estimated as 37 to 30 calories per pound of body weight, respectively, boys 13 to 20 years old need 33 to 23 calories, respectively. Girls 13 to 20 years old need 27 to 20 calories (38, p. 50).

Protein

Protein should be considered first, after water, since it composes the greatest proportion of the body tissues. Protein foods are important as they serve not only to make the meal more appetizing but also to promote a high plane of nutritional well-being (6). It is important to get proteins from animal and plant sources. Ninety-five per cent of the hemoglobin molecule is protein. Defenders are other proteins in the blood which give a means of developing resistance and some immunity to disease. Proteins help in the exchange of nutrients between cells and the intercellular fluids and between tissues, blood and lymph. Proteins,

like carbohydrates and fats, can supply energy (38).

(1) Protein is essential in building tissue. (2) Since most adults eat more protein than is needed for repair processes and for the manufacture of vital body compounds and since the adult does not ordinarily store protein, the excess of this nutrient may function as a source of energy. (3) Protein has regulatory functions--it is important as a regulator of osmotic pressure and of water balance within the body (6). To study the needs of people and animals for protein, scientists commonly study the nitrogen balance.

> Nitrogen is easier to measure than protein. The amount of nitrogen, properly determined, is an accurate index of the amount of protein involved. Because the common proteins average sixteen per cent nitrogen, we can measure the amount of nitrogen in a food, multiply the amount by 6.25 and get the answer in grams of protein (38, p. 59).

The protein requirement depends on how fast the body is growing and how large it is. As the body grows faster it needs more protein. Also the larger the mass of living tissue, the more protein it must have for maintenance and repair. Protein cannot be used for growth until after the needs for maintenance have been met. A child grows faster during the first year than any time, but he grows fast also during adolescence. So his total need increases as he gets bigger, because there is more and more tissue to keep supplied and replenished with protein. The total daily protein needs increase from birth to adolescence and then decrease to a maintenance level of adulthood (38). The recommended daily allowance climbs from 32 grams of protein for children one to three years old to 55-60 grams for children ten to 12 years old. At the young ages, there is no difference in the recommendations made for boys and girls. Beginning with the age group from 12-to-15-years-old, boys and girls have different patterns of growth and therefore different dietary allowances

of protein. Girls mature physically earlier than boys do, and begin their rapid adolescent growth earlier. The recommended daily allowance therefore is highest for girls 13 to 15 years old (62 grams daily) and drops to 58 grams for girls 16 to 19 years old. Because boys 13 to 15 years old are bigger than girls of that age, 75 grams of protein daily is the amount recommended for them. Then from 16 to 19 years, when most boys are growing most rapidly, the allowance is increased to 85 grams daily. The recommended daily protein allowances for adults are 70 grams for the average man who weighs about 154 pounds, and 58 grams for the average woman who weighs 128 pounds. These amounts are equivalent to 1 gram of protein per kilogram of body weight, or .46 grams per pound, for both men and women. Women need more protein when they are expectant mothers. Their total intake at this time is raised to 78 grams daily. The mother's total protein allowance when she is nursing her baby is the highest of any time in her life. Her total daily recommended intake is 98 grams during this period (15).

Osteoporosis--A mineral deficiency disease?

Osteoporosis is defined as a condition of the skeleton in which the absolute amount of bone has been diminished, but in which the remaining bone is normal in chemical composition. Osteoporosis has been described in association with hyperadrenocorticism, hyperthyrodism, hyperparathyrodism, scurvy, various malignancies, and rheumatoid arthritis. It is more common in women than men in a ratio of about four to one. It is not seen before the age of 50. Bone which contains 99 per cent of the calcium in the body, can behave as a buffer for the maintenance of a constant level of calcium in the blood and circulating fluids. Calcium is lost from the circulating pool by way of the urine, in sweat, and in

intestinal secretions. Calcium enters the body to replace that lost from the pool, either by absorption from the diet or from reabsorption of the bone. Normally, calcium is being deposited into the bone by the process of bone formation at a rate sufficient to replace that lost by resorption. If the rate of bone formation decreased or if the rate of bone resorption is increased due to increased losses in the urine, stool or increased demands such as occur in pregnancy or lactation, the net result is decreased bone mass, or osteoporosis. In some individuals, osteoporosis is due to inadequate dietary intake relative to losses from the body. Some subjects are in negative calcium balance despite very high dietary intake, in these a relative defect in calcium absorption is postulated, correctable in some instances by the administration of vitamin D (24).

Calcium in urban family food supplies

Dairy products are the most important food source of calcium. The different dairy products contribute varying amounts of calcium to the diet. The most important products in terms of calcium per pound are cheese and dried or other processed milk. Income level and type of household both affect the calcium level of the food supplies. Effective food knowledge, both nutritional and economic, on the part of the homemaker may logically be presumed to be an important factor. Also food habits in relation to the use of dairy products are an important factor. The calcium in one quart of milk, roughly one gram, is available at widely varying cost in the different dairy products. Reports of milk drinking by family members both at home and away, showed that men drank milk more often than women and that more women than men at 50 years or older drank no milk (5).

Calcium is the most abundant element in the mammalian body. A

person weighing 70 kilograms contains about 1,700 grams of calcium. The small fraction circulating in the blood and permeating the soft tissues, however, is tremendously important in determining the state of health (36). The normal rhythm of the heart muscle and the excitability of the other muscles and nerves depend on their being constantly bathed with blood or lymph containing the physiologically normal amount of calcium. Also the regulation of the permeability of the membranes and the clotting of blood depend on a constant maintenance of this element (39). Calcium also activates certain enzymes, and is essential to lactation and maintenance of acid-base equilibrium. Vitamin C and D facilitate the utilization of calcium. Milk sugar increases lactic acid medium which is favorable to the absorption of calcium.

There are large numbers of factors which influence the individual's requirement for calcium. Consideration must be given to the basic maintenance requirements in adults, the special needs of growth during pregnancy and lactation.

> Recent findings show that only 15-35 per cent of the dietary calcium can be used by man. One hundred per cent of the element is not utilized even from foods such as milk, in which calcium is most available. For this reason, the National Research Council has suggested in its 1963 revised 'Recommended Daily Allowances' that the calcium requirements for all adults, regardless of size, weight, or activity, be not less than 800 milligrams per day. Children, adolescents, and pregnant and lactating women have increased need for calcium, and their minimum daily requirements should be at least 1.3 grams per day (18, p. 64).

The ratio of calcium to phosphorous in the diet is an important factor in calcium availability. The calcium-phosphorous ratio should be between 1:1 to 2:1, since at this range the vitamin D requirement is at a minimum. Thus adequate calcium and phosphorous nutrition in normal people is dependent on three factors: a supply of both elements, a suitable ratio between them, and the presence of vitamin D. An upset of the

calcium-phosphorous-vitamin D balance results eventually in one of several forms of rickets. When calcium is low and phosphorous is normal, tetany results, and bone growth stops. A deficiency of phosphorous, with calcium normal, leads to overgrowth of the osteoid tissue at the ends of the long bones and rib junctures. If calcification is retarded, the bones fail to acquire normal rigidity, and the ends tend to enlarge. When both calcium and phosphorous are reduced, bone growth also ceases and osteomalacia results. Rickets will occur even in the presence of sufficient calcium and phosphorous if vitamin D is not present in adequate amounts. It is important to know that too much vitamin D taken constantly tends to reduce the calcium and phosphorous content of the body by increasing the amount excreted. Massive doses of vitamin D may produce hypervitaminosis, but fortunately, the range between the body requirements and a harmful dose is rather wide, so there is little danger under ordinary circumstances (18).

The part played by the sun in producing vitamin D is very interesting. Certain wave lengths of the spectrum coming in contact with 7-dehydrocholesterol in the skin and in animal foods change it into vitamin D. Pigmentation is a factor in the absorption of ultraviolent rays. The more the pigment the less the amount of vitamin D produced in the body by irradiation. Vitamin D is a factor in both linear and lateral growth, as well as in dentition. In no way, however, may it take the place of calcium and phosphorous in the diet. If vitamin D is present, blood serum secures its normal supply of calcium and phosphorous. The deposition of calcium and phosphorous in the bone matrix is carried on efficiently, and the teeth are well calcified. The beneficial effect of vitamin D on the formation of the teeth may be expected only when the intake of calcium and phosphorous are satisfactory. Deficiency of either

or both calcium and phosphorous in the blood will lead to rickets. Rickets is often associated with rapid growth of muscle tissue.

> Tetany accompanies the low calcium type, which may be associated with parathyroid disturbance. Osteomalacia, a rickets-like disorder common among women in the Orient, is related to their inadequate diet, lack of direct sunshine and frequency to reproduction. Vitamin D is used in its treatment (6, p. 225).

