The problem of improving food habits is complicated and imperfectly understood. Actually food habits are constantly changing. For example, the per capita consumption of citrus fruits, milk, and eggs changed greatly between 1935 and 1953 (1). The consumption of fresh citrus fruits decreased from 48.5 to 42.7 pounds but at the same time consumption of frozen juices was almost nine times as great and of canned juices more than three times. The consumption of fluid milk and cream increased from 330 to 350 pounds. We ate almost twice as much ice cream. Egg consumption increased from 296 to 400 per capita.

Deliberate attempts to change food habits, however, often meet with strong resistance. This may be why we have tried to improve the American diet when people were not looking, so to speak. That is, we have improved the nutritive value of certain common foods so that some nutrients will be automatically supplied. A food that is eaten at almost every meal and in relatively large quantities is an important food. When breads and other cereals were enriched with vitamins and iron without changing their desired characteristics, diets were improved with little conscious cooperation from the average consumer. Other similar ways by which the supply of nutrients has been automatically reinforced include the enrichment of oleomargarine with vitamin A, of salt with iodine, and of milk with vitamin D.

The school lunch program has been another direct effort to im-
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prove diets of one population group. This program has been supported by the Congress of the United States, school administrators, school boards, and parent organizations. Through the school-lunch plan, meals containing at least one-third of the Daily Allowance of nutrients recommended by the National Research Council (2) for children have been offered to them. The only cooperation expected of the child and his parents has been that the food be paid for, if possible, and that the pupil eat the food served to him. If the parents are unable to pay, the lunch is frequently made available to the child without cost.

Enrichment and school lunch programs have improved our nutrition with relatively little responsibility on the part of the individual. The main hope for further improvement lies in effective educational programs. We cannot expect to make fundamental changes in food habits until we have educational programs that awaken individuals to an active, intelligent concern for their own nutritional status. Of course, neither enrichment nor the school lunch program is available in all communities, and they can only be extended when public opinion is aroused. Education aimed to bring about these changes can parallel education designed to improve food habits of individuals. Both types of program are needed.

In spite of the hours of teaching nutrition in our schools, diets of many school children have fallen far short of recommendations of the National Research Council. Many schools are expected to teach nutrition in all grades as part of the health, hygiene, or general science courses. Home economics courses emphasize nutrition. Certainly there is interest among school administrators and teachers. Some time in the school schedule has been allowed. In the school curriculum countless opportunities exist for teaching nutrition but we are not getting satisfactory results. Perhaps it is because we are using ineffective ways of teaching; perhaps it is because we aren't reaching the parents who control what is served at home and who influence attitudes toward food.

We can teach much more effectively if we know more about our students' personal goals, attitudes, and beliefs about foods. Then we

... attempts to improve the diet when people were not looking!
can apply the principles of motivation in our teaching. We can ob­
serve good timing so that children are taught when they are ready to
learn. If we consider home and community influences when we make
recommendations, we will know whether the foods we recommend
are available and whether the children know what the foods look and
taste like. The problem of teaching nutrition is complex, but a poor
job will be worth nothing.

SOME PROBLEMS IN STUDYING HUMAN NUTRITION

Normally you cannot subject human beings to diets suspected of
being poor; therefore it is a real problem to show scientifically the
effects of diets of different nutritive quality on human beings. Even
if human beings were willing to submit to the controlled diets re­
quired of subjects in nutrition research over long periods of time,
such research would not always be feasible. The life span of men and
women is many times greater than that of the rat, one of the most
frequently used experimental animals. Thus the effects of nutritional
deficiencies in the human being may appear so slowly that they are
not easily identified. This situation makes identification or control of
influences on health from generation to generation extremely difficult.

Cause and Effect Relationship Not Always Apparent

The effects of dietary deficiencies may be so interwoven with those
of other adverse conditions that it is impossible to point to any single
causative factor. Poor nutrition may be closely related to tooth decay,
for instance, but there may be many contributing causes, such as lack
of dental hygiene, inherited tendency toward poor teeth, and acci­
dents to the teeth. Other defects such as poor posture and degenerative
diseases may have a close relation to nutrition, but may have other
causes, also. With the human being nutrition belongs to a complex
of which the parts are almost inseparable.

