The title of my talk might lead you to believe that you are about to be subjected to a barrage of statistics on food consumption. That's right, partly; I wouldn't want to disappoint you. But I would like to approach it somewhat differently. My objective will be to point out the principal changes in kinds and amounts of food eaten by the average American household, emphasizing meats—the item of principal concern to you. But also, I have been asked to explore the changes in nutrient intake from these foods and point out the nutritional significance of these changes.

Join me for a few moments in reflecting upon your experience and observations on changing trends in food consumption. If you are old enough to remember, perhaps the low point of this century's economic life may be good as a starter. I remember, as a teenager in the mid-1930's, customers coming to our country store in Pennsylvania with their relief checks. What do you suppose they bought with those meager but vital checks? Flour, macaroni, rice, "soup" beans. Before I ever knew the meaning of the word "calorie" I learned that when people are poor, and hungry, they attempt to stretch their limited food dollars by obtaining as many calories as possible. But it still bothers me when I recall, also, the man with a large family of young children who always included at least six cans of shrimp in his order. Even at that tender age, I looked upon this as poor judgment in food spending, a squandering of money on a luxury food. He was a prime target for nutrition educators, but we did not have "nutrition aides" in those days.

In the mid-40's, as an Army recruit I witnessed draftees thrive on the much-griped-about "chow" and saw some of them gain weight in spite of burning up calories on 18-mile hikes and obstacle courses. Others who entered the service with "well-rounded" figures rapidly lost some excess weight. In other words, it was apparent to me that the Armed Forces made it possible for some of these young men, and older ones too, to have well-balanced diets, perhaps for the first time in their lives. At least, that was the objective of the Quartermaster Corps, to which I was assigned later. Here I saw a constant effort to procure only wholesome subsistence items which were subject to inspection and had to meet minimum standards of quality.

With the welcome return of peacetime things went quietly, at least in my recollection, until some people such as the formerly slimmed-down recruits gained weight so that they could no longer get into their uniforms

to march with the American Legion in the Memorial Day parade. And the fairer sex, too, became figure conscious. Then, as now, if you were to mention the word "diet" the average American would very likely think of a weight reducing diet. And so, many overweight people turned to reduced calorie diets, with the aid of their selection from the constant stream of new books and pamphlets issued on the subject.

Then came the concern about fat in the diet and the controversy centering about saturated and unsaturated fats and cholesterol and their relationship to cardiovascular disease. Now, an additional number of people made adjustments in the fat in their diets.

Naturally, we would expect that all these emerging dietary concerns, some of which have been called "food fads," have had some impact on the profile of food consumed by the population of the United States. A counteracting force which made it all the more difficult for people to exercise these well-intended dietary restraints was the fact that their incomes, on the average, were rising. Furthermore, advancements in the technology of food production, such as higher yields and greater processing efficiency, had the effect of reducing the percentage of the income dollar spent for food—from 25 percent in 1947 to only 16.5 percent in the first quarter of 1970.

In summary, then, changing preferences and food choices, more money to spend on an increasing variety of foods, processed to a higher stage of convenience and readiness—all these factors have brought about changes in kinds and amounts of foods used.

What Have Been the Principal Shifts In Food Consumption?

Before answering that question we need to take a look at several ways of measuring food consumption. In the Department of Agriculture we have two principal measures. The Economic Research Service compiles data to calculate and publish "per capita food consumption" figures, referred to by some as "disappearance" or "time series" statistics. Basically, these data represent total production and marketings of the respective food items, converted to retail weight equivalent and weighted with constant retail prices, and divided by the population count to convert to a per capita basis. These per capita food consumption figures are useful for observing trends and year-to-year changes.

In our Consumer and Food Economics Research Division of the Agricultural Research Service, we measure food consumption by conducting periodic nationwide surveys. The emphasis here is to measure and analyze differences in food consumption by population groups such as households of different incomes, in various regions of the country, living in urban or rural places, etc. Furthermore, the food data serve as a basis for calculating nutrient intake from food so as to study diet quality.