Vitamin D increases the volume and the acidity of gastric secretion. Also growth of soft tissue is accelerated by vitamin D. The Food and Nutrition Board recommends a daily intake of 400 I.U. of vitamin D throughout the growth period. The premature infant is sometimes given a larger daily supply because he is growing fast and his utilization of fat is poor. The Food and Nutrition Board states that 250 units of a water-miscible preparation should be sufficient for the day but suggests that 400 units may well be given to make allowance for individual handicaps. Four hundred I.U. are recommended daily throughout the reproductive period (38). The small, malformed pelvic arch resulting from childhood rickets may so exaggerate the danger of delivery to both mother and infant that a Caesarian operation is advised. Early symptoms of hypervitaminosis D include anorexia, nausea, pallor and lassitude (6).

Urinary excretion of phosphrous is less in children and animals when vitamin D is included in the diet. The levels of blood calcium and phosphorous fall in children deprived of the vitamin. Too much vitamin D can be harmful. Toxic effects result in children on 40,000 or more units a day and in adults on 100,000 or more units a day. Overdosing with concentrates of the vitamin results in loss of appetite, vomiting, diarrhea, and drowsiness (13).

Rickets is defined in medical dictionaries as:

> A constitutional disease of infancy, characterized by impaired nutrition and changes in the bones, the symptoms being a diffuse soreness of the body, slight fever, and profuse sweating about the head and neck, and changes in the osseous system, consisting in a thickening of the epiphyseal cartilages and periosteum and softening of the bones (11, p. 172).

Rickets decreases the absorption into the blood of phosphorous from the digestive tract, and vitamin D increases such absorption. Nicolaysen and associates state that vitamin D affects the absorption of calcium, but not that of phosphorous. Also rickets increases the enzyme phosphatase in the blood. Morris and Peden discussed the cause of the increase of blood phosphatase in rickets. They said that this indicates the presence of a surplus of unused phosphatase in the bone cells (11). McBeath and Zucker showed that vitamin D is a factor in the prevention of dental caries as well as the fighting of infection in the body, but now there is little to support this view (27). Blackberg and Knapp found vitamin D dosage beneficial in treating the distention of the cornea of the eye known as keratoconus (11).

Vitamin C

Vitamin C is the same chemical compound whether it is isolated from foods or is synthesized and sold as pills or capsules. The normal newborn infant has stores of ascorbic acid adequate to prevent development of scurvy for about five months. The breast-fed baby gets enough for protection until he begins to eat a variety of foods. Deficiency is rare in children more than 15 months old. Infant scurvy will develop in three months or more after breast feeding is stopped if no food rich in vitamin C is given.

The symtoms are found in growing bones as follow:

> Areas at the end of the bone shafts are especially affected. The soft tissue about the joints swells and is tender. The difficulty tends to be more severe in the legs than in the arms. Walking and sitting become painful, and the child lies on his back to avoid the pain involved in moving his legs. The front ends of the ribs are sore. Breathing may be difficult. The ribs may be beaded. The child cries when handled or even approached, because he expects pain. If there are teeth, the gums may bleed (9, p. 152).

Dr. Michel Pijoan believed that the ability to maintain a fixed level of vitamin C in the plasma prevents scurvy. He maintained himself for 20 months on an average intake of 16 milligrams of vitamin C daily. His plasma levels during that time were 0.0 to 0.2 milligram per 100 milliliters. At the end of the 20 months wound healing was found to be normal. Low levels of vitamin C in plasma, 0.2 milligram per 100 milliliters or less, show a need for increasing the intake of vitamin C. The connection between vitamin C and infection probably is the reason that nutritionists recommended liberal intakes. A deficiency of vitamin C carries with it liability to infections.

Recommended daily allowances to maintain good health and nutrition are based on age, size, and sex, as the adult man may need a little more than a woman (9).

Recommendations given in the Recommended Dietary Allowances (revised in 1963) are: For infants 30 milligrams a day; for children from 1 to 9 years, start at 40 and increase to 60 milligrams; for males 10 to 20 years old, increase gradually from 60 to 80 milligrams; for fully grown men, 70 milligrams; for the adolescent girl 10 to 20 years old, the decrease is from 80 to 70 milligrams; for fully grown women, 70 milligrams. In the second half of pregnancy, and in lactation 100 milligrams are recommended for women (15).

The supporting or intercellular tissues of cartilage, dentin, and bone martix, and the collagen of fibrous tissues and non-epithelial

cement substances play an important part in the structure and functioning of bones and teeth, capillaries, muscles, and grandular organs. A lack of vitamin C causes abnormalities in these tissues, like hemorrhage, soft swollen gums, malformed and weak bones, anemia, teeth with reabsorbed porotic dentine, and degeneration of muscle fibers, including those of the heart. During a deficiency of ascorbic acid, wound healing is retarded and defective. It has been found that collagen synthesis is poor at this time. In the presence of vitamin C the proline of connective tissue is converted into hydroxyproline and the synthesis of collagen takes place normally (6).

Vitamin A

The relationship of the carotinoids of plants to vitamin A was shown by Steenbock in 1919 (8). Of the plant precursors B-carotene is the most important, because it produces two molecules of vitamin A while α and γ carotenes yield only one molecule. Many organs and tissues of the body can change carotene into vitamin A. Its presence favors normal growth and development. It is a well-known fact that vitamin A is stored during fetal, as well as throughout postnatal, life and is dependent upon the intake of this factor by the organism. The site of storage is the liver, and it must be in free form to be utilized.

The first trimester of pregnancy in the human being is considered the critical period, and lack of vitamin A during this time may cause miscarriage. Vitamin A is essential for the normality of epithelial tissues. These cells form the outer layer of the skin and the mucous membranes that line the mouth and the digestive, respiratory, and genitourinary tracts. A lack of vitamin A will lead to changes in these cells, they became stratified and keratinized, and the cilia normally

present in the tracts are lost. These abnormalities are apt to result in disease, lowered resistance, and failure to reproduce (6).

Vitamin A is necessary for vision. The retina of the eye contains a pigment, visual purple, which is composed of vitamin A and protein. Also, this vitamin influences the development of the teeth. If the child gets too little vitamin A during the development of the teeth, the enamel-forming cells become abnormal and lose their effectiveness in forming enamel prisms. Also, bones and the nervous system may be slowed if vitamin A is lacking during the period of rapid growth. Overdosing with vitamin A may cause serious injury to health. Self-administration of highly potent concentrates is likely to result in hypervitaminosis A (13).

Minimal requirements are set at 20 I.U. of vitamin A per kilogram of body weight, or 40 I.U. of carotene. The allowance set by the Food and Nutrition Board, for the "Reference Man and Woman" is 5,000 I.U. daily, of which 4,000 units come from carotene. During pregnancy and lactation, the need for vitamin A is increased. Six thousand I.U. of vitamin A during the latter half of pregnancy and 8,000 I.U. daily during lactation are recommended by the Food and Nutrition Board. The daily allowance as recommended by the Food and Nutrition Board begins at 1,500 I.U. daily for the infant and increases to 4,500 I.U. for the ten-to-12-year old. Five thousand units are recommended for older children (15).

Good sources for vitamin A are yellow and green leafy vegetables, such as turnip greens, kale, carrots, squash, peaches, apricots, cantaloup, and sweet potatoes. Liver of all animals is an excellent source. Whole milk, cheese, butter, margarine enriched with vitamin A, eggs, and kidney are good sources (6).

Water

The longer an individual goes without water, the greater the number and severity of symptoms he shows. Weakness, lassitude, thirst, and dryness of the mouth are the first signs of dehydration. Loss of weight and mental confusion set in later. The importance of water as a foodstuff was well stated years ago by Rubner when he showed that

> ...an animal in starvation can still live if he loses practically all of the glycogen and fat, and half of the protein from his body, whereas a 10 per cent loss of water is very serious, and a 20 to 22 per cent decrease will result in death. The need of the body for water is exceeded only by that for oxygen (6, p. 327).

If dehydration occurs in a very warm place, the person may develop heat cramps, heat exhaustion, or heat stroke before the preceding cycle has run its course. The body loses water in various ways. The kidney is the first way. When the intake of water ceases, the urine volume decreases, but there is a lower limit of approximately one-third of a quart below which the volume in an adult cannot be reduced. Also, water is lost through skin. Diarrhea may increase the water loss to an extent that dehydration develops. A number of hormones are involved in the regulation of water metabolism. One of them is vasopressin, which is produced by the posterior pituitary gland. Another group of hormones produced by the adrenal cortex, influences water in the body through their action on sodium and potassium metabolism. It is well to remember that it is more important to have an adequate intake of water than it is to have enough calories (33).

