FIGHT FOR FOOD

BY

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BY

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To

MY MOTHER

THIS BOOK IS AFFECTIONATELY
DEDICATED

PREFACE

In the following pages of this little book, the writer has brought together, in a popular manner, the various problems of the big fight for food with the hope that the facts presented may be of benefit to the public. All available sources of the highest authority have been consulted.

So much has been published in our popular magazines tending toward the sensational, that it has become necessary to put the problem in its true light for the student, doctor, and consumer. All matter of sensational character has been eliminated as much as possible. It is necessary that the public at large know something about the food which they daily consume. No problem is of more importance. All technical matter such

as chemical equations and nomencla ture which the average reader cannot understand, unless he has taken a course in chemistry, has been omitted.

This book is not intended to replace the large reference works on foods, nutrition or economics, but if the writer has stimulated interest for further study, he has been amply repaid for his effort.

THE AUTHOR

Topeka, Kansas
July, 1916

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FIGHT FOR FOOD

CHAPTER I

INTRODUCTION

THIS book is the outcome of a demand for information put in popular form of the fight for pure and sanitary foods and drugs, and their associated problems. Our food and drug problem is important; and there have been creeping into the problem a great many new facts such as applied sanitary food principles, nutrition, flavor, misuse of drugs, the use of former waste products, and the knowledge of food constituents. Just because a food has so much fat, protein or certain nitrogenous matter, carbohydrates or starches and sugars, and the burned residue or ash, or mineral matter is not enough to prove

its worth or value. In the near future people will be more eager to find out whether these food constituents are in available form, and are the kinds of fats, proteins, mineral matter, etc. needed. Thus you may see that the tendency is for specialization.

There is no doubt but that our present food and drug control laws are more for the economic purchase of food and drugs; that is, they tend to prevent fraud and deceit in buying and purchasing the article. Then food and drug laws are supplemented in a large number of States, and by the National Law by a so-called "Weights and Measure" or a "Net Weight" law. The law's enforcement of true and correct scales, weights and measures, saves the public millions of dollars annually in preventing fraud and deceit, and the economic buying, selling and purchasing of not only food

and drug supplies but other merchandise as well.

Recently a number of States have enacted false advertising laws; and the Federal Government has enacted the so-called "Sherley Amendment" to the Food and Drugs Act. This Federal amendment is aimed at false and misleading statements on drug products and so-called patent and proprietary medicines.

The fight for food is not alone centred in the food, drug, weights and measures, and false advertising laws, but is also associated with such State laws as cold storage acts; and in the Federal Government in the Sherman Anti-Trust Law, the Clayton Act, and the proposed generally known Stevens or recently named Ayres Bill now before Congress.

There will be brought out in other chapters in this book, the so-called

"State Sanitary Laws" and how they are lacking in effective control over persons handling food stuffs. Most of these sanitary laws are enforced by those having charge of the enforcement of the State Food and Drugs Act. There is at present no State or National law enforcing medical inspection of the personnel handling food supplies. The "State Sanitary Laws" are at present æsthetic measures, that is, they tend to regulate the *place* and do not compel *medical inspection of the person in the place.*

In the following chapters of this book, the writer will give, in a popular way, many facts regarding food, which are not generally understood by the majority of the people. In his official capacity as one of the State food and drug officials, the writer has experienced from hundreds of letters coming to his desk, that there is

wanted an unbiased and true explanation of the fight for food and its associated problems.

The anti-trust laws and other laws regulating large manufacturing concerns and the interstate commerce of the article manufactured are very important laws to both the food producer and consumer. Laws regulating the actions and methods of the middle or commission men are generally the outcome of action taken by the producer or farmer and sometimes by associations of consumers, or consumers' leagues. The alleged cornering of the market of our food stuffs by the stock exchanges would certainly tend to make the price of food higher and hence the struggle to obtain food is that much greater.

Lack of food or improper nourishment causes no end of suffering, sickness, and crime. This particular

problem in the fight for food has a close relationship with the science of sociology, especially in regard to the poorer classes. Then again, improper nourishment, or no variety to the diet, causes such diseases as pellagra, beriberi and other nutritional diseases.

Rural sanitation is becoming a more important subject every day. It has quite a definite relation to the food problems because the farm or rural community is the producing centre of our food stuffs. Did you ever stop to think that the main reason the farm boy goes to the city is because he does not have the conveniences and pleasures of city life? The farmer in losing his boy has to employ extra help and hence makes the cost of production higher. The danger of sickness to people on the farm is greater than in the city—especially typhoid fever, due to insanitary out-

houses; and pneumonia, due to the exposure and carelessness in right living. If sickness comes to those on the farm production of food cannot help but be less. The less production will result to a certain degree in higher cost of food. Hence the writer has incorporated in this book a chapter on Rural Sanitation.

The chapters on "Food and Drugs —Their Relation to the Public Health" and "Milk—Its Importance to the Public Health" are quite important to the great fight for the genuine and pure article. "The Sanitary Handling of Food in the Home" means a constant fight for the housewife in the economy and sanitation of the food she prepares for her family.

It is enough to say that the writer has tried to bring to his readers food for thought and show them that this great fight for food has many angles.

CHAPTER II

THE ENFORCEMENT OF THE FOOD AND DRUGS ACT

PURE food law labels were in existence in 900 B.C. according to a discovery made by Prof. George A. Reisner of Harvard. Inscriptions excavated in the ancient city of Samaria in Palestine, are labels which were employed as seals on jars of wine and oil. They mention the years in which the wine was laid down in the cellar of the palace storehouses and they state the vineyard from which the wine came. These labels, about seventy-five in number, have been dug up on the ruins of the storehouse attached to the palace of King Shab, over 3000 years ago, and the names of the owners as given indicate that not only the king himself, but other

men stored their wines and oils there. Thus it will be seen that pure food labels are not new, as is generally supposed by the majority of people.