Trends in Per Capita Consumption

Let us begin by taking a look at overall trends in the per capita consumption of food from 1950 to date. Consumption of animal products has increased about 7 percent, which is somewhat greater than the 4 percent
increase in crop products. I would remind again that this series of figures is weighted by constant retail prices. Actually, total pounds of food consumed per capita decreased from 1,505 pounds in 1950 to 1,436 pounds in 1968. The price weighting approach is used in order to give proper representation to some relatively light but higher cost items as well as to heavier but lower-priced food items.

Among foods of vegetable or crop origin the greatest increase occurred among the processed items, that is, canned, frozen or dried fruits and vegetables, an increase of almost 50 percent since 1950 (fig. 1). On the other hand, fresh fruits and vegetables declined in use by over 20 percent, reflecting increasing consumer preference for more convenient forms of food.

Cereal and bakery products, as a group, also declined in use, but items in this group changed in different directions, as we will see later in the household survey findings. The use of sugar and other sweeteners increased slightly over this period of nearly 20 years.

Among foods of animal origin, poultry took the lead, nearly doubling in amount consumed since 1950 (fig. 2). Among the red meats, beef led with an increase of over 50 percent since 1950.

Among the foods which declined in use since 1950 were eggs and milk and other dairy products. Pork was used in somewhat lesser amounts than in 1950, but the period was marked with ups and downs apparently related to the hog cycle.

Changes Shown by Household Survey Results

Nationwide household food consumption surveys provide a cross-sectional measure of food consumption at a point in time. Comparisons between surveys are another means of observing trends in what people eat. The USDA has been conducting such surveys beginning with 1936, with subsequent surveys in 1942, 1948, 1955, and the most recent one extended from spring 1965 through winter 1966. Whereas all the former surveys were made in the spring of the year, for the first time, in the 1965-66 survey, information was also obtained from additional sample households in summer, fall, and winter. Thus, we will be able to make a seasonal comparison and also calculate annual averages.

Among items in the bread and cereal group, in terms of percentage changes in household use from 1955 to 1965, the greatest increase was for bakery products other than bread, including sweet rolls, cake, pie, biscuits, crackers, etc. (fig. 3). Breakfast cereals also increased, over 20 percent, and indeed the money value increased considerably more, over 70 percent. The lower use of flour and flour mixes in households, about 40 percent less than in the 1955 survey, is understandable in view of the great increase in the use of bakery products. This reflects the increased usage of convenience foods in general. Bread, which was actually the largest component of this group in terms of average pounds per household, was also used in lesser amounts.

The most notable change in the vegetable and fruit group was the increased use of processed vegetables and fruit, especially frozen and canned
vegetables and frozen and chilled fruit juice (fig. 4). On the other hand, household use of fresh vegetables decreased 17 percent, and fresh fruit, 14 percent between the two surveys. Again, a switch to the more processed foods is in evidence.

There have been some striking changes in household use of items in the milk group. Fresh fluid milk, including skim, buttermilk and chocolate milk, is by far the largest component of this group, but the average household used 19 percent less in 1965 than 10 years earlier (fig. 5). Evaporated milk and cream declined, also. Processed milk as a group increased, however, largely due to the more than doubled use of nonfat dry milk. Ice cream and other frozen milk desserts constituted the second most used item in the milk group and increased about 30 percent since the last survey. The use of cheese increased, also, in spite of an even greater percentage increase in price.

Anyone attending this conference of the American Meat Science Association would naturally be interested in changes in consumption of foods in the meat group. Beef led with an increase of over 30 percent in the 10 year period (fig. 6). This is particularly noteworthy in view of the increase in beef prices which pushed the money value to more than 50 percent greater than in 1965. Conversely, poultry showed the second greatest increase in the group, but this was associated with lower prices and a decrease in money value. Household use of pork declined by an average of 6 percent between the two surveys.

In spring 1965 household use of items in the meat group ranked in this order, with beef leading at 5.4 pounds per household in a week, up from 4.2 pounds a decade earlier (fig. 7). Pork was next with an average of 3.6 pounds, followed by poultry, averaging 2.8 pounds. Lunch meats were next and their average use exceeded that of seafood, veal, or lamb.