Functions of water

(1) Water is a carrier of nutrients and waste. (2) Water regulates the body temperature. (3) It serves as a cushion and prevents the transmission of shock from the outside.

The Food and Nutrition Board states that a 70 kilogram man on a 3,200 calorie diet requires from 2,300 to 3,100 milliliters of water daily (15). The greater needs per unit of weight during growth are to be expected since the child has a higher metabolic rate, proportionately greater surface area, and extra needs for tissue building. Age, activity, and environmental conditions are the most important variables in determining the body's needs for water. This is due to a lack of realization of the importance of this foodstuff, and secondly to custom. Under certain conditions the amount of water consumed needs special consideration. In fever, strenuous exercise, and at high environmental temperatures the craving for water automatically takes care of the extra need. Replacement of depleted liquid is important after a hemorrhage and in extensive surface burns. If older persons complain that they do not like water, then fruit juice and soft drinks may be taken. When the weather is very hot or when strenuous activity causes excess perspiration, not only water but also salt is lost from the body. Thirst governs the actual amount to drink (6).

CHAPTER III

METHOD OF PROCEDURE

Development of a Daily Food Plan for Low Income People in Egypt

In developing this plan the most common foods in Egypt were selected. These foods are of low cost and high nutritive value. Then these foods were divided into groups according to their value from the standpoint of proteins, vitamins A and C, and niacin, iron and calcium.

Combinations of foods that were adequate in niacin required the most consideration. Tryptophan equivalents of niacin were calculated because 60 grams of tryptophan can be turned into 1 milligram of niacin in the human body. Also, consideration was given to the amounts of calcium and iron. These two nutrients can be obtained by including curd, molasses and dates in the daily food supply.

To determine the variety and quantity of foods, all easily available foods in Egypt were calculated to determine their nutrient content per average serving (7).

Four food groups rich in the following nutrients were evaluated together:

1. Protein, calcium, and iron.
2. Vitamin A rich foods.
3. Vitamin C rich foods.
4. Energy foods.

Those foods which contained as much as two-thirds of the Recommended

Dietary Allowance--1964 in one serving, were ranked as excellent sources, while those which contained one-half the day's allowance were considered good sources. The recommended daily food intake was calculated for each group separately to be sure that the variety and amounts listed in the four groups were adequate in all nutrients needed.

Instructions for use of the four food groups included definite quantities of food for various age groups from each food group per day. After these quantities of food were eaten, additional foods such as sugar, fats, candy and bread were permitted to supply each individual with the calories he needed.

The foods in these four groups are:

1. Protein, calcium and iron-rich foods--curd, lentils, and eggs.
2. Vitamin A-rich foods--carrots, sweet potatoes, and spinach.
3. Vitamin C-rich foods--orange, sweet potato, green pepper, guava, and blackberries.
4. Energy foods--oatmeal, banana, date, and bread.

In using this plan, select the main part of the diet from the four food groups. Then, to these four groups one may add other foods as more calories and energy are needed. These foods included oils, sugar, molasses, candy, bread, dates, and bananas. Also, it is necessary to know that the size of serving may differ--small for young children, extra large (or seconds) for very active adults or teenagers. Pregnant and nursing women require more foods from these groups. So, according to this food plan, the author formulated some diets to feed to rats to observe the effect of these food combinations on the well being of the animals. The diets were as follows:

Diet I

Protein deficiency demonstration

Ingredients	Percentage
Refined wheat and corn flour	92 parts
Cottonseed oil	3 parts
Sodium chloride	1 part
Calcium carbonate	2 parts
Yeast	2 parts
Cod liver oil	40 drops/1000 grams diet

This diet has the necessary carbohydrate, fat, minerals and vitamins but is lacking in adequate protein.

Diet II

Mineral deficient diet (calcium, phosphorous, iron, and iodine)

Ingredients	Percentage
Casein	15 parts
Cottonseed oil	4 parts
Corn flour	74 parts
Agar Agar	6 parts
Yeast	1 part
Cod liver oil	40 drops/1000 grams diet

Diet III

Adequate diet for Egyptian farm families

Ingredients	Amounts given
*Oatmeal, whole wheat and corn flour	15 grams/day
Lentils	15 grams/day
Curd (whole milk 2% fat)	15 grams/day

*To these ingredients molasses, yeast and salt were added to make an Egyptian bread.

Ingredients	Amounts given
Sweet potato, green pepper, or orange	2 grams/day
Carrots, or spinach, or green pepper	2 grams/day
Dates or bananas	5 grams/day

The last diet was used in feeding two animals. In this experiment weanling albino rats were used to study the growth of the animals fed an Egyptian diet. The rats were born on January 19, 1966, and the experiments were started February 14, 1966, and were continued for five weeks.

Preparation of the diet:

Egyptian Bread

Ingredients	Amounts
Enriched wheat flour	300 grams
Enriched corn meal flour	200 grams
Enriched oatmeal	100 grams
Salt	3 grams
Yeast cake	2 grams

*To these ingredients Fenugreek is added, but it is not available in the United States.

Mix all the ingredients well. Let the dough stand about ten minutes to raise. Shape bread like a cake and bake for ten minutes.

Milk

One package of dried whole milk (2% fat) dissolved in one quart of hot water, add a starter, then leave for one day to permit the milk to form a curd.

Lentils

Three cups of lentils and a small amount of salt. Cooked in seven

cups of water for 35 minutes.

Marking the animals

To differentiate the rats from each other one may paint various parts of the rat with a vegetable dye, or clip notches in their ears with scissors. Also, it is important to keep the rats in a place that is well-ventilated. The room should be warm (between 60° to 80° F), light and clean.

In the beginning of the experiment, rats Number I and II weighed 58.2 and 55.5 grams respectively. The rats were fed a weighed diet every morning. The first day they were fed 25 grams which was increased to 30, then to 54 grams. Over the weekend the amount of food was doubled. So the animals were fed early on Monday morning. At all times the rats were fed ad libitum and were given all the distilled water they wanted.

Methods of Teaching Nutrition

In teaching nutrition it is wise not to tell the people what they should do. But teach in such a way that individuals decide to improve their food practices because they recognize the advantages of changing. Efforts to change food habits of people should be accompanied by certain precautions. It is also important to remember that food habits are complex. Not all people can be motivated to improve their nutritional status by appealing to the same interests. Because the interests of boys and men may be different from those of girls and women, it is desirable to appeal to each group in different ways. For example, the knowledge that food can help to build big, strong bodies, if genetic factors are favorable, may motivate a group of boys to eat enough of the important foods. But as a group, girls are not anxious to have large bodies.

Unless one points out that good health contributes to beauty of skin, hair, nails and so forth, the girls probably will not be interested in changing their food practices. Here the author suggests some useful methods in teaching nutrition for the Egyptian people.

(1) Animal feeding experiments.

In this project, students not only learn about nutrition, but they also learn to take responsibility and to work together. Animal feeding experiments can show living evidence that foods work together to promote growth and health. For a majority of students, seeing is believing. It may be possible to work with the science teacher to set up relatively simple feeding experiments with weanling age rats to show supplementary relations between two basic foods. Feeding experiments can be arranged in a series which increases in complexity as the interests and abilities of adults and children permit. A rat feeding experiment may be used to show the need for certain foods that are missing in the diets of the students. Students like projects in which they can participate. When they plan the diets, feed and care for the animals, and keep records of their growth, the results are remembered longer.

To call attention to the characteristics of each rat, the teacher might ask such questions as:

1. Which rat has gained the most?
2. Which rat has the nicest fur?
3. Which rat has the brightest eyes?
4. Which rat is best looking now?
5. Which rat is least irritable?
6. Which rat seems to be the healthiest?
7. Which kind of posture does each rat have? (A healthy rat keeps its body close to the floor when walking; a sick one may be hunched or stiff).
8. What made one rat healthier than the others?
9. What foods should be eaten every day? (12, p. 188).

Reports of animal experiments are a means of reaching parents with nutrition education. Adults and parents may be invited to school to

hear the students tell about their experiments. Another way to reach parents and other adults would be to exhibit animals from an experiment, or pictures of them, in a local store window with the sign "Food Made the Difference." The author thinks that rat-feeding experiments may be useful in teaching students of various ages. It is important that students understand the purpose of the rat-feeding experiment. It stimulates interest to have each rat named. The progress of each animal can be recorded on a large wall chart on which age, sex, diet, and starting weight should be indicated. Encourage students to think of signs for good or poor nutrition and list them. It may be desirable to feed the healthiest rat the poor diet, so pupils can recognize the need for a continued good diet. Also, the poorly nourished rats should be fed the diet of the well-nourished animals so students can see that foods make a difference. When the rat experiment is completed, it is unwise to give the animals to the children to take home.