FACTORS RELATED TO HEALTH

Many teachers have been puzzled by the child whose diet is poor
but who looks healthier than some of his classmates who seem to fol­
low good dietary practices. There are many reasons why the effects
of poor diet may not be evident. Human beings can adjust to tempo­
rary stresses, such as a poor diet, and thus results are delayed. This
ability to adjust differs from one person to the next. Then, too, the
needs of individuals vary to a certain extent. What may be a poor
diet for some individuals may be adequate for others.

Individuals may not get the full value of nutrients in their food
if they have infections, are fatigued, or have not eaten well in the
past. When writing about the effects of poor nourishment upon utilization of nutrients, Dr. Stearns said (3):

"It appears, therefore, that inadequate nutrition during any considerable part of childhood results in decreased efficiency of the gastro-intestinal tract. Absorption of substances difficult to absorb normally, as calcium, is affected to much greater extent than is absorption of nitrogenous substances. Six months or more may elapse before utilization of a good diet becomes efficient. The implication of this poor utilization of calcium on studies of nutrition and diet in relation to dental caries in adolescence is obvious."

At some ages the effects of a poor diet may be more drastic than at other ages. During early childhood, when growth is slower, dietary shortages may leave less serious marks than later on when the stresses and strains of adolescence plus spurts of growth make nutritional needs especially large. If previous diets have been inadequate the ability of the adolescent to utilize the nutrients eaten may be retarded.

Dr. Stearns attributes this condition to such strains as those caused by variations in amounts of body hormones from day to day, rapid growth of the body, and unstable emotions.

Emotional disturbances, whether happy or unhappy, may interfere with the utilization of nutrients. Teachers are aware of some emotional experiences of their students but others may be hidden and thus go undetected as a reason for poor utilization of food. We are built “all in one piece;” mental health will affect physical health, and for most people the reverse is also true.

**GAPS IN INFORMATION**

Nutrition research is a living, growing science. Although we now know what primarily causes deficiency diseases such as scurvy, rickets, and endemic goiter, we look forward to the day when we can identify the role of nutrition in the failure to achieve buoyant good health.

This lack of all the desirable nutrition information need not deter our educational efforts. There is much that can be taught now.
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It has been said that there is enough knowledge available in nutrition to produce a superior race of people, if we only put it into practice. It will be wise for you to help your students to think and to form desirable attitudes as well as to learn certain facts and generalizations. Attitudes and ways of thinking can prepare students to evaluate, organize, and use new facts when they are available. Nutrition cannot be taught once for all time because it is a developing subject. But this is an advantage. A subject taught in the framework of research increases the student's ability to think, and discourages blind dependence upon rules.

Because we do not have research facts that show all the relationships between diet and good health for human beings, we must depend upon animal and even plant experiments. As educators, we must find ways of convincing people that there is a solid relationship between good health and good nutrition. The child may accept the fact that if a white rabbit needs lettuce so does he, but his father may be more skeptical. The exact findings of animal experimentation may not always apply to man, but the general relationship between nutrition and well-being is always present.

Experiments with rats, pets, and farm animals have shown conclusively that when their diets have been liberally supplied with all the needed nutrients these living creatures have developed into superior individuals. They are more beautiful and perform their biological functions better. They have more of the vigorous adult years or the "prime of life." The onset of old age is delayed. Finally, these well-fed animals have more and healthier offspring through several generations. As every farmer and 4-H boy and girl knows, good nutrition is basic to the production of prize-winning livestock.

HOME AND COMMUNITY INFLUENCES

In 1953 a committee of the American Dietetic Association investigated the false beliefs and information about food held by the people of the United States. Misinformation was in circulation regarding the connection of food to health and disease, regarding the caloric value of foods, and many other things, including methods of cooking and preservation of food.