Households in the North Central region and in the West used more beef--around 6 pounds per week--than those in other regions of the country. Pork was used in greatest amounts by households in the North Central region and in the South, both averaging around 4 pounds per week (fig. 8).

Lunch meat was used by households in all regions in greater amounts than lamb, veal, or variety meats, but the North Central households led in average consumption of lunch meats (fig. 9). Lamb and veal, together, were used in relatively greater amounts in the Northeast and the West than in other regions.

Per capita consumption of total fats and oils has changed very little since 1950, according to the time series data. But when vegetable oils and animal fats are broken out of this average a divergent statistical picture emerges. The trend since 1950 shows an increase of about 50 percent in the use of the vegetable oils and a decrease of about one-third in per capita consumption of animal fats.

Further detail as to the shift in usage of some of the food products in this group can be seen from the household survey data for 1955-1965 (fig. 10). In 1955 the average amount of margarine used by households was about equal to that of butter. But by 1965 use of margarine increased to eight-tenths of a pound, while butter decreased to four-tenths pound per
household per week. As for cooking fats, in 1955 lard and vegetable shortening were also used in about equal amounts by households, but usage of both decreased by 1965. In fact, lard was used in lesser amounts than vegetable shortening. On the other hand, household use of vegetable oils nearly doubled in 10 years. Household use of salad dressings, including mayonnaise and other dressings containing vegetable oils, was about the same in both surveys, about one-half pound per week.

**Trends in Nutrients from Food**

What do these changes in food consumption mean in terms of nutrients? Here again, there are two ways of measuring, paralleling the national food supply "time series" data and the household consumption survey data. From data on total quantities of foods in the national food supply, calculations are made each year to arrive at the daily per capita quantities of nutrients furnished by these foods. The long term trend in some of the principal nutrients and food factors in the national food supply, in terms of percentage change since 1909-13, shows that fat from meat, milk, and other fat-containing foods increased from 125 grams per person per day in the base period to 153 grams in 1969 (fig. 11). On the other hand, the level of carbohydrate in the American diet decreased from 492 grams per capita per day in 1909-13 to 374 grams in 1969. Protein has declined slightly since the base period, from 102 grams to 99 grams in 1969. But the composition of this total protein has changed significantly, due to the shift to animal sources of protein, which now account for two-thirds of the total amount compared with one-half in 1909-13. This has been at the expense of flour and cereal products which contribute 18 percent of the protein in the nation's food supply now as compared to 36 percent in 1909-13.

Food energy, which derives from protein, fat, and carbohydrates, has declined over the long term, from 3,490 calories per capita per day in 1909-13 to 3,240 calories in 1969. But over this period fat contributed a greater proportion of the calories, an increase from 32 percent to about 42 percent, while the energy from carbohydrate decreased from 56 percent to about 46 percent.

The calcium content provided by food increased about 25 percent between the base period and the mid-1940's but has declined somewhat since then (fig. 12). Thiamin in the nation's food supply trended downward until the mid-1930's, but with the introduction of enrichment of cereal products in the early 1940's thiamin levels increased substantially. It is estimated that cereal enrichment adds about one-third more thiamin, one-fifth more iron and niacin, and one-tenth more riboflavin to the American diet than if these foods were not enriched. Vitamin A value and ascorbic acid are now about the same levels as they were in 1910, after having shown an increase during the World War II years. The decline since then is due to a number of contributing factors, including such things as lower sweetpotato and potato consumption and a decline in citrus consumption since the mid-1940's.

**Changes in Nutrients and Diet Quality as Revealed by Surveys**

From the household food consumption survey data it is also possible to calculate the average amount of nutrients available per person per day.
Between the last two surveys, spring 1955 and 1965, the greatest changes were seen for calcium and vitamin A value, both of which declined 10 percent over the 10-year period. Other nutrients showing a decrease were ascorbic acid, 6 percent; riboflavin, 5 percent; and thiamin, 4 percent. The only increases, although in minor amounts, were for protein, plus 3 percent; and iron, plus 2 percent.