2. Food Preparation in Schools.

Preparation of food is a method of teaching which may help the students to change their attitudes about some foods, and it also provides opportunities to apply generalizations about nutrition. For instance one can increase the acceptance of vegetables, fruits, lentils, curd, eggs, and milk dishes by letting the students prepare and eat them. One can prepare new foods, let the students taste each, and then express freely their reactions to each food. Also, the teacher can show ways to modify flavor or texture so that the food is acceptable. If this approach is made, each individual can feel that he is making an independent choice rather than following rules made by an authority. When a food is prepared, its role in a well-balanced diet should be presented in a manner that the age group will understand.

3. Planning Menues for the School Lunch.

Planning menus for the school lunch can be used as a means of changing attitudes of students toward foods. When food preferences are different, students must learn how to make a group decision. Group pressures may be great enough to result in acceptance of foods by all class members if, at the beginning of the project, everyone agrees to support the decision of the majority. In addition to considering differences in food preferences, the person who plans the school lunch menu is faced with the problem of providing at least one-third of the necessary nutrients for a day within limitations of money, time, and equipment. If this project includes checking plate waste by older students, they may become more aware of dangers to themselves in disliking foods important for good nutrition. As students plan menus, they learn how to apply the facts and principles of nutrition. Also, facts have more meaning as they are used.

4. Making and Using Posters.

Making nutrition posters for the school lunch room may be an excellent way of teaching nutrition. In the process of selecting ideas for posters, students can be encouraged to study nutrition and to formulate generalizations that can be understood by all of the people they wish to reach. A living poster may be more interesting than a traditional one. It can be seen by everyone in an auditorium when many graphic materials cannot. A living poster takes more imagination than time.

5. Teaching through Radio and Television.

Television and radio programs may be sources of case studies that are interesting to people. When programs are given by a competent staff, the information is likely to be both reliable and up-to-date. For this reason, one may find that the effort needed to locate and listen to educational broadcasts is well spent because he will gain knowledge himself,

or he may be able to arrange for members of a group to get first-hand information that is not available elsewhere. Advertisements on radio and television influence the food practices of people. When students have opportunities to give a radio or television program, they are likely to be strongly motivated to learn what is needed to do a good job. Students will probably be interested in making careful preparation when they know that they will reach a large audience and will not have the opportunity to correct mistakes or to make additional explanations of ideas that are not clear.

6. Field Trips.

Field trips may be arranged to increase the understanding and knowledge related to processing and distributing food. In field trips unpleasant experiences should be avoided. The group should know in advance what to look for during the trip. It is well to keep groups small enough so that questions and explanations can be understood en route. Field trips planned in advance, may create much interest and help the person gain knowledge and understanding which can be obtained in no other way. Following the field trip, it is profitable to have a discussion of what has been seen and to point out principles and generalizations which are related to the experiences of the field trip.

7. Using Films and Slides in Teaching Nutrition.

Films and slides can be valuable aids in teaching nutrition. Films used for education should be informative. People may not understand the point even when they are interested in the film. Only when their observation is directed, one can be sure that they will remember the ideas for which the film was shown. In school, the teacher should guide his particular class to an understanding of the film. He may ask questions to focus attention on the aspects of the situation the student should

observe, and thus he will simplify the film for them. Moreover, by emphasizing some aspects of a film and ignoring others, he can use the same film for different sequences of learning. Films and slides about diseases such as kwashiorkor, pellagra, and rickets may be shown. In addition to these, films and slides about good nutrition and health should be included.

Listed here are some films which aid in nutrition education and their sources:

1. Babies like to eat (16 mm. Color. 11 minutes)

Excellent illustrations are given of how and when to introduce new foods to the baby. Emphasis is placed on the individuality of babies and the fact that babies like to eat.

There is need for patience when helping the baby learn to drink from a cup or accept strange new foods, and understanding when the baby goes on food jags. Avoid making the baby the center of attraction.

Inclusion of the same variety of food for the baby that the family is eating, prepared so the baby can handle it, is advocated.

Source: Social Science Films
2395 Hampton Street
St. Louis, Missouri

2. Hungry Angels (16 mm. Color. 20 minutes)

Guatemalan children (3), born the same day, show the dramatic fight for life when malnutrition (Kwashiokor) results from ignorance and superstition. Produced by INCAP.

Source: Association Films, Inc.
347 Madison Avenue
New York City, New York

3. It's all in knowing how (16 mm. Color. 13 minutes)

Especially recommended for use with adolescent boys and girls. Demonstrates how inadequate food intakes influence energy and personality.

Emphasis is placed on the use of protective foods as sources of vitamins A, B-complex, and C; and protein, calcium, and iron.

Source: National Dairy Council
111 North Canal Street
Chicago 6, Illinois

4. More life in living (16 mm. Black and white. 11 minutes)

Shows the effects of good and poor diets on general health, weight, and personality. Relationship between health and ability to participate in active sports is emphasized.

Source: National Dairy Council
111 North Canal Street
Chicago 6, Illinois

5. Food through the ages (Film strip. 82 frames. Color. 33 1/3 r.p.m. transcription)

A history of food preparation and processing; suitable for use in the elementary grades, but interesting to adults.

Source: Manufacturing Chemist's Assoc., Inc.
1825 Connecticut Avenue, N.W.
Washington 9, D. C.

8. Demonstration of plants grown in good and poor soil.

This project can be carried out in school through the science teacher. The students may be divided into two groups, one will grow plants in a good soil and have good seeds and good fertilizer. The other group will grow the same plants in a poor soil, using the same kind of seeds. The teacher can emphasize the importance of good nutrition for people to keep healthy as compared with the plants. Also, this project may be carried out through the planting of home gardens.

CHAPTER IV

RESULTS

In Egypt it is important for the people to remain in a good state of health. So in order to do this, people must know how to select foods of high nutritive value and the proper amounts per day. With this in mind, the author formulated a "Daily Food Plan for Low Income People in Egypt." All the nutrients required by man were met by this plan. In developing this Daily Food Plan, economic factors, food habits, foods commonly available, and the amount of work done were taken into consideration.

It is impossible to pass a law because each individual has the freedom to choose his own food and it is very difficult to change their food habits. So, the author plans to use the following concepts and generalizations in teaching nutrition to the farm people.

Objectives for Teaching Nutrition to Farm People in Egypt:

1. Convince village people that they should change their food habits
    a. For improved health
    b. For prevention of dietary deficiency diseases
        1. Pellagra
        2. Rickets
        3. Ostcomalacia
        4. Others
    c. To build resistance to infection
        1. Tuberculosis

d. For maximum enjoyment of life at all ages

e. To extend the length of life

f. To insure well being of infants and young children

1. To identify variety and quantity of food for health of mothers during reproduction and lactation

II. Convince leaders in the government of Egypt that the village farm people need assistance to improve the productivity of the land and to increase the variety, quality, and quantity of food.

a. Grant agricultural organizations in the villages funds to provide fertilizer, good seed, and instruction in farm practices.

1. Persuade the agricultural workers in the villages that a variety of food of good quality is necessary for the well-being of all people.

2. Convince the agricultural worker that adequate amounts and a good variety of food will permit farmers and their families to be more efficient in their work.

3. Obtain assistance in how to care for farm animals such as cows, sheep, chickens, ducks, rabbits, and water buffalo to increase their quality and productivity.

b. Obtain participation of various organized groups in village communities so that they realize the need for cooperation to improve the nutriture of village people.

1. Work through child and mother care centers to share nutrition information and to gain understanding of what is being done to improve nutritional well-being.

2. Work through the schools to give information on varieties and quantities of food needed by village families.

a. Encourage school feeding and improvement of present

school feeding programs.

3. Work through parents' organizations in the school to demonstrate the need for milling grains so that whole grain flours are available for use in making breads.
4. Develop recipes for whole grain breads and other dishes which are needed to improve the food intake of village people.

Key Concepts in Relation to Teaching Nutrition to Farm People in Egypt

I. Significance of food

Security

Health

Religion

Superstition

Cost

Comfort or satisfaction

Prestige

II. Nature of food

Nourishment for life

Natural food

Treatment by heat

Temperature

Purity

Appearance

Flavor

Texture

Geographic factors

Preservation of food

III. Provision of food

Production

Available land

Fertilizer

Seed

Labor

Consumption

Selling food products

Price

Availability

Seasons

Productive measures

Pollution

Dilution

Sanitation

Governmental regulations

Labeling

Preservation

Generalizations Related to Key Concepts for Teaching Nutrition to Farm People in Egypt

1. Significance of food

A. Security

1. When a person is extremely hungry he is likely to be restless, quarrelsome and lacking in self-confidence and judgment.