Many instances may be cited in the Bible as to the penalties inflicted on those who adulterated the food supply. History tells us of drastic and novel measures against food adulterations which were taken by Jacques de Tourzel, seigneur of Ambert. In a decree issued in 1148 he directed that "a funnel shall be placed in the mouth of any man or woman convicted of having sold watered milk and the said watered milk shall be poured down the funnel until such time as a doctor shall declare that the culprit cannot be made to swallow any more without danger of death." The seller of impure butter was to be put in the pillory, "when the butter shall be crushed down over his head and shall

remain there until the sun shall have melted it."

The first food inspection work done in an official way in the United States was inaugurated in the District of Columbia in 1871. Massachusetts was the first State to make preparations for official food inspection and enacted a law in 1883. Partial food inspection, however, was established in New Jersey March 25, 1881, under the administration of the State Board of Health, but the first appropriation for its enforcement was not made until 1883. Food inspection in New Jersey was extended to include milk in 1882, and the appointment of a State Inspector of Milk for its enforcement was authorized.

New York State enacted a partial food law in 1884. Connecticut and Ohio started the enforcement of general food laws in 1886, Minnesota

August 1, 1889, Wisconsin in 1889. Michigan enacted a food law July 1, 1893 and a drug law July 1, 1909. Pennsylvania's first food law was passed in 1895, Utah's in March, 1897, Hawaii's in May, 1898, and Kentucky's on June 14, 1898. North Carolina saw the pressing problem of food legislation in 1899, followed by Oregon February 16, 1899, Nebraska July 1, 1899, Porto Rico July 29, 1899, and Illinois the same year.

The States of Washington and South Dakota enacted food laws in 1901, North Dakota July 1, 1903, Wyoming September 30, 1903, New Hampshire in 1903, Vermont 1904, Kansas March 23, 1905, Indiana August 1, 1905, Maine 1905 for foods and 1908 for drugs, and Iowa in 1906.

The United States Government, after fighting for a food and drugs law for many years and after public opin-

ion had been aroused by the above mentioned States, passed the Food and Drugs Act of June 30, 1906, which regulates the interstate shipment of food and drug products.

After the passage of this important law, the few States which already had laws of this character found it easier to enforce them. It became necessary for *every* State to enact a food and drug law to protect the consumer from adulterated and misbranded food and drugs within the State, since Federal jurisdiction ends when food and drugs pass into the State.

The following States and Federal possessions followed the Federal Government in passing their first important food and drug laws: West Virginia (February 11, 1907), Texas (1907), Tennessee (April 9, 1907), Philippine Islands (May 18, 1907), Arkansas (May 28, 1907), Georgia

(August 1, 1907), Florida (September 1, 1907), Delaware (October 1, 1907), California and Colorado (January 1, 1908), Louisiana (1908), Virginia (March 11, 1908), Oklahoma (June 30, 1908), Rhode Island (1908), Nevada (1909), Idaho (March 15, 1909), Alabama (1909), Missouri (May 15, 1909), Maryland (1910), and Montana (March 8, 1911).

Most all of the States, including the Federal Government, have at times amended their initial food and drug laws so as to make these laws more effective and more serviceable to the public.

Nearly all the States have officials to enforce food and drug laws. Some are independent commissions, some are attached to the State Department of Agriculture and four to State experiment stations. The State Health Department has the enforcement of

these laws in Arizona, California, Colorado, Delaware, Idaho, Indiana, Kansas, Louisiana, Maryland, Massachusetts, Montana, New Hampshire, Oklahoma, Tennessee and Vermont

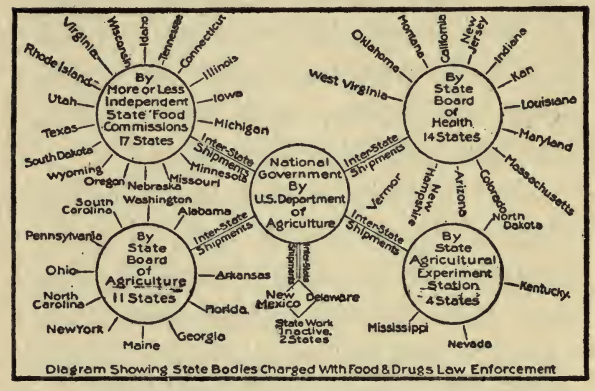


Diagram Showing State Bodies Charged With Food & Drugs Law Enforcement

and West Virginia; although the food and drug commission is nearly an independent office in the State Department of Health in the States of Idaho and Tennessee. Practically no work is done in Arkansas, Delaware and New York owing to lack

of funds. In the following States the pure food laws are enforced by independent food and drug commissions: Connecticut, Illinois, Iowa, Michigan, Minnesota, Missouri, Nebraska, Oregon, Rhode Island, South Dakota, Texas, Utah, Virginia, Wisconsin and Wyoming. The State Department of Agriculture enforces the food law in the following States: Alabama, Arkansas, Florida, Georgia, Maine, New York, North Carolina, Ohio, Pennsylvania, South Carolina and Washington. The State Agricultural Experiment Stations enforce the food and drug laws in Kentucky, Mississippi, Nevada and North Dakota. The food and drug laws of New Mexico are not enforced by any particular board or commission, but the State Attorney General does some correspondence relative to that State law.