The real significance of these changes in nutrient content in the American diet can be stated by the question: How has it affected people's diets? One of the basic objectives of the historic series of nationwide food consumption surveys has been to answer this question. The yardstick against which nutrient intake has been measured is the series of Recommended Dietary Allowances (RDA's) established by the Nutrition Board of the National Research Council, National Academy of Science. In 1965, it was found that 50 percent of the households in the survey had diets rated "good," that is, they met the allowance for each of the seven nutrients. This reflected a decline in the grade of diets since the 1955 survey. To put it another way, 21 percent of the diets rated "poor" as compared with 15 percent in the 1955 survey. A household diet was rated "poor" if it met less than two-thirds of the allowances for from one to seven of the nutrients studied.

The nutrients which were most significant in accounting for this downgrading of diets were ascorbic acid, vitamin A value, and calcium, all judged on the basis of the 1963 edition of the RDA's.

For the first time in the 1965 survey, we also obtained information on the 1-day food intake of 14,500 men, women, and children in the survey households. Their diets were evaluated in terms of the averages for 22 sex-age groups, paralleling those used in the Recommended Dietary Allowances. For the dietary analysis of this phase of the survey, the 1968 RDA's had become available and were used. One of the principal changes from the previous edition of the RDA's was an increase in the iron allowance for some ages of females. Thus, iron was a nutrient, along with calcium, found to average below the allowance for more sex-age groups and by a greater degree than any other nutrients studies (fig. 13). Also, diets of girls from age 9 and up and of women averaged below the allowances for more nutrients and by greater amount than was the case of diets of males of the same ages. Among younger children, under age 6, iron was the only nutrient averaging below the allowances.

How much can meat, and other foods in the meat group, such as poultry, and fish, contribute to helping certain age groups improve their diets and come closer to meeting the RDA's for problem nutrients? In a positive sense, we could say that this group of foods, the consumption of which has increased over the years, presumably has helped to improve diets. Foods in the meat, poultry, and fish group contribute over 40 percent of the protein in household diets (fig. 14). Beef accounts for the largest proportion, followed by pork and poultry. These foods score well, too, in providing iron, about one-third of the total amount in the diet. Many people know that liver is a good source of iron, but liver provides only a small percentage of the total iron. Herein is a lesson--foods which are excellent sources for certain nutrients may not be widely used, nor in large amounts. Pork provided 14 percent of the total thiamin in household diets. Among the foods in the meat group, liver was the principal source of vitamin A value, contributing 11 and one-half percent of the total intake from household food supplies.
The Iron Situation

A nutrient which is the subject of considerable concern among the various professionals concerned with nutrition these days is iron. Let's take another look at the iron situation in our study of individual diets (fig. 15).

The groups who fell below the allowances by the greatest amounts were infants and children under 3 years, whose average food intake provided just under 50 percent of the RDA for iron. The next major group of persons falling below were females of ages 9 through 54, whose food intake averaged under two-thirds of the allowance for iron. The only group of males below the allowances by an appreciable amount were boys of ages 12 through 14, averaging 77 percent of the RDA for iron. Although averages include individuals with both higher levels as well as lower levels of iron, it is evident that here is a nutrient which is not obtained in sufficient amounts by a large number of persons, particularly girls and women, at least as measured by the current recommended dietary allowances set forth by the Food and Nutrition Board.

How are these problem areas of iron intake related to trends in food consumption? Unfortunately, we do not have a historic series of individual dietary studies such as the one made in 1965 as a basis for tracing diet quality of the respective sex-age groups. But looking at trends in sources of iron since 1910, we note that the meat, poultry, and fish group has become a more important source, accounting for 30 percent of the total iron in the national food supply in 1969 (fig. 16). A large part of the additional iron contributed by the meat group since the years 1957-59 came from the increased consumption of beef, although poultry also contributed an additional amount (fig. 17). Thus, the meat group has pulled ahead of flour and cereal products in spite of the considerable extent of iron enrichment of bread and some other cereal products. Vegetables and fruits including legumes rank next as a source of iron but they have declined somewhat, apparently due to the decrease in consumption since the 1940's.