2. When hunger is prolonged it makes people lose their sense of right and wrong, consideration for others, ability to get along with people, and their ambition.
3. Hungry human beings think of little else than food or subjects closely related to it.
4. Good nutrition is an important measure in helping to prevent antisocial behavior.

B. Health

1. The variety and quantity of food eaten daily is one of the most important factors affecting how people feel, look, and work.
2. Food eaten at three or more regular meal times, spread about the same number of hours apart, promotes better health than one or two meals spread many hours apart.
3. When a wide variety of wholesome foods are eaten daily they contribute to building of firm muscles and steady nerves.
4. When one does hard physical work he needs more sweet and starchy foods such as dates, bananas, sweet potatoes, molasses, bread and foods rich in fat such as butter and cottonseed oil.
5. Food needs of individuals vary with age, sex, activity, climate, and state of health.
   a. During infancy and childhood the need for foods which build muscles and bones is high because the body of the child increases at this time.
      (1) Lentils and curd contain materials which are needed to build bones, teeth, and muscles.

b. During pregnancy, especially the latter part, and lactation, there is an increased need for a variety of good foods.

c. Food needs of young children and boys and girls 12 to 18 years old are greater than for adults in relation to muscle and bone building materials (curd, lentils, ground nuts).

d. Growing boys need more food than growing girls due to their greater activity, muscle mass, and usually larger size.

e. Older men and women continue to need a variety of wholesome foods, but the quantity may be decreased.

f. An extremely warm climate is likely to decrease the body's need for food because of lessened physical activity and a slowing down of body functions.

g. An extremely cold climate, or lack of protection from cold, increases the body's need for food energy.

C. Religion

1. Many of the great religions of the world forbid the use of certain foods.

a. The Islamic religion prohibits its followers to eat pork or foods containing fat from pork.

b. During Ramadan Moslem people do not eat from sunrise to sunset.

(1) When food is taken the meal is begun by eating dates or some kind of soup.

(2) Meats, and various forms of lentils and nuts, are always included in the food eaten.

2. Feast days and fast days are observed by followers of many different religions.

D. Customs

1. The state of health of the individual depends largely upon the selection of food and the ability of the body to use materials in the food eaten.
2. Education and training in the wise selection of food for health are important since humans are not known to inherit impulses to select the food they need.
3. When people refuse to eat many foods or, for some reason, cannot have a variety of foods, they are likely to fail to obtain some of the materials needed for health.
4. Many combinations of food or patterns of eating may result in a good diet.
5. Food guides may be helpful in food selection but they should be flexible.
6. In festivals all the farmers eat any kind of meat, vegetables and rice, or macaroni.
7. In wedding parties a certain main dish is served which consists of meat, rice and tomatoes and a dessert is used which is made of milk, rice, and sugar.
8. On a festival day called Sham El Niseem, the Egyptian people eat colored eggs, lettuce, onion, and salted fish.
9. On the feast day called El Eid Saghir, Egyptian people eat cakes, biscuits, and some kinds of candy. These foods are offered as the people visit each other and are served as a symbol of hospitality and friendliness.

10. At harvest time farmers gather together to celebrate by dancing and eating meat and vegetables.

E. Superstitutions

1. In Egypt green onions are put under the pillow to ward off evil on Sham El Niseem day.
2. Egyptian farm people believe one should not eat fish and drink milk at the same time--that it will make one mad.
3. Burned peanuts, when eaten, will cause the hair to be black and very long.
4. If pieces of bread fall on the ground, one has to pick it up and kiss it, or he will not find anything to eat afterwards.
5. No one food serves a special purpose, such as fish serving as a brain food.
6. There is no reason to believe any combination of sanitary foods is harmful or poisonous, or that certain foods, when used together, have some unusual reaction in the body.
7. Excess of vitamins above those needed for the use and stores of the body will not be likely to yield special benefits in the form of extra vim and vigor.
8. No foods or diets now known can produce any spectacular benefits for arthritis, rheumatism, or cancer.
9. Acid fruits and vegetables do not produce an acid condition of the blood or of the body.
10. Special diets, advertised to meet specific conditions, often are seriously deficient in some materials needed by the body and would be harmful if used over a period of time.

F. Cost of foods

1. Increase in demand for certain food items may result in increased cost.

2. Poor nutrition is likely to be common in periods of rising food cost or loss of income, unless people see the need for using money for food even if they must do without many other comforts and pleasures.
3. Through home food production food costs may be substantially reduced.
4. A knowledge of food values necessary for good health makes it possible for many people with low incomes to have food which will keep them well and happy.
5. Wise production and use of food for the family members should be considered before taking foods to market to sell.
   a. Meat, eggs, fish and poultry are expensive, and after the need for them is supplied, money may be saved by using bread, bananas, dates, molasses, sweet potatoes and vegetable oils or butter to meet the energy needs.
   b. Milk, in the form of curd or cheese, is an important source of food material for building muscles, bones, and teeth as well as fighting off disease.
   c. Good, low cost food may be obtained through the liberal use of milk products and lentils with daily addition of of whole grain cereals and breads, sweet potatoes, spinach, carrots, green pepper, cabbage, tomatoes, guava, bananas, dates, oranges, and molasses.
   d. Cereal foods afford one of the cheapest sources of food energy.

G. Comfort

1. Meals eaten two or three hours apart promote the best use of food materials by the body.

2. If one meal is missed during the day, careful planning will be required to furnish the food materials needed by the body in the other meals of the day.

H. Prestige

1. In Egypt a guest is served chicken, goose, turkey or other meat but never is he served lentils.
2. When an honored guest visits in a home in Egypt he is always served a dessert with his meal.
3. Following dinner, Turkish coffee is served to guests.

II. Nature of food

A. Nourishment for life

1. The variety and quantity of food eaten daily is one of the most important factors affecting how people feel, look and work.
2. There is much evidence that the people in Egypt could improve their diets considerably if they replaced breads made with refined flours, with whole grains ones, and increased the use of milk products, lentils, nuts, dark green and deep yellow vegetables, green pepper, sweet potatoes, guava, oranges, and fresh berries.
3. Since infection may increase the need for certain food materials, it may be a factor in bringing about a state of lessoned well-being on an apparently good food intake.
4. Well-nourished children are less likely than poorly nourished children to contract many infections.
5. Need for food materials may be increased by illness at the same time that food intake and use are decreased; if the condition is chronic malnutrition may become a complicating factor.

6. Large amounts of such foods as meats, eggs, milk or cheese, and lentils will aid recovery from wounds, burns, broken bones, and wasting illness.

7. The food requirements of the undernourished person may be greater than those of a well-nourished person of the same size.

   a. A continued state of malnutrition may reduce the ability of the body to utilize food material.

   b. The muscles of the digestive tract and the functioning of the digestive organs are impaired by poor nutrition.

   c. In certain kinds of nutritional deficiencies the appetite is markedly decreased.

B. Natural food

1. Natural foods probably have some important, as yet unknown, factors which vitamin preparations may not contain unless they are concentrates of some naturally occurring substances such as liver, yeast, and cod-liver oil.

   a. Vitamins and mineral supplements are valuable adjuncts for use by physicians in the treatment of many conditions.

   b. If large amounts of certain minerals or vitamins are taken they may increase the need for others and so create deficiencies where none existed in the beginning.

   c. With the proper selection of natural foods it is unnecessary for the healthy adult to take vitamin supplements.

   d. Although some vitamins may be stored, many cannot, and therefore should be supplied in the food every day;

excesses are useless and if taken over a long period, may endanger health.

e. Many vitamins dissolve in water and can be destroyed when exposed to light and air, or when heated.

2. Good nutrition is promoted by handling and using foods so that they will furnish their maximum of food value.

a. Liquid in which vegetables are cooked, contains valuable minerals and vitamins and, if not served with the food, may be used in soups and gravies.

b. Appearance, flavor, and food value of vegetables and fruits are saved by quick cooking in small amounts of water.

c. If fruits and vegetables are kept at room temperature, after cutting or chopping them, they rapidly lose their vitamins through exposure to air and light.

d. Keeping vegetables hot after they are cooked, or re-heating cooked vegetables, causes loss of some color, flavor and vitamins.

e. Storage in a dark place helps to retain the food value of foods.

f. Since people eat food that tastes good to them, it is important that foods be prepared so as to be palatable.

g. Tough cuts of meat can be tenderized by long cooking, with moist heat, at or just below boiling temperature.

h. Overheating fat in frying causes breakdown and production of irritating material which may cause indigestion.