Summarizing from the above facts,

food and drug laws are enforced by sixteen State boards of health, but only fourteen of these States are absolutely under the direction of the State boards of health and in one of these the work is inactive owing to the lack of appropriation, hence there are thirteen State boards of health actively in charge of State food and drug work. Eleven State boards of agriculture enforce State food and drug laws, and fifteen State independent commissions, which, together with two independent commissions in State boards of health makes seventeen independent commissions enforcing these laws. Four State agricultural experiment stations enforce the food and drugs act. In four States the food and drugs act is practically inactive due to lack of appropriation and the enforcement of the laws not being given to a person or board having supreme control.

CHAPTER III

THE PRESENT STATUS OF THE ADULTERATION AND MISBRANDING OF FOODS AND DRUGS

THE proper preparation of food and drug products has long ceased to be carried on by haphazard-rule-of-thumb methods that formerly prevailed. Skilled chemists are employed in most of the large food and drug establishments. We do not find crudely adulterated and misbranded food and drug products such as formerly prevailed when the Pure Food and Drugs Act went into effect, or even a few years later.

In order to understand the meaning of the terms "adulteration" and "misbranding," we may define them as generally accepted by most of the State food laws and adopted in part

by the National Pure Food and Drugs Act:

Adulteration of food may be defined in general as follows:

1. If anything has been mixed with it to reduce or lower its quality or strength.

2. If anything inferior or cheaper has been substituted wholly or in part therefor.

3. If any valuable constituent has been abstracted wholly or in part from it.

4. If it consists wholly or in part of a diseased, decomposed or putrid animal or vegetable substance.

5. If by coloring, coating, or otherwise it is made to appear better or of greater value than it really is.

6. If it contain any added poisonous ingredient.

Misbranding of food may be defined as follows:

1. If the food package contain any untrue or misleading statement or design on the label.

2. If the nature of the contents is left off the label.

3. If the name and address of the manufacturer is left off the principal label.

4. If the incorrect statement of the weight or measure is given on the label.

5. If extravagant or untrue claims as to nutritive value are given on the label.

Some food products are rarely adulterated. We may mention fresh fruit, common sugar, cereals, fresh meats and fresh vegetables, although we quite frequently find products such as meat, fruit and vegetables wholly or in part in a diseased, decomposed or putrid condition, and hence they would, under the term adulteration, be classed as adulterated.

Years ago our ground spices were mixed with ground olive pits, ground English walnut shells, ground cocoanut shells, spruce sawdust, ground date stones, linseed meal, etc., but such sophistications are rarely practised nowadays. At present we sometimes find a manufacturer abstracting the essential oils from spices and replacing oils in the spices with a synthetic product; but the grosser adulterations, as above mentioned, are rare.

Ground coffee used to be much adulterated with ground roasted cereals, ground roasted peas and beans, and chicory. Java-Mocha blends so much in evidence in the cruder misbranding are in most cases a thing of the past. Our present adulteration of coffee is the glazing of inferior coffee beans with sugar, glycerin and glucose, and other mixtures to make

the coffee bean appear of greater value. We have also the mixing of small, so-called male berry of the coffee with the coffees of higher quality.

Cereals, such as compound graham flour, unmarked bleached wheat flour; the mixing of cheaper grades of wheat flour are occasionally found at present. Some of the cereals, such as polished and coated rice, such polishing and coating to cover up an inferior article, are to some extent found to-day.

The canned vegetables and fruits are at present very little adulterated, but are in a number of cases found misbranded. For instance, a second grade of canned article is quite often labelled first quality, or extra standard quality. We might mention a practice of taking swelled or bulged canned goods and reprocessing them, which would be classed as an adul-

teration in that they are constituted to a certain extent of decomposed vegetable substance and often contain in solution tin, dissolved by acids formed in the process of decomposition.

Bottled goods such as catsup, etc., are being put up by reputable firms without the addition of preservatives, since science teaches us that properly sterilized, clean products can be produced without added preservatives. We occasionally find some bottled goods, such as catsup, filled with a large number of bacteria, yeasts and molds, due to decomposed material and careless methods of handling. In such goods a preservative is sometimes added, and also an excessive amount of pungent spices, etc., to mask the odor and taste of any putrid material that is present.

Milk and its products, such as butter and cheese, are serious problems

with which the food officials have to deal. Milk and its adulterations should be a problem left primarily with the municipality to enforce; but it is the duty of the State and National food officials to educate the milk dealer in the proper handling of such a product, to keep it free from pathogenic or disease-producing organisms and to establish sane standards which are practical. The problem of pure milk production seems to be its proper handling and the proper sanitation of the milk producing and selling establishments.

Vinegar is a product which is at present much adulterated and misbranded. Sophistication of vinegar is a problem with which the food chemist is confronted, because vinegar manufacturers and their chemists do put out vinegars which are difficult to prove adulterated.

Flavoring extracts and their substitutes are problems of misbranding in that the nature of contents is left off the principal label.

Edible oils, such as olive oil, are quite often adulterated with cottonseed oil, peanut oil or sesame oil. These are sometimes added because they are cheaper. As a rule the low grade olive oils are most subject to adulteration, by reason of the fact that it hardly pays to destroy or even modify the fine quality or delicacy possessed by a first class olive oil.

Eggs are quite often adulterated during the hot season in that they consist wholly or in part of a decomposed substance. Like milk, eggs are a problem to be left to the municipalities to some extent, but State and National authorities should educate the egg handler and the farmer in the proper handling of such products. It

is a well-known fact that non-fertile eggs keep longer and better than the fertilized eggs. After the breeding season is over roosters should be separated from the hens, thus insuring non-fertile eggs for the market.

The question of cold-storage eggs is a matter of proper branding both as to the marking of the time the eggs went into storage and the time the egg went out of storage.

Preserves and jellies are sometimes classed adulterated in that glucose or corn syrup is substituted wholly or in part for the original product and misbranded in that glucose or corn syrup is not correctly stated on the label. Certain manufacturers adulterate pure fruit juice jellies with a base of apple jelly.