Not only has the consumption of the meat group increased over the years, but it appears that the iron intake from food is bolstered by the rather universal inclusion of goodly amounts of foods in the meat group in the diets of persons of both sexes, and all ages (fig. 18). That a number of these groups could fall below the recommended allowances as established in 1968 is a situation that was foreseen by the Food and Nutrition Board when the 1968 RDA's were announced, because they stated that some groups of people could not be expected to meet the iron allowances from ordinary foods in the amounts usually eaten. For this reason consideration is being given to additional iron enrichment of appropriate foods to supplement the dietary intake.

The foods selected for enrichment are usually those that are widely used and of fairly low cost. In the most recent household survey the most economical source of iron in terms of the amount obtained from a dollar's worth of food was the legume group of dry beans, peas, and nuts; however, relatively low quantities of these foods were used. On the other hand grain products, the second ranking group, were widely used, bread being
the leading item. Of course, bread has been enriched with iron as well as other nutrients since the early 1940's, but many other bakery products have not. Therefore, this group would be a prime target for enrichment.

Whereas enrichment is a means of providing additional nutrients through foods ordinarily eaten, another approach is to induce people, through nutrition education and market promotion, to modify their eating patterns by including more of the foods that are good sources of nutrients. But this may be an uphill battle. Sometimes it is easier to accentuate the positive, that is, to encourage people to eat a proper balance of foods they like from the basic four food groups--the meat, milk, bread, and vegetable-fruit groups.

But you people involved in the meat industry seemingly have a good story to tell insofar as the meat group is concerned. Beef accounted for 14 percent of the household food dollar in the spring 1965 nationwide survey but it provided at least that much, or more, of three nutrients--17 percent of the protein, 14 percent of the iron, and 14 percent of the niacin in household food supplied (fig. 19).

Pork (other than bacon and salt pork) also gave a good account, taking 6 percent of the household food dollar, but providing twice that proportion of total thiamin, 12 percent, and also 7 percent of the protein, 6 percent of the iron, and 6 percent of the niacin in household food consumed in a week (fig. 20).

In summary, it appears that the upward trend in consumption of foods in the meat group has had a favorable influence on the dietary situation of American families in a number of ways. First, these foods are a principal source of protein, and their increased use helps to explain why relatively few households were under the allowances for protein and none of the sex-age groups in the individual diet survey averaged below the RDA's for protein. Second, the substantial intake of foods in the meat group has sustained iron intake at higher levels than would have been the case had there been no increase in consumption of meat and related items. And lastly, considering the whole array of nutrient intake from the meat group as related to the cost of these foods, we can rightfully take a measure of pride in the American standard of living which has enabled increasing numbers of families to include in their diets more of the foods they enjoy, and which are also good sources of nutrients.

The challenge before us is not to be content with the good score card shown by the "averages," but to help those households, and those persons, who are not as fortunate as the "average" so that they may upgrade their diets and include more of the foods they prefer. Public programs such as the Food Stamp Plan, the School Lunch Program, and the Expanded Nutrition Program are helping people to move in this direction. The continuing concern and positive efforts through further advancements in technology and processing efficiency in the food industry are necessary counterparts in this effort to provide adequate diets, consisting of acceptable foods, to all persons in this land.
PER CAPITA CONSUMPTION OF
SELECTED CROP PRODUCTS

PER CAPITA CONSUMPTION OF
SELECTED LIVESTOCK PRODUCTS

Figure 1

Figure 2
BREAD CEREAL GROUP
Use down, money value up in 1965

% CHANGE, 1955 TO 1965
-40 -30 -20 -10 0 +10 +20 +30 +40 +50 +60 +70 +80 +90

TOTAL GROUP

BREAD

OTHER BAKERY PRODUCTS

BREAKFAST CEREAL

OTHER CEREAL, PASTES

FLOUR, MIX

MONEY VALUE

Household Food Consumption Surveys, Spring 1965 and 1955
U.S. DEPARTMENT OF AGRICULTURE
NEG NO. 67(6) 5839
AGRICULTURAL RESEARCH SERVICE