3. Food must be made safe for human use even though the food value may be slightly lessened.
   a. Heating fresh milk does not improve its food value but does lessen the danger of substances which may produce diseases.
   b. Milk sold from an open container cannot be considered safe.
4. Since the food value of many products is not distributed equally, throwing away parts of food items may reduce their value.
   a. Large amounts of minerals and vitamins in vegetables and fruits often lie directly under the skin, so cooking them with the skin on helps to retain these minerals.
   b. Through removal of the outer husk and germ of grains, the food value of flour and meal is greatly reduced.
   c. By throwing away outer green leaves of foods such as lettuce and cabbage, these foods lose much of their value as a source of vitamins and minerals.
5. Chemicals used in preserving foods can serve many useful purposes and are not harmful to man when used in suitable amounts and under proper safeguard.
   a. Protection against the improper use of chemicals is controlled by government laws.
6. In order to have a variety of foods all through the year it is helpful to be able to transport it by boat, trains, trucks, or by animals, from the places where it is grown to other areas.

a. Foods which are not in season in one location may be transported from some area in which they are in season.
   (1) Food which is to be carried a long distance may be treated with a wax cover to prevent evaporation.
   (2) Foods may be allowed to dry in the sun until the water content becomes low, so that spoilage will be lessened.
   (3) Foods may be preserved by placing them in salt water or vinegar which prevents spoilage for a long period.
   (4) In season fruits, vegetables, melons, and berries should be used in large amounts.

7. Many new foods are becoming possible as new methods of treating the raw products are developed.
   a. Fresh or dried fish are good sources of necessary food materials which can be obtained the year round.
   b. Canned fruits and vegetables make it possible to have these foods out of season.
   c. Family gardens permit growing of such foods as potatoes, peppers, carrots, spinach, lettuce, cabbage, and tomatoes.
   d. When improved seeds and fertilizer are used to grow legumes such as lentils, beans and peas, larger yields are obtained.
   e. Improved feed mixtures for rabbits, chickens, geese, and turkeys, permit increased amounts of these animals to be used for food.

8. Good nutrition may be furthered for low-income families through wise and economical food budgeting and buying.
   a. Enough money should be reserved for food to be sure of an adequate supply of food materials by all of the family members.
   b. Poor nutrition is likely to become common in periods of rising food costs or loss of income.
   c. Through food production food costs may be substantially reduced.
   d. Nutrition education makes it possible for many people with low incomes to have food materials which are nutritionally adequate.
   e. Wise, economical food buying involves consideration of unit costs, amount of waste, time and energy.
   f. Protein-rich foods such as meat, eggs, and milk are often expensive; after the need for them is supplied, economy may be gained by using carbohydrate and fat-rich foods to meet the energy needs.
   g. Good, low-cost foods may be obtained through the liberal use of cereal and legumes such as lentils supplemented with inexpensive forms of milk like curd and cheap vitamin-rich vegetables such as cabbage, carrots, green pepper and tomatoes.
   h. If a cut of meat contains much bone, connective tissue, or grissle, it may be expensive even though the price per pound is low.
   i. Fruits with thick skins and vegetables with a large proportion of coarse outer leaves or shriveled skins

may not be economical because so much of them cannot be used for food.

9. For some factors which influence nutrition, the responsibility of the individual must be exercised through participation in community, and national affairs.
   a. A sanitary food supply requires proper legislation and public opinion.
   b. Conditions which facilitate distribution from point of production to point of need are essential for obtaining adequate nutrition.
   c. Safety of food is controlled by the procedures used in the production and processing of food, and by the sanitary measures used in the handling and storing of it in the market and in the home.
   d. Government agencies give protection and guidance to consumers in their purchase of food by certifying its wholesomeness and freedom from spoilage, by establishing standards of identity, by requiring truthful labeling, and by prohibiting false statements in advertising.
   e. When there is evidence that the addition of a particular nutrient or other additive to a food serves a useful purpose, government defines and regulates such additions.
   f. The work of the government in improving the quality and quantity of the food supply is strengthened by the support and cooperation of informed citizens.

The rats that were fed the Egyptian diet grew very well and were easy to handle. At the end of the experiment, they weighed 207 grams

and 160 grams, respectively. Their growth curves were above the standard curve as shown in Figure 1. These animals were very active. They had clean, smooth fur, smooth tails, bright pink eyes, quick, alert movements, and firm nails. These characteristics indicated that the rats were fed an adequate diet.

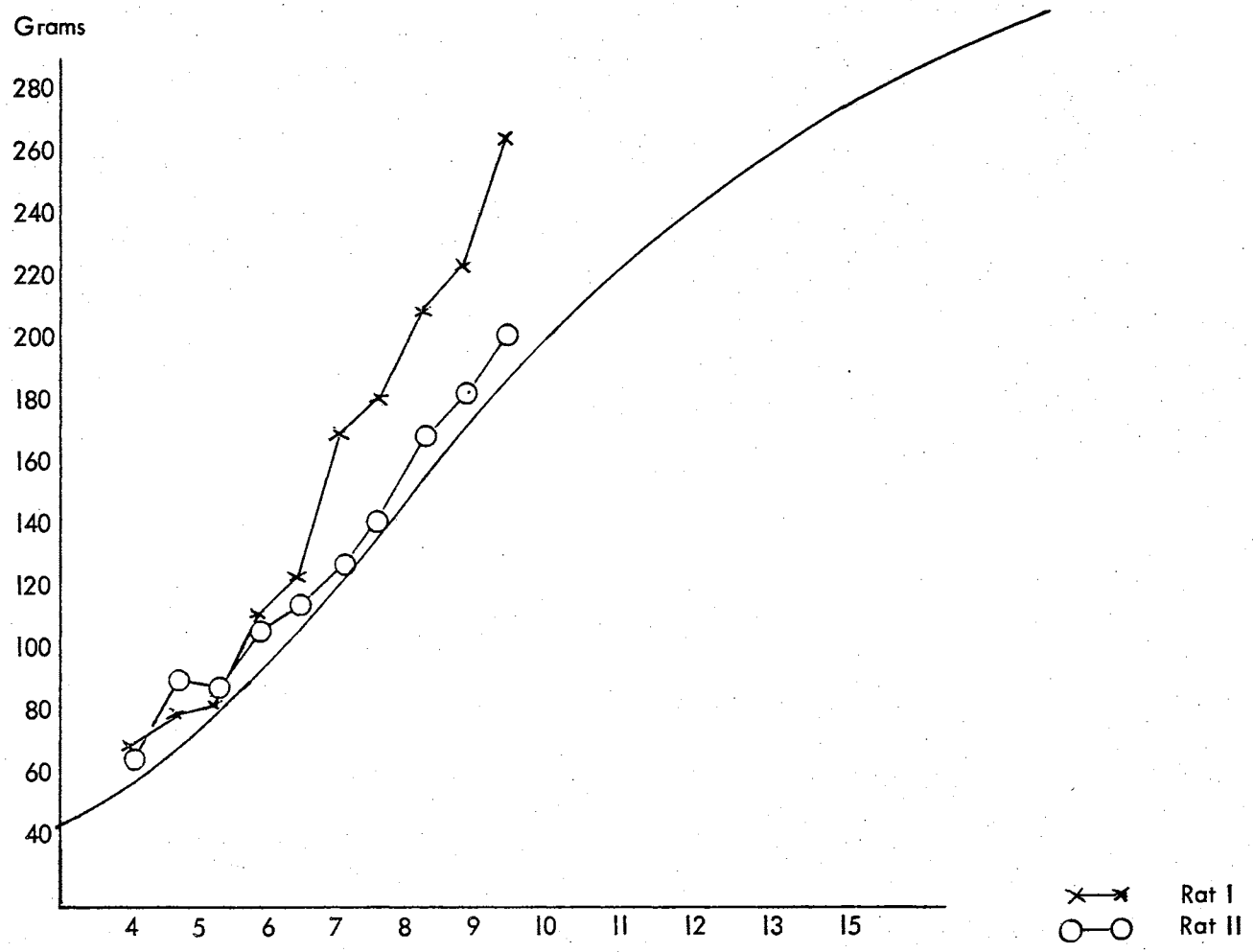

Figure 1. Growth of rats given foods in the Daily Food Plan for Low Income People in Egypt

CHAPTER V

SUMMARY AND CONCLUSIONS

In Egypt most people like to eat white bread, so their diets become lacking in vitamins of the B group. Therefore much attention is given to encouraging the use of whole wheat bread instead of white wheat or corn bread. A Daily Food Plan for Low Income People in Egypt was developed to promote the use of whole grain products and to increase the variety of foods eaten.

In general the niacin requirement can be met if enough animal protein is taken. But in this plan, protein from milk curd and lentils was used in order to make the diet of less cost. It is important to calculate the amount of niacin and tryptophan equivalents in the daily food intake to be sure they are present in adequate amounts.

In developing this Daily Food Plan for Low Income People in Egypt, economic factors, food habits, the foods commonly available, and the amount of work done were taken into consideration. This plan was made to be helpful for all age groups of people, especially those of low income.