Baking powder is a live question in food control to-day. We have baking powders on the market which,

while primarily within the letter of the law, are *not* within the spirit of the law in that false claims in their advertising matter tend to deceive the purchaser.

Such frauds and fakes will be abolished only when we have both National and State false advertising laws enacted.

At present *drugs* may be deemed to be *adulterated:*

1. If, when a drug is sold or dispensed by a name recognized in the United States Pharmacopœia or National Formulary, it differs in composition or standard of strength, quality or purity from that recognized by the United States Pharmacopœia or National Formulary official at the time of sale.

2. If its strength or purity falls below the professed standard or quality under which it is sold.

Those drugs may be deemed misbranded the container or label of which bears any statement, design or device regarding such article or substance contained therein which would be false or misleading in any particular:

1. If it be an imitation of, or offered for sale under the name of another article.

2. If the contents of the package as originally put up should have been removed in whole or in part and other contents shall have been placed in such package.

3. If the package failed to bear a statement on the label of the quantity or proportion of any alcohol, morphine, opium, cocaine, heroin, alpha- or beta-eucaine, chloroform, cannabis indica, chloral hydrate, phenacetin, acetanilid, or any derivative or preparation of any such substance contained therein; provided that drugs

and medicines dispensed by or on the order of a physician's prescription, or in accordance with a formula submitted by the purchaser and intended for immediate or temporary use, need not bear any statement on the package as to its contents, when labelled with directions for use.

One of the most common practices of the older days in drug adulteration was using poisonous "wood" or methyl alcohol in place of the common or ethyl alcohol. But it seems now that this practice is very rare.

The practice of most druggists of making up their standardized tinctures from fluid extracts is also losing ground; because series of analyses of tinctures made from the fluid extracts by the retail druggists show that in nine cases out of ten a standard tincture cannot be made

from a fluid extract by the retail druggist. The retail druggist of repute is now buying his standardized tinctures from wholesale drug houses, who put same in small containers and who accurately standardize their tinctures by physiological tests on animals.

The old practice of throwing a few drugs together and filling the bottle up with water and alcohol to make such liquid preparations as the United States Pharmacopœia or National Formulary exacted has passed. Druggists, both wholesale and retail, are carefully compounding their drugs as nearly as possible to the exact requirements of the United States Pharmacopœia and National Formulary. Occasionally we find a careless druggist or an incompetent one. The problem of deteriorated and substituted drugs has

not been entirely solved, but time will bring a few unscrupulous druggists selling such goods in line with the reputable druggists.

One of the greatest problems in drug control is the patent medicine business. An authority on the subject, who has recently analyzed a large number of products on the market, divides this class of medicines into three groups:

1. An exceedingly small number of proprietaries, representing well-known formulas, which are sometimes of value in the home medication of the simpler diseases in the absence of a physician. As a class this type constitutes a minority so small as to be practically negligible when compared with the number of so-called remedies and cures upon the market.

2. A much larger number of preparations which contain injurious

drugs or drugs which in some cases may have a deleterious effect.

3. A constantly increased number of patents and proprietaries the medicinal effect of which is practically nil; yet the advertisers claim for them the most wonderful properties for the cure or relief of diseases.

In giving this résumé of the food and drug adulteration and misbranding, it is not my purpose to cover the whole realm of adulteration and misbranding of food and drug products, but to put the problem in its true light by giving various instances and examples of a few of the recent problems on this subject.

Space will not allow me to go into any further detail. It must be borne in mind that the real problem of manufactured foods and drugs is the misbranding. Always read the label carefully. Note what you are buying

and if upon reading a label, it is an imitation and does not give the name of a product for which you asked, don't buy it but go where they keep the genuine article.

In food control besides these problems of misbranding and adulteration, we have the problem of proper sanitation of food and drug establishments. Sanitation, or the keeping of the business in a cleanly manner, is of prime importance to both the manufacturer and retailer and the consumer.

The day is not far distant when the manufacturer who puts out a cleanly product from a clean factory will obtain the greater bulk of the business.

Likewise the retailer who has a clean, up-to-date and sanitary place of business will put the insanitary merchant out of business.

CHAPTER IV

THE ÆSTHETIC IN ADULTERATING FOODS

A PLEASURE or a pain to the eye, or the science of the sensations, or that which explains the cause of mental pain or pleasure as derived from a contemplation of the works of nature and the handiwork of art in pleasing the vision, is often taken advantage of by the manufacturer of foods.

The æsthetic should be cultivated for pure food and drink; but it should not be cultivated for fraud and deceit by making the genuine or imitation article of food or drink appear better than it really is.

While the modern pupils of Epicurus (a Greek who lived in 341–270 B.C.), cultivate a so-called epicurean sense of taste and smell, old Epicurus himself, who founded the epicurean

school, was a materialist, and placed the following motto on the front door of his home, which he gave to this old Grecian school: "Stranger, here it will be well with thee. Pleasure is the highest good." Epicurus was a simple man and emphasized the idea of fellowship and friendship as an aim of life.

Speaking as an epicure, Henry T. Finck in "Food and Flavor" aptly says that "were all of us epicures, what a change our markets would undergo. How the chemically denatured foods, the tainted cold storage fowls, the drugged, soggy bread, the tasteless, frozen butchers' meats, would be swept away, together with frozen, impalatable fish, wilted vegetables, unclean milk, unripe, and decayed fruits, all of them the daily source of discomforts and disease (often yielding ptomaine poisoning) to thousands."

As I have said before, the epicurean side of the food question should be cultivated, but the æsthetic should not be cultivated for fraud and deceit to the purchaser of our food stuffs.