These misbeliefs must be dispelled by facts presented in an objective way so that wise decisions about food can be made. Facts must be accepted emotionally, deep down, if they are to be used. Merely stating the facts to children, and most adults, will have little effect unless the traditional beliefs, cultural patterns, and superstitions are examined in view of the facts, and people are encouraged to think critically about their information. If the nutrition teacher, an out-
sider, attempts to impose completely new patterns, the students are likely to defend emotionally their traditions and cultural patterns, rather than to evaluate them.

For that matter, there may be nothing wrong with some of the cultural, traditional, and religious food patterns. The only sound criterion for judging the desirability of a family food practice is its effect upon either the health or the resources of the family. Failure to recognize the worth of cultural patterns may result in raising unnecessary barriers to the achievement of an adequate diet. Individual foods or combinations of them may seem undesirable to the teacher who has accepted for herself a "traditional American" dietary pattern. But personal preference is an unsound basis for encouraging change, even though practices advocated in books support the teacher. It must be remembered that there are many ways to obtain a good diet.

A teacher of nutrition is most likely to improve diets in a community if she knows not only what modifications are desirable but also those which are acceptable and possible. Acceptability depends in part upon family food practices and experience with a food. Some evidence presented in the following chapter supports the belief that failure to accept many foods is more the result of never having tasted them than of dislike for them. If tasting unfamiliar foods were encouraged as an adventure in eating rather than because the foods are "healthful," more cooperation might be secured. The youngster or immature adult advised to eat a food because "it is good for him" may rebel because he likes to feel independent.

**AVAILABILITY OF FOODS IN HOMES AND THE COMMUNITY**

The child depends upon the food set before him for most of his growth-giving nutrients. His own selection of food is limited chiefly to snacks. If his parents do not provide an adequate diet for him, there is very little the community can do about it. The school lunch may provide its share of the nutrients needed daily, but this may not overcome deficiencies in the home diet. It would seem most logical, then, to work with the parents in order to impress upon them the importance of nutritionally better diets.

Home food production and the cost of food affect its availability. In some parts of the country there are seasonal variations in the supply of fresh fruits and vegetables of good quality at prices homemakers are willing to pay. However, there usually is some form of
fresh fruits and vegetables available all year round now, thanks to our fine food distribution system. Moreover, the market contains a huge variety of canned and frozen fruits and vegetables that are often less expensive than the fresh. If the homemaker is willing to try new forms of familiar foods, she can feed her family well all year at reasonable prices.

Sometimes other forms of the food are not as well liked as the fresh product. Tomatoes are an example. When fresh tomatoes are plentiful, many people have an important source of vitamin A and ascorbic acid, but canned tomatoes are often refused as a substitute. The homemaker has a choice of three procedures: prepare the canned tomatoes in an acceptable, attractive form; find a substitute, such as oranges, to serve when fresh tomatoes are not available; or attempt to obtain the acceptance of the food through dictatorial methods.

Some parents do not realize the importance of the nutritional adequacy of their children's meals. Possibly they are not aware of the differences among foods, or they do not know or place enough importance upon the relationship of good food to health. Convincing these parents of the role of good nutrition in health will be a big step toward improvement. If they are convinced, most of them will use the time, money, and skill it takes to provide food every day according to an adequate plan. Often parents are vitally concerned about the child's food as an infant and toddler, but when the child reaches middle childhood (about 10 to 11 years), their interest dwindles and they seem to think that nature will take care of his needs.

When parents no longer closely supervise the diets of their children, there is special need for nutrition education at school. Even though a child will be dependent upon parents for adequate meals at home, he will usually have opportunities to choose snacks. Furthermore,
he may be freer than formerly to choose what he wishes to eat of the foods served to him in meals. The child must be highly motivated if he is to assume responsibility for what he eats.

**GOALS OF INDIVIDUALS CHANGE**

Because goals of individuals change as persons grow older, motivation to change food practices must change, too. Knowing the usual goals of an age group will help you to recognize the goals of your students, whether they are school children or adults. Despite their individual differences, persons within an age group tend to be alike in many respects.