The food habits of a nation determine the nutritional status and the level of health of its people. Foods are always defined culturally. The people of different societies, live to some degree in separate cultural worlds. Recognizing the significance of cultural differences for one thing, means that much effort must be made to understand the other fellow. Food habits become deeply imbedded in the personalities of

people raised in a particular cultural pattern. Changing the food habits is not easy, and it takes a long time. Also, the problem of changing food habits becomes more complex when the values of the people to be influenced are different from those of the nutritionist. If the diet of certain groups needs to be changed or to be improved, then it is important to understand the food culture of these people.

Education is an important factor in improving the nutritional status of individuals and groups. Success in the selection and use of educational techniques depends largely on the educator's ability to analyze the problem considering both the concerns, wants, and interests of the people. It is important to consider the time at which the individual will accept the change in his food habits.

There are many methods for teaching nutrition, such as:

1. Using a Daily Food Plan for Low Income People in Egypt.
    a. The food used in this guide was fed to two white rats to evaluate its nutritional value. The rat growth curve was above the standard curve which indicated that the foods in this daily food plan form an adequate diet.
2. Learning through doing with instruction from an able person.
3. Use of posters and charts.
4. Lecture and discussion-decision methods.
5. Brainstorming.
6. Using films and slides.
7. School lunch programs.
8. Field trips.
9. Animal feeding experiments.
10. Teaching through radio and television.

Through the use of a variety of teaching methods the author plans to

try to convince the Egyptian farm people of the importance of eating a variety of foods daily. To do this, the assistance of people in agriculture, mother and child centers, school lunch programs, and parent organizations will be utilized.

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A P P E N D I X

TABLE A

NUTRIENTS IN THE FOUR FOOD GROUPS FOR EGYPTIAN FARM FAMILIES

Food	Amount of Food	Protein	Iron	Calcium
Protein, Fe, Ca Group				
Curd	3 C.	26.4	0	1008
Lentils	1 C.	15	44	30
Eggs	1 med.	6.1	11	26
Energy Group		Calories		
Bread, whole wheat	3 sl.	165		
Dates	1 C.	505		
Vegetable oil	2 Tbsp.	248		
Sugar cane	3 Tbsp.	138		
Molasses	1 Tbsp.	165		
Banana	1 med.	132		
Vitamin A Group		Vitamin A I.U.		
Carrot--raw	1 C.	12,000		
Sweet potato--baked	1/2 Lg.	8,559		
Spinach--cooked	1/2 C.	10,600		
Vitamin C Group		Vitamin C mg.		
Orange	1 small	49		
Green pepper	1 shell	64		
Gauva	1/2 med.	151		
Blackberries--fresh	1/2 C.	1,088		

TABLE B

CALCULATED NUTRIENTS IN DIET FOR 1-3 YEAR-OLD CHILD

Age	Food	Amount of food	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen Equivalent
1-3 years old	Curd	3 C	354	26.4	1008	0	372	1380	6	---	456	---	366
	Oatmeal, cooked	1 C.	148	5.4	21	1.7	220	50	4	0	6	0	
	Lentils	1 C.	101	15	30	4.4	260	130	10	---	340	---	
	Orange	1 sm.	45	9	33	.45	80	30	2	49	190	---	1.5
	Egg	1 med.	77	6.1	26	1.1	40	130	tr	0	550	27	101
	Bonana	2 med.	264	3.6	24	1.8	120	150	2	1	1290		
	Sweet potato	1/2 lar.	137	2.0	38.5	.8	90	54	.7	20.5	8559		
	Cod liver oil	1 tsp.	33								6660	645	
	Sugar	3 Tbsp.	138										
			1297	67.5	1180.5	10.25	1182	1924	4.9	70.5	18,051	672	468.5 = 7.8 Niacin equivalent
	R.D.A.		1300	32	880	8	500	800	9	40	2000	400	

CALCULATED NUTRIENTS IN DIET FOR 3-6 YEAR-OLD CHILD

3-6 years old	Curd	3 C.	354	26.4	1008	0	372	1380	6	---	456	---	366
	Egg, Cooked hard	1 med.	77	6.1	26	1.1	40	130	tr	0	550	27	101
	Orange	1 sm.	45	9	33	.45	80	30	2	49	100	---	1.5
	Carrot, cooked	1/2 C.	23	.5	20	.5	38	38	3	3	9375	0	---
	Molasses	1 Tbsp.	165	---	90	7.2							
	Oatmeal, cooked	1 C.	148	5.4	21	1.7	220	50	4	0	6	0	---
	Lentils	1 C.	101	1.5	30	4.4	260	130	1.0	---	340	---	---
	Banana	2 med.	264	3.6	24	1.8	120	150	2	1	1290		
	Cod liver oil	1 tsp.	33								6660	645	
	Sugar	3 Tbsp.	138										
	Veg. oil	1 Tbsp.	124										
			1609	68.0	1290.5	17.95	1220	1962	5.2	73.5	27,336	672	408.5 = 7.8 niacin equivalent
	R.D.A.		1600	40	800	10	600	1000	11	50	2500	400	

TABLE C

CALCULATED NUTRIENTS IN DIET FOR BOYS & GIRLS 6-9 YEARS OLD

Age	Food	Amount	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit.D	Trypotophen Equivalent
6-9 years old	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456	---	366
	Sweet potato	1 lg.	274	4.0	77.0	1.6	180	108	1.4	41	17118	---	---
	Orange	1 sm.	45	.9	33	.45	80	30	.2	49	190	---	1.5
	Egg, hard boiled	1 med.	77	6.1	26	1.1	40	130	tr	0	550	2.7	101
	Lentils	1 C.	101	1.5	36	4.4	260	130	1.0	---	340	---	---
	Veg. oil	2 Tbsp.	248										
	Molasses	2 Tbsp.	104		60	4.8							
	Sugar	1 Tbsp.	46										
	Oatmeal, cooked	1 C.	148	5.4	21	1.7	220	50	.4	0	6	0	---
	Dates, pitted-dried	1/2 C.	252.5	1.95	64	1.85	80	85	1.95	---	50		54.5
	Bread	1 loaf	165	6.5	63	1.5	150	90	2.1	0	0	---	---
	Banana	2 med.	264	3.6	24	1.8	120	150	2	1	1290	---	---
	Cod liver oil	1 tsp.	33								6660	645	
			2091.5	69.65	1415.0	19.20	1502	2153	9.65	91	26660	672	523.0 = 8.7 niacin equivalent
	R.D.A.		2100	52	800	12	800	1300	14	60	3500	400	

TABLE D

CALCULATED NUTRIENTS FOR GIRLS 9-12 AND 12-15 YEARS OLD

Age	Food	Amount	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen Equivalent
9-12 years old	Curd	3 C.	354	26.4	1008	0	372	1386	.6	---	456	---	366
	Lentils	2 C.	202	30	72	8.8	520	260	2.0		680		---
	Carrot--raw	1 C.	42.0	1.2	39	0.8	60	60	0.5	---	12000	---	---
	Bread, whole wheat	2 loafs	330	12.6	32	3	300	180	4.2	0	0	---	---
	Orange	1 small	45	0.9	33	.45	80	30	0.2	49	190	---	1.5
	Date, pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100	---	109
	Banana	2 med.	264	3.6	24	1.8	120	150	2	1	1290		
	Sweet potato	1 lg.	274	4	77.6	1.6	180	108	1.4	41	17118	---	---
	Veg. Oil	1 Tbsp.	124										
	Sugar	1 Tbsp.	46										
	Molasses	1 tsp.	52		30	2.4							
	Cod liver oil	1 tsp.	33								6660	645	
			2271	82.6	1443.0	22.55	1792	2338	14.8	91	38494	645	476.5 = 7.1 niacin equivalent
	R.D.A.		2200	55	1100	15	900	1300	15	80	4500	400	
12-15 years old	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456		366
	Lentils	2 C.	202	30	72	8.8	520	260	2.0	---	680		
	Bread, whole wheat	2 loafs	330	12.6	32	3	300	180	4.2	0	0	---	---
	Carrots, row	1 C.	42	1.2	39	0.8	60	60	0.5	---	12000	---	---
	Orange	1 sml.	45	0.9	33	.45	80	30	6.2	49	190	---	1.5
	Dates, pitted-dried	1 C.	505	3.9	188	3.7	160	170	3.9	---	100		109
	Veg. oil	3 Tbsp.	248										
	Banana	3 med.	396	2.4	36	2.7	180	225	3	1.5	1935		
	Sweet potato	1/2 lg.	137	2.0	38.5	6.8	90	54	0.7	20.5	8559		
	Sugar	3 Tbsp.	138										
	Molasses	1 Tbsp.	52		30	2.4							
	Cod liver oil	1 tsp.	33								6660	645	
			2484	79.4	1476.5	22.65	1762	2359	15.1	71.0	29580	645	476.5 = 7.1 niacin equivalent
	R.D.A.		2500	62	1300	15	1000	1500	17	80	5000	400	