Figure 3

VEGETABLE FRUIT GROUP
Use down, money value up in 1965

% CHANGE, 1955 TO 1965
-20 -10 0 +10 +20 +30 +40 +50

TOTAL GROUP

FRESH

CANNED

FROZEN

MONEY VALUE

Household Food Consumption Surveys, Spring 1965 and 1955
U.S. DEPARTMENT OF AGRICULTURE
NEG NO. 67(6) 5838
AGRICULTURAL RESEARCH SERVICE

Figure 4
MEAT, POULTRY AND FISH
USED PER HOUSEHOLD IN A WEEK, SPRING 1955 AND 1965

Figure 7

BEEF, PORK, POULTRY AND FISH
USED BY HOUSEHOLDS IN A WEEK

Figure 8
LAMB, VEAL, VARIETY MEATS, AND LUNCH MEAT USED BY HOUSEHOLDS IN A WEEK

HOUSEHOLD FOOD CONSUMPTION SURVEY, SPRING 1965

Figure 9

FATS AND OILS USED PER HOUSEHOLD IN A WEEK, SPRING 1955 AND 1965

Figure 10
Figure 11

CONSUMPTION OF FOOD ENERGY, PROTEIN, FAT, AND CARBOHYDRATES
Per Capita Civilian

Figure 12

CONSUMPTION OF CALCIUM, VITAMIN A, THIAMIN, AND ASCORBIC ACID
Per Capita Civilian

167.
CONTRIBUTION OF MEAT, POULTRY & FISH TO SELECTED NUTRIENTS IN HOUSEHOLD DIETS

Figure 14
IRON FROM ONE DAY'S DIET
As a Percent of the Recommended Allowances*

PERCENT

0
50
100
150
200

AGE IN YEARS

U.S. DEPARTMENT OF AGRICULTURE
N.R.C. 1968
U.S. DIETS OF MEN, WOMEN, AND CHILDREN 1 DAY IN SPRING, 1965

Figure 15

SOURCES OF IRON

0
20
40
60
80

% 1900 1910 1920 1930 1940 1950 1960 1970

U.S. DEPARTMENT OF AGRICULTURE
PER CAPITA CIVILIAN FOOD SUPPLY: 1965 PRELIMINARY DATA.
0 Includes Sweet Potatoes.
@ Includes Dry Beans, Peas, Nuts, Soya Products.

Figure 16
CONTRIBUTION OF MEAT, POULTRY & FISH TO IRON IN FOOD SUPPLY

Figure 17

MEAT, POULTRY, FISH
Quantity per Person in a Day

Figure 18
BEEF
AS PART OF FOOD DOLLAR & SOURCE OF NUTRIENTS

PROVIDES THIS MUCH OF NUTRIENTS

PORK
AS PART OF FOOD DOLLAR & SOURCE OF NUTRIENTS

Figure 19

Figure 20
E. WEIR: Thank you very much Dr. Swope. A nutrition program that has great significance for all of us is the National Nutrition Survey that was undertaken in 1968 under Dr. Schaefer's direction and the results from this are, what Dr. Schaefer will be telling us in the next few minutes. I think some of you may be interested in Dr. Schaefer's background because of the number of you that are familiar with the institution where he had his early training. He received his Bachelors degree from the Univ. of S. Dakota, his Masters and PhD degrees from the Univ. of Wisconsin in biochemistry with Dr. Elvehjem. He was on the staff of the Alabama Polytechnic Institute. He was head of the Nutrition Research Dept. of E. R. Squibb and Sons and then he was a biochemist with the Interdepartmental Committee on Nutrition for National Defense ICNND. At the present time he is the Chief of the Nutrition Program with the Center for Disease Control in Public Health Service. During his work ICNND Dr. Schaefer was responsible for nutrition surveys in 33 countries as well as special surveys in the US. His contributions in this area were recognized this year by the American Institute of Nutrition when he received the Conrad Elvehjem Award for Public Service. His current work with the surveys is one of these. Dr. Schaefer.

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