The individual's idea of the best way to achieve a goal may be unwise even though the goal itself is desirable. For example, the goal of Jane, 16, may be to reduce her weight. She wants to lose weight to win approval of her age mates, or because she will better accept her own physique. However, she may believe that skipping breakfast is an effective way to reach her goal. In the Iowa Breakfast Studies (4) this concept was found to be a false one. Data from this research showed that people who omitted breakfast consumed as many calories as did those who ate breakfast, and at the same time, they were measurably more fatigued before noon.

There is a predictable sequence of learning which society expects of an individual. Usual characteristics of groups from middle childhood to later maturity are discussed here.

*No breakfast — no pep!*
Middle Childhood

Children from 6 to 8 years old\(^1\) gain many new physical skills. They like to be good at games. Each child wants to have a sense of accomplishment. He collects such things as animals, rocks, marbles; acquires such skills as reading, swimming, talking; learns such facts as the locations of state capitals. His growth in height and weight is usually slow and steady.

This is the age when students are eager to learn new facts if they are understandable. The facts must be concrete rather than abstract; they must relate to foods rather than terms that are relatively abstract such as protein, carbohydrate, or vitamins. The foods talked about in a classification such as the "Basic Seven" must be those that students have an opportunity to see, handle, and taste. Thus, what you teach will have meaning to your students.

Late Childhood

During this period (about 9 to 11 years) growth is very uneven. Many girls begin the growth spurt but only a few boys do. Children become over-obedient to gangs of their own sex and less obedient to adults. Organized games requiring skill are important to them. They begin to learn the sex roles that society expects of them. Growth is rapid. Girls are usually taller and heavier than boys. Posture may be poor, awkwardness is prevalent.

This is the age when students are likely to be interested in the ways that food can affect their growth and development. Boys will be interested in growing muscular and tall, but girls may be afraid that food will make them taller or larger than they want to be. You will want to assure girls, in particular, that heredity limits the height of a person but that food can help them reach their own optimum heights. Girls will be interested in having straight well-formed bones, also.

Skill in games is important to both boys and girls. You expect them to be interested in such generalizations as, "Foods which help to develop sound muscles and steady nerves contribute to ability to develop athletic skills," and "Members of a winning team need an adequate diet every day, not on days of the game alone." (See 3A (2) and (6), pages 52 and 53.)

Adolescence

The tasks of adjusting to a changing body may be more difficult during this period (about 12 to 18 years) than it has been earlier be-

\(^1\) Chronological ages for these developmental ages are not exact because there may be as much as two years' variation in physical maturity within a chronological age group of the same sex. As a group, girls develop about two years earlier than boys during adolescence.
cause now the sex organs develop and adult sex characteristics appear. Girls and boys must learn to accept their bodies as well as a socially approved masculine or feminine role.

Girls may be taller than many of the boys in a group because nearly all girls have reached their adult height by 16 while most boys will continue growing until 18. Associated with body changes are such interests as the opposite sex and personal adornment.

Both sexes are concerned about being normal and may be worried about acne, obesity, and other physical characteristics which they consider undesirable.

Most of the generalizations suggested in Chapter Four can be developed with a group of adolescents. Actually, the concerns of young people were used as the framework for organizing these generalizations.

Young Adults

Because of the many changes in their lives, most young adults are likely to be receptive to education that will help them in the solution of personal problems. Their problems are many and varied. During this period most young people select a mate, learn to live with a marriage partner, start a family, rear children, use resources to provide a home, and become adjusted to an occupation.

Difficulties that arise in meeting these new situations are often related to providing food for one’s self or family and establishing food
habits that will contribute to health of the family. Young people who believe that the knowledge of nutrition helps in solving problems will be ready to learn more about nutrition and the management of resources so that the food served to the family is satisfying.

Later Maturity

This period in the life cycle is sometimes referred to as the “empty-nest” stage. Children are grown and have left home, so the family is smaller. The mother is no longer as active in the home as she was when the family made many demands upon her time and energy. Eating habits tend to be fixed but at the same time there is a tendency to choose foods that require little preparation.

The health of individuals varies widely but both men and women are affected by physiological changes. Because loss of teeth may interfere with mastication, softer foods are chosen. Digestion may be impaired, so that some foods cannot be eaten with comfort. Metabolism appears to diminish. Exercise also may decrease, and the net result is that many persons tend to gain weight in the middle years.