The coloring of oleomargarine is done for nothing more than to make it appear like butter. The argument that it should be colored is that it would decrease the cost of living by supplying the poorer classes a means of having an article for their table in imitation of butter. The fraud and deceit come when this imitation article is served in our dining-rooms for the genuine butter or is sold to the housewife in our retail stores for butter at butter prices. Butter colored in imitation of "June butter" is a fraud.

The coloring of cider vinegar or imitation cider vinegar is done for no other reason than to make these arti-

cles appear better than they really are. The fine rich color of genuine cider vinegar without added coloring matter is a great deal more pleasing to the eye than a caramel coloring to the imitation vinegar or to the genuine vinegar.

A great many States prohibit added coloring matter to genuine or imitation flavoring extracts such as vanilla extract, lemon extract, and other extracts. There is no doubt in the minds of intelligent people that added coloring matter only tries to make these articles appear better than they really are by defrauding the purchaser in that these extracts are of greater strength and value.

Visit a County or State Fair, and the æsthetic is preyed upon by the seller of lemonade or orangeade. It is perfectly legitimate to place orange slices and lemon slices in the genuine

orangeade or genuine lemonade respectively, but it is fraud and deceit to place these in the imitation article. The reason is quite obvious.

Why do all millers of rice polish this product? For the simple reason that it makes the rice appear better to the æsthetic. We must educate people to demand unpolished rice since the polishing process takes off those mineral salts which aid the body to keep well. The coating of rice is nothing more than a fraud, because such coating covers up inferiority, and the argument that it appeals to the æsthetic cannot be substantiated.

Why bleach out dried fruits? The argument of the "bleacher" is that it appeals to the æsthetic. This is a base falsehood. We do not need our dried fruits bleached with the fumes of sulphur, or in other words, we do not

need our fruits impregnated with sulphurous acid. Why not have the sun-dried fruits as our forefathers had? Simply because custom of the housewife desires a beautiful looking dried fruit instead of a dried fruit that will be of some aid to the digestion. In fact, on cooking the fruit, the "unsulphured" is just as appetizing when it reaches the table as the "sulphured" or bleached fruit. The appeal to the eye to make the dried fruit appear better than it really is, is the object of those who wish to adulterate.

Foreign coloring matter in jelly and jam in order to cover up inferiority or to make such products appear of greater value in fruit juice than the amount of fruit product present, is not primarily put into the jelly or jam by the manufacturer for æsthetic purposes, only to that degree

that it might be a better seller and might appeal to bring a better price than the product is really worth.

The glazing or coating of coffee, my dear reader, is primarily put there for the purpose of covering up inferior coffee—not to appeal to the æsthetic coffee drinker for we do not see the glazing after the coffee is ground and placed in the urn. This glazing may appeal to the æsthetic buyer of coffee, but it is an æsthetic fraud.

The "bleaching" of inferior wheat flour—no matter what process is used, whether the nitrite or chlorine process—is done for the purpose of making lower priced wheats appear of better quality to compete with Northern wheat flour, which is naturally whiter.

The "greening" of pickles and of tea by copper salts, the added color-

ing of fruit juices, the polishing and coloring of pecans, are likewise sophistications tending to deceive the æsthetic in that these articles, with such sophistication, appear better than they really are.

Every one loves to look at the beautiful natural food products which are beautiful, help to stimulate digestion, and hence promote health. The reason inferior food products are coated, stained, bleached, polished or prepared æsthetically is for the purpose of competition with the high-priced quality article of food. It is not a question of whether *minute amounts* of nitrites, chlorine, sulphurous acid, coal-tar dyes, and copper salts are injurious to the system. Some food authorities who try to prove this proposition as to the harmfulness of very small amounts of such substances, will eventually lose out on

this line of tactics. The answer to the whole proposition of such added foreign substances to our food is that first, they are not needed; second, the legitimate dealer in natural products (without foreign ingredients) is put out of business; and third, (perhaps the strongest argument) such foreign added ingredients to food products make the inferior food products appear to the æsthetic better than they really are.

CHAPTER V

FOOD AND DRUGS—THEIR RELATION TO THE PUBLIC HEALTH

MUCH has been written in the past of the misbranding and adulteration of food and drugs; but it has not occurred to the majority of people that food and drugs have an intimate relation to the public health. Nearly every State in the Union has laws regulating the sale of misbranded or adulterated food and drugs and a few States have sanitary inspection laws regarding these commodities. These sanitary inspection laws are not adequate in that only the places where food and drugs are handled, distributed, stored or sold are required to be kept sanitary, but medical inspection of those handling these kinds of

products should be exacted and written into these laws.

Laying aside the technicalities of misbranded and adulterated food and drugs, I wish to point out the dangers that fall in the pathway of those handling and distributing these commodities to the consumer; also the relation of these articles to the public health. Technicalities of our food and drugs law deal with the pocketbook of the manufacturer and the ultimate consumer and are quite important from an economic point of view. Fraud and deceit should, of course, be curbed and may indirectly be a menace to health in that money paid for something one does not get might have been used for more nutritious food, which would have kept the body in better condition to ward off disease.