TABLE E

CALCULATED NUTRIENTS FOR GIRLS FROM 15-18 YEARS OLD

Age	Food	Amount	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen Equivalent
15-18 years old	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456		366
	Lentils	2 C.	202	30	72	8.8	520	260	2.0		680	---	---
	Bread, whole wheat	1 loaf	165	6.3	66	1.5	150	90	2.1	0	1 0	---	---
	Sweet potato, baked	1 lg.	274	4.0	77.0	1.6	180	108	1.4	41	17118	---	---
	Orange	1 sm.	45	0.9	33	.45	80	30	0.2	49	190	---	1.5
	Date, pitted-dried	1 C.	505	3.9	188	3.7	160	170	3.9	---	100	---	109
	Bananas	3 med.	396	2.4	36	2.7	180	225	3	1.5	1935		
	Veg. oil	2 Tbsp.	372										
	Cod liver oil	1 tsp.	33								6660	645	
			2346	73.9	1480	18.75	1642	2263	13.2	91.5	27130	645	476.5
													niacin equivalent - 7.1
	R.D.A.		2300	58	1300	15	900	1300	15	70	5000	400	

TABLE F

CALCULATED NUTRIENTS FOR BOYS 9-12 and 12-15 YEARS OLD

Age	Food	Amount	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen Equivalent
9-12 years old	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456		366
	Lentils	1 C.	101	15	36	4.4	260	130	1.0		340	---	---
	Bread	2 loafs	330	12.6	132	3.0	300	180	4.2	---	---	---	---
	Carrots, raw	1 C.	42	1.2	39	0.8	60	60	0.5	---	12000	---	---
	Dates, pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100	---	109
	Orange,	1 sm.	45	0.9	33	.45	80	30	0.2	49	190	---	1.5
	Veg. oil	3 Tbsp.	372										
	Molasses	2 Tbsp.	104		60	4.8							
	Sugar	3 Tbsp.	138										
	Sweet potato	1 lg.	274	4.0	77.0	1.6	180	108	1.4	41.0	17118	---	---
	Candy	4 sq.	76										
	Cod liver oil	1 tsp.	33								6660	645	
			2374	64.0	1513	18.75	1412	2058	11.8	90	36864	645	476.5
	R.D.A.		2400	60	1100	15	1000	1400	16	70	4500	400	
12-15 years old	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456	---	366
	Lentils	2 C.	202	30	72	8.8	320	260	2.0	---	680	---	---
	Carrots, raw	1 C.	42	1.2	39	0.8	60	60	0.5	---	12000	---	---
	Orange	1 sml.	45	0.9	33	.45	80	30	0.2	49	190	---	1.5
	Date, pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100	---	109
	Veg. oil	3 Tbsp.	372										
	Molasses	2 Tbsp.	104		60	4.8							
	Sugar	3 Tbsp.	138										
	Sweet potato	1 lg.	274	4.0	77.0	1.6	180	108	1.4	41	17118	---	---
	Candy	4 sq.	76										
	Cod liver oil	1 tsp.	33								6660	645	
	Banana	3 med.	396	2.4	36	2.7	180	225	3	1.5	1935	---	
	Bread	2 loafs	330	12.6	132	3.0	300	180	4.2	---	---	---	---
			2871	81.4	1585.0	24.85	1652	2413	15.8	91.5	39139	645	476.5
	R.D.A.		3000	75	1400	15	1200	1800	20	80	5000	400	

TABLE G

CALCULATED NUTRIENTS FOR BOYS 15-18 YEARS OLD

Age	Food	Amount	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen Equivalent
15-18	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456	---	366
years old	Lentils	2 C.	202	30	72	8.8	320	260	2.0	000	680	---	---
	Carrots, raw	1 C.	42	1.2	39	0.8	60	60	0.5	---	12000	---	---
	Orange	1 sm.	45	0.9	33	.45	80	30	0.2	49	190	---	1.5
	Dates, pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100	000	109
	Veg. oil	3 Tbsp.	372										
	Molasses	2 Tbsp.	156		90	7.2							
	Sugar	3 Tbsp.	138										
	Sweet potatoes	1 lg.	274	4.0	77.0	1.6	180	108	1.4	41	17118	---	---
	Candy	4 sq.	76										
	Cod liver oil	1 tsp.	33								6660	645	
	Banana	3 med.	396	2.4	36	2.7	180	225	3	1.5	1935	---	---
	Bread	4 loafs	660	25.2	264	6.0	600	360	8.4	---	---	---	---
			3353	94.0	1747.0	31.25	1952	2593	30.6	91.5	39139	645	476.5
										niacin equivalent - 7.1 mg.			
	R.D.A.		3400	85	1400	15	1400	2000	22	80	5000	400	

TABLE H

CALCULATED NUTRIENTS FOR ADULT WOMEN AND MEN

Food	Amount	Calories	Proteins	Ca	FE	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen equivalent
Curd	3 C	354	26.4	1008	0	372	1380	.6	---	456		366
Molasses	3 Tbsp.	156	--	90	7.2							
Lentils	2 C.	202	30.0	72	8.8	520	260	2.0		680	---	
Bread, whole wheat	3 sl.	165	6.3	66	1.5	150	90	2.1	0	0		
Carrots, raw	1 C.	420	1.2	39	0.8	60	60	0.5		12000		
Orange	1 sml.	45	0.9	33	0.45	80	30	0.2	49	190		1.5
Dates, pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100		109
Vegetable oil	2 Tbsp.	248										
Sugar	3 Tbsp.	138										
		2233	68.7	1436	22.45	1342	1990	9.3	49	12426		490
										niacin equivalent = 8.1		
R.D.A.		2100	58	800	15	800	1300	14	70	5000		
For adult man is the same diet with the addition of 2 loafs and 2 Tbsp. of oil.												
		2811	91.2	1568	25.45	1642	2170	13.5	49	13426		
R.D.A.		2900	70	800	10	1200	1700	14	70	5000		

TABLE J

CALCULATED NUTRIENTS FOR PREGNANT AND LACTACINT WOMEN

	Food	Amount	Calories	Proteins	Ca	Fe	Thiamine	Riboflavin	Niacin	Vit. C	Vit. A	Vit. D	Trypotophen equivalent
Pregnant women	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456	---	366
	Sweet potatoe	1 lg.	274	4.0	77.0	1.6	180	108	1.4	41	14148	---	---
	Orange	1 sml.	45	.9	33	.45	80	30	0.2	49	190		1.5
	Molasses	1 Tbsp.	52		30	2.4							
	Egg, cooked	1 med.	77	6.1	26	1.1	40	130	tr	0	550	27	101
	Vegetable oil	1 Tbsp.	124										
	Date pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100		109
	Breod	1 loaf	165	6.3	66	1.5	150	90	2.1	0	0	---	---
	Banana	3 med.	396	2.4	36	2.7	180	225	3	1.5	1935	---	---
	Cod liver oil	1 tsp.	33								6660	645	
	Lentils	2 C.	202	30	72	8.8	520	260	2	---	340	---	---
	Green pepper	1/2 shell											
			2227	80.0	1476.0	21.25	1682	2393	13.2	91.5	27349	672	577.5
											niacin equivalent - 9.6 mg.		
	R.D.A.		2100	78	1300	20	1000	1500	16	100	6000	400	
Lactating women	Curd	3 C.	354	26.4	1008	0	372	1380	.6	---	456	---	366
	Lentils	2 C.	202	30	72	8.8	520	260	2	---	340	---	---
	Orange	1 sml.	45	.9	33	.45	80	30	0.2	49	190	---	1.5
	Dates, pitted-dried	1 C.	505	3.9	128	3.7	160	170	3.9	---	100	000	109
	Breod	3 loafs	495	18.9	36	2.7	180	225	3	0	---	---	---
	Banana	3 med.	396	2.4	36	2.7	180	225	3	1.5	1935	---	---
	Cod liver oil	1 tsp.	33								6660	645	
	Egg, cooked	2 med.	154	12.2	52	2.2	80	260	tr.	0	1100	54	202
	Sweet potato	1 lg.	274	4.0	77	1.6	180	108	1.4	41	17118	---	---
	Sugar	2 Tbsp.	92										
	Green pepper	1/2 shell											
			2922	98.7	1604	23.95	2022	2703	17.4	91.5	27899	699	678.5
											niacin equivalent = 11.3 mg.		
	R.D.A.		2900	98	1300	20	1200	1800	20	100	8000	400	

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