There are many problems among this aging group which nutrition education can help solve. But the best way to begin is through establishing good food habits and attitudes during childhood and to learn, beforehand, the changes which should be made as one passes from one stage of development to the next.

DIFFERENCES WITHIN EACH AGE GROUP

The above discussion of different age groups indicates that individuals within each group have similar “developmental tasks.”

Every teacher is aware of differences in the ability of people to achieve their developmental tasks. These differences in ability may be due in part to differences in interest but they may also be influenced by such characteristics as emotional or social adjustment, intelligence, social and physical skills, physical make-up, and personal or family resources.

DIFFERENCES IN VALUE PATTERNS

A very potent force in motivation is the relative importance of values to an individual. A value is an ultimate goal that determines what more immediate goals shall be. For example, if friendships were a value, the goal of a boy in middle childhood might lead him to behave in a manner approved by a gang he wished to join. If a more important value of this boy were family life, he would probably behave in a manner approved by his parents whether or not a group of his age mates approved.

Research by Hawkes (5) indicated that value patterns varied for
individuals within a group of elementary-grade students studied. Girls had a composite pattern of values that differed greatly from the boys considered as a group. Here are the values he tested: recognition, personal improvement, physical freedom, power and control, privacy, family life, friendship, excitement and recreation, comfort and relaxation, beauty.

DiVesta (6) compared the value patterns of adolescent boys found in a corrective institution to another group of boys considered well adjusted. He found the groups to differ somewhat in values of greatest importance to them. The groups differed more in their concept of ways to achieve their goals and values than in the values themselves. The boys in the corrective institution used means that were not socially approved.

Each one of us is constantly making choices to achieve ultimately the state of affairs, or set of values for which we are willing to use our resources. Values usually form slowly as a result of satisfying emotional experiences. They may be changed after analyzing behavior and reflecting on its consequences.

Sometimes we make a choice which conflicts with one of our goals. Although we consider the goal very important, we either do not know or disregard the fact that our choice conflicts with this goal. An example is seen in the child who wishes to be strong and healthy. When green vegetables he dislikes are served, he refuses them. He may not really believe that he needs these vegetables frequently in order to continue in good health. But at any rate he is unwilling to overcome his dislike for them in the form served, and the larger goal is thwarted.

Educators usually assume that health is an important value for everyone and therefore can be used as a basis for motivation. This assumption is supported by the fact that many people say they desire health. The real test of the importance of health, as a motivator, is whether or not other values will be sacrificed in order to achieve it. For instance, the satisfaction that Sue gets from eating sweets may seem too important at the moment to sacrifice for the value of maintaining normal weight. As long as she recognizes that normal weight and nutritious food contribute to good health, but at the same time continues to eat unwisely, we must assume that she considers the enjoyment from eating sweets more important than health.

Health for health's sake may be rather dull unless the teacher points out its relationship to other important values. When friendship with other people is a value, health can become a real motivating power if it is recognized that through good health you can better enjoy your friends. An attractive appearance, a peppy personality, ability to enjoy sports, or skill at work will attract friends. Good
health will help in the attainment of these qualities. If you see and believe this relationship, the importance of health is increased and will motivate you to do something to promote good health.

There are times, however, when the value of friendship may conflict with the value of good health. We may go to too many club meetings, attend too many late parties, or work too hard, in order to gain the approval of our friends. Another example is the popular custom of drinking carbonated beverages. Even if John prefers milk or orange juice, when a carbonated beverage is popular with his “gang,” he will likely choose it. The leader is likely to be imitated, whether or not his actions are supported by the facts of nutrition.

In other words, individuals differ both in the values that they consider most important and in the means which they believe to be most efficient for achieving their important values. Therefore motivation of all students is dependent upon showing how nutritional status is related to the many goals of an age group.