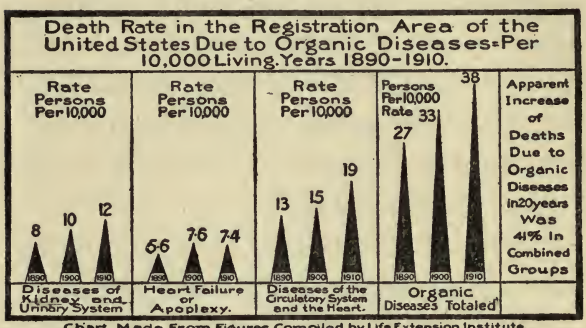
Sanitary inspection laws, as at present enforced in a number of our

States, do some good for the public health by keeping many food and drug establishments clean. The old saying that "cleanliness is next to godliness," is quite apt, especially in speaking of food products. Bacteria, yeasts, and molds usually develop faster and more quickly in filthy, non-ventilated, and dark places, where the moisture or water content of the food is suitable. Decayed animal and vegetable matter seems to be alive with these organisms. Ptomaine or food poisoning is quite often the result of certain actions of certain forms of bacteria; especially is this true in such products as partially decomposed meat and fish. Excessive tin content in certain canned goods, such as vegetables containing a high acid content, an example of which is canned asparagus; and such canned foods as sardines and other fish in oil

—the oil of which has changed into certain organic acids, which attack the tin and contaminate the food—has in a number of cases caused food poisoning due to the toxic properties of the salts of tin which are eaten with the food. A number of highly acid canned foods have been prepared successfully by most up-to-date canneries by using lacquer as a lining to the tin can, which in most cases prevents acid attack.

Most of our present food and drug laws prevent the addition of poisonous material to foods, but it is necessary according to law, to prove that these poisons are in sufficient quantity to be detrimental to health. These laws should be changed and all poisonous materials, no matter in what quantity, ought to be excluded from food stuffs, since it is sometimes quite difficult to prove that small amounts

of poisonous material are detrimental at one, several or a series of doses. There is no doubt in the minds of most serious people that a continual accumulation of poisons in the human system sooner or later prevents the



body from performing its normal functions and hence is a menace to the public health. Sanitarians and health officers cannot help but be impressed with the fact that deaths from organic diseases are increasing each year, and it is time closer investigation is made as to the cause of this fact.

A closer relation between the sale of food and drugs and the public health is urged as regards medical inspection of employees handling these products. It is a well-known fact that many tubercular or consumptive people may handle our food supply and the public or officials know nothing of this. Likewise we may have typhoid and diphtheria carriers infecting our food supply. An illustration of this may be cited in "Typhoid Mary," who carried typhoid fever to a large number of families. "Typhoid Mary" carried typhoid fever by means of her excreta, which was in her case never freed from the typhoid germ. No case of tyhoid fever can be transmitted from one person to another unless the excreta from the infected one is transmitted to the system of the one to become infected. This may be by the direct method or

by the indirect method, as by means of the common house fly. It is a well-known fact that the fly is a feeder on refuse matter. He goes to the unprotected privy vault, where is thrown the excreta from the typhoid. With the little hairs on his legs contaminated with germs of typhoid, he next visits the food supply, and in most cases typhoid fever results from eating this infected food. The fly may also infect food with tuberculosis by first attacking the spittoon where a consumptive has expectorated the deadly germs of consumption.

Drainage of the insanitary privy into the water supply causes many deaths from typhoid fever. This may be true when such contaminated water is used for rinsing the containers at the dairy farm, thus polluting the milk and causing an epidemic of typhoid along the milkman's entire route.

One more reason why we should have stricter medical inspection of those handling the food supply—and that is dirty hands and habits of those who are carriers or those who are sick with disease. In retail places of business, the hands come in contact with food stuffs more or less. The hands likewise come in contact with the disease germ—especially is this true if the person handling the food product is diseased. There is no doubt that gonorrhea and syphilis may be transmitted to the innocent by such methods and we are not sure that our food handlers are freed from such infection.

Sub-standard and deteriorated drugs are a menace to the public health. When a physician treats disease and is dependent on the strength of a certain drug he is administering to his patient, and in some cases a matter of

life and death rests on the action obtained, it becomes a serious matter whether the drug he is using is standard or what it is supposed to be. This shows an intimate relation between drugs and the public health.

Proprietary or patent medicines of unknown formulæ are detrimental to the public health. This is particularly true when such medicines are advertised to the public for cure of disease. It stands to reason that no two cases of disease are in the same stage of development and self-medication by one who is not trained in the treatment of disease may result in death, and in cases of communicable diseases, death to the innocent. Always consult a physician if you are sick or ailing. Your case cannot be properly diagnosed unless a reputable physician examines you.

CHAPTER VI

MILK AND ITS IMPORTANCE TO THE PUBLIC HEALTH

PURE, clean milk is something that everyone is entitled to have. In fact, the character of the milk supply plays an important part in the health of any community. When produced amid unclean surroundings or handled carelessly, milk used by babies is certain to produce much intestinal trouble and frequent deaths. Quite important is clean, pure milk to the growing child and the adult, since, unlike other foods, milk is usually consumed in the raw state, and therefore seldom passes through treatment by which dangerous germs, if it contain such, are destroyed before it reaches the consumer. Most other foods are cooked before they

are eaten, and the bacteria which are present are thus killed by heat. Instead of being killed after introduction into the milk, bacteria that find the milk a suitable place for development increase at a rapid rate. Impure milk, owing to the existence of possible pathogenic or disease-producing organisms, may cause serious and even fatal disease.

Outbreaks of typhoid fever, diphtheria, scarlatina, septic sore throat, etc., have definitely been traced to infected milk supply. In order to obtain disease from milk, the germ of these diseases must come in contact with the milk, either by a direct or indirect route. Typhoid fever can never be contracted unless some of the excreta from patients having the disease enters our body. In a number of cases this is accomplished by the water supply becoming polluted

by excreta from the outhouse or privy, which drains into well or spring. The polluted water is used in rinsing milk utensils and hence infects the milk supply. Also some unscrupulous dealers who water the milk to make the supply go farther sometimes infect dozens of families with typhoid fever by means of the sometimes polluted water which they use as an adulterant —to say nothing of the robbing of the milk of its food value.