It is likely that behavior can be changed most readily by evaluating the means of achieving a value rather than by attempting to change the value itself. Changing values is difficult and usually requires a long period of time, but concepts of ways to achieve values may be changed by securing accurate facts and using problem-solving techniques. For example, Mary Jane ranks prestige high in her scheme of values, and has, as a goal, an attractive appearance. She may have heard her mother say that “milk is fattening” and so she begins to drink less milk in order to be more slender. If Mary Jane is given accurate information showing that milk is not necessarily fattening, and that its use is very important to her in achieving an attractive appearance, she will be encouraged to discover and try other ways of reducing her caloric intake that will not be detrimental to her appearance.

A child’s desire for independence can either further or hinder nutrition education. As he grows, the responsibility for wise selection of food should fall more and more on his own shoulders. As he himself wishes independence, he should be given more opportunity to develop it. Hand-in-hand with responsibility, for decisions should go careful teaching, so that the child knows the relationships between what he eats and achievement of his own goals.

A desire for independence may hinder nutrition education when the child takes the responsibility for his food selection before he is ready for it. If he doesn’t know nutrition facts, but still asserts that what he eats is his own business, he may make foolish selections. The teacher can agree that it is his own business but that it is her business to teach him both the nutrition facts and how to form generalizations so that he can use them in the solution of personal problems.
You will be able to motivate the students as long as you understand their interests. In defining these interests you may think about the influences of the developmental age of the student, the values he considers most important, and his concepts of the best way to achieve these values.

**READINESS TO LEARN**

Readiness of a student to accept the learning planned for him depends in part upon his past experiences. Words and activities can be interpreted only in terms of past experiences. Since experiences with foods are likely to be closely associated with the customs and practices of the family, readiness may also be influenced by feelings of loyalty to the family. Words will have the same meaning for a student and his teacher only when they represent similar experiences. For example, a student may be as confused when he tries to visualize the unfamiliar vegetable, broccoli, as he is when he tries to formulate the concept of differences among food groups. The teacher who knows when students need experiences that will give meaning to words and how to provide these experiences, will increase the readiness of her students to learn about nutrition.

Although it has not been proved, it seems likely that boys and girls who live in families where they are served three well-balanced meals a day are more ready to learn about nutrition than are children who live in families with poor food practices. When the school reinforces learning at home, children may be expected to have less conflict in accepting teaching at school. There should be no reason for a feeling of disloyalty to the family when evaluation of meals served at home indicates that they are inadequate.

However, there may be the child who is not ready emotionally to accept and use nutrition facts until he has learned that he can appreciate members of his family even though he does not always agree with them. For example, if father ridicules the idea of eating some of the green and yellow vegetables, he may influence the actions of his child. The child's acceptance of these vegetables is difficult even when their nutritive value is known to him. The teacher who helps students resolve conflicts when teachings at home do not agree with those at school increases readiness of students to learn.

The period when students are ready for any aspect of nutrition teaching depends, also, upon their mental development. During late childhood pupils begin to grasp the notion that changes may be brought about by conditions that cannot be observed directly. But scientific interest can be more fully developed during early adolescence. If students are expected to do a kind of thinking for which they are not ready, thoughts of others may be memorized without
understanding. When this happens, it may be difficult to motivate learning at the appropriate time later, because the students may think that the material has been learned.

**TRANSFER OF LEARNING**

One means of evaluating the effectiveness of your teaching is to observe the carry-over of learning to other situations. The value of teaching nutrition in school is limited unless students are better able to improve their food practices wherever they may be. Development of this ability partly depends upon ability to generalize facts and to use these generalizations when making decisions about choice of food.

Both motivation and transfer of learning may be most effective if students generalize important facts in such a way that relationships among foods eaten, nutrition, and goals of students are evident. Such an organization of facts is presented in Chapter Four. Of course, if learning is to be most effective, the situations in which students are making food choices must be identified and used to illustrate ways to apply the generalizations.

When you teach so that the food practices of students are improved, you use all of your abilities as a teacher. You know which home and community influences support what you teach and which ones interfere with the changes that you suggest. You know when students need experiences with food so that what you teach has meaning for them. You know how to motivate students to eat adequate meals regularly because you know what is likely to be important to them and can show them how good nutrition will help them reach their goals.
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