Diphtheria and scarlatina are sometimes contracted through milk supply by the direct route—by means of persons having the disease. There is such a thing as a healthy disease carrier, especially in these two diseases mentioned. The person having diphtheria germs in his throat may be immune to the disease himself, but coughing or sneezing throws the diph-

theria germ into the milk and it grows with great rapidity.

The ulcerated udder of a cow infected scores of persons with septic sore throat in a certain New York State town. The septic sore throat epidemic was centred along the route of a certain dairyman. The sanitarian went to the dairy and by examining the milk from each cow, finally found the cow with the ulcerated udder. After eliminating this cow and sterilizing all utensils, the epidemic of septic sore throat ceased to spread.

There is the lurking danger of contracting tuberculosis through milk that is supplied by a tubercular herd of cows—especially is this true in regard to such infected milk being supplied to babies. Scientists have not satisfied themselves as to there being such a great difference between the bovine and human tubercle bacillus,

which causes tuberculosis or consumption in cattle and in man respectively. In fact, a most eminent bacteriologist is working on this problem at the present time, and I am informed that he is impressed with the idea from his experimenting, that chicken, bovine, and human tubercle bacilli act so very similarly when brought into the same environment for a period of time, that it indeed is quite clearly impossible to distinguish them. Future work will conclusively prove to the world that it will soon be a crime to distribute or sell milk from non-tuberculin tested cattle.

There should be no sediment in milk supplied to the consumer. It is a menace to health to find sediment or dirt in milk, since such may bring with it countless numbers of undesirable germs or other organisms. I have

seen specimens of the strainings of pint samples of milk which were nearly as black as tar. Other pint samples of milk strainings showed the presence of all kinds of matter foreign to milk, such as human hair, sand, yarn, flies, manure, alfalfa, and other feeding stuffs, pieces of metal, from the cans or utensils, cow's hair, dirt, and in some cases, pieces of gravel. This indicates careless handling of the milk and we do not want to trust our health to anyone who handles the milk in such a manner, since milk may be prone to undesirable organisms that may upset our health.

The above facts lead us to the question as to how the producer of a clean, safe milk may give us a product free from contamination. First we must insist on our dairyman providing the following:

1. Clean, healthy cows kept in clean, light, well-ventilated stables.

2. Stables so constructed as to be easily cleaned.

3. A clean, well-drained barnyard.

4. Clean utensils, very thoroughly sterilized.

5. Clean, healthy milkers who milk with dry hands.

6. A small top milking pail.

7. Immediate cooling of the milk to 50° F. or lower.

8. Storage of milk at a low temperature until delivered to the consumer in clean bottles.

9. A clean separate house for handling the milk.

10. An abundant supply of pure water to clean utensils. If in doubt as to the purity of the water, always boil it before washing or rinsing utensils.

11. If disease is present on the

dairy farm, no milk should be brought to the consumer without first consulting the health authorities.

There may be danger of the consumer infecting the milk supply of the dairy. In the case of communicable disease in the home, such as diphtheria, scarlet fever, typhoid, etc., the return of a milk bottle to the milkman unless the milk bottle has been thoroughly *sterilized outside the infected premises,* may transmit the disease to others by means of this infected agent. Therefore return no milk bottle in a case of this kind to the milkman without the permission of the health officer.

CHAPTER VII

THE SANITARY HANDLING OF FOODS IN THE HOME

THE sanitary handling of foods in the home is of prime importance. Very little is generally known by the average family as to how foods should be properly handled so as to prevent waste and the spread of disease by means of contamination. The subject, therefore, naturally divides itself into (1) to prevent waste of food so as to keep down the cost of living; (2) to prevent spread of disease by foods which have been infected by undesirable organisms, so as to keep down loss of life. Both are desirable from an economic point of view and both are indispensable from a health standpoint. Why is the pre-

vention of waste of food indispensable from a health standpoint you ask? Simply because if we spend our money replacing our home food supply when we could have saved foods from spoilage by proper storage in the home, it necessitates an outlay of money which could be used to advantage in providing comforts, to make us happier, live better lives; and, in the case of the sick, give them more money to provide richer and more nourishing food and suitable remedies to aid the body in getting well.

One reason we make our homes sanitary is to prevent undesirable organisms and dirt from coming in contact with our food; and in nine cases out of ten, disease in the home is carried to our bodies from contaminated food supply, directly or indirectly. Another reason is, of course, the æsthetic; personal pride, and what

others think of us make a large share of people keep clean in the home. This last is a reason that is foremost where the gospel of Public Health has not been preached to any great extent.

I will take up the prevention of waste of food first. It has long been known that if food is stored in proper containers and in as clean a manner as possible it can be kept longer than if stored otherwise. "There's a reason" as a certain clever advertisement says. Nature has taught us that if we leave matter exposed to the air and the elements of weather, such matter decomposes. It is true of everything provided time is given its course and no prevention is used. Just why it is that food and in fact everything decays, science has stepped in and pointed the ways.

All of you know of that element in chemistry we call oxygen. Iron if

allowed to rust turns into what we call ferric oxide—a combination of oxygen and iron. An apple if bruised is suddenly attacked by yeasts and molds from the surrounding air, and rapidly deteriorates unless we use prevention. In fact, if we could exclude all oxygen from coming in contact with matter—having first excluded all forms of undesirable organisms—it would be possible to preserve indefinitely. But such is not possible—a perfect vacuum has never been obtained and could not for any length of time be kept—due to the great volume of air pressure about it. Nature abhors a vacuum, you will remember from studying physics. But man has found many ways of storing and preserving food for all practical purposes by means of heat and excluding as much air as possible, such as the canning of food

stuffs; by means of refrigeration, such as cold storage; and by means of equalizing the temperature and careful sorting out of decayed material so as to prevent contamination.

Food is attacked by many organisms that induce spoilage, namely bacteria, molds, and yeasts. Then we have the ravages of insects, worms and rodents. Thus you see that unless we prevent these from attacking our food supply, spoilage is certain. From the standpoint of household sanitation, bacteria are by far the most important of the micro-organisms that attack food. They are many times smaller than the yeasts, and their power of reproduction is almost unlimited. They require at least 25 per cent. of moisture in which to live and multiply and they prefer darkness to light, and while as a class they grow best at a comparatively high

temperature, 80° to 95° F., most of them are killed by an exposure of 150° to 160° F. of moist heat. A repeated application of boiling temperature is necessary, however, to kill the spores which certain kinds produce.

Bacteria are very widely distributed; the soil teems with them; they are in the air, in water, and in all food exposed to dust and air, milk being a favorite habitat. The flesh of the healthy living animals is free from them, but when slaughtered and marketed the surface is almost certain to acquire bacteria, like all things which are exposed to air and dust. They are inside the human body, often performing important functions, as in intestinal digestion. In short wherever organic material is exposed to their inroads there they are found. We can protect our food supply from their undue growth by reversing all

conditions that they require for their development.

It is of primary importance that bacteria be prevented from getting their start. Hence, only such foods should be bought as are in the freshest and best possible condition. Since succulent fruits, milk, raw meat, and meat products are especially subject to bacterial action, they must be given unusual attention. They should be consumed as soon as possible after purchase or subjected to the following conditions. Utensils that come in contact with them must be thoroughly scalded, or better, boiled. The hands and clothing of the worker must be kept clean and every effort made to avoid contact with dirt. Of cooked foods, moist vegetables, cooked fruits, moist made dishes like meat pies and similar dishes, are particularly liable to "spoil" or "sour," and the im-

portance of clean utensils, of keeping the foods protected from dust, etc., cannot be overestimated.

The temperature at which food is kept should be reduced to that best suited to it, which is usually as near the freezing point as possible. Highly putrescible food, as meat, is thus kept for months in cold storage and a good ice box will keep such food for days in perfect condition. Cool, clean storage is as important for many cooked foods as for raw.

Since the water content of food must be above 25 per cent. before bacterial life is possible in it, we may preserve food by drying it. This method, often in combination with salting and smoking, is applied to fish, meat, vegetables and fruit.

By exposing food to 150° to 160° F. of heat for half an hour, all varieties of bacteria would be killed ex-

cept a few that are very resistant to heat. In the case of spore forming bacteria, the spores would in certain cases resist this degree of heat. The pasteurization of milk offers a familiar example of a food that is kept from spoiling by this method.

After thorough boiling, food may be sealed from the outer air by the well-known method of canning. Most varieties of bacteria are killed in a few hours by direct sunshine, but it must be direct. The recesses of a dark room are little affected by what sunshine may filter into its depths. Contents of storerooms should now and then be sunned, and such rooms should be regularly aired.

We may often make use of substances that inhibit bacterial growth. These tiny organisms cannot live in a strong sugar solution, a fact made use of in preserving fruits. Vinegar,

spices, salt and wood smoke have a like effect, and their use is familiar in pickles and spiced vegetables and fruits and in salted and smoked meats.

Molds are familiar to all of us. The spores (*i.e.*, the minute reproductive bodies) of the different varieties of mold are everywhere present, and they need only warmth and moisture to enable them to grow on many kinds of food. These organisms are always at work in damp corners of rooms; they are borne on the feet of insects, they are on the skins of all fruits, and in the dust flying in the air. They are not fond of light and they require no great abundance of air, flourishing best in foods that are piled close together, leaving small undisturbed air spaces and moisture. They always start on the surface, and throw their thread-like filaments down into the substance below.

As stated, molds need moisture for their development. They must also find some place in the food to push their long thread-like filaments into the food. For example, if fruit is bruised, the bruised portion will be a favorite stand for the mold and decay will ensue. Fruits are living things. They are taking in oxygen and breathing out carbon dioxide as a result of the chemical processes going on in the tissues. These changes go on before and after the fruit is picked. This results in particles of moisture being deposited on fruit after standing for a time in the home, and this is the reason apples, pears, etc., are wrapped in soft paper so as to absorb moisture and prevent bruises when such materials are stored or shipped.

If the growth of mold is started, it is hard to arrest. The first requisite is absolute cleanliness in the storage

place of food. This is not to be attained by the use of soap and water alone. Fresh air, sunshine, and whitewash are important aids. Shelves should be washed clean and then dried; but the undue use of water should be avoided, as moisture is one of the chief requisites of growth. A cellar may be kept dry by placing in it dishes of unslaked lime which takes up the moisture with avidity. When the lime crumbles apart, losing entirely its crystalline character, it has become slaked, will take up no more water, and must be renewed.

The growth of most molds is retarded by light, ventilation and low temperature. Light and ventilation are important. The right degree of cold for each different product has been studied experimentally, and a knowledge of low temperature in relation to the growth of bacteria and

fungi, forms the basis of the cold storage industry.

Besides the bacteria and molds that cause spoilage of foods, we have the so-called "wild yeasts," which are everywhere, even in the air. These "wild yeasts" are of a different variety than those which are cultivated for the making of bread, etc. Yeasts have legitimate functions as stated, but we do not want yeasts where they have no proper function. "Wild yeasts" attack the sugar in the stewed fruit that has stood exposed on a warm day, or the jelly left uncovered, or sometimes even when apparently covered, only in these cases the gas evolved serves no useful purpose and the fermentation ruins the flavor and taste of the food. In the legitimate use of yeasts in making bread, when introduced into the bread dough, they break up part of the

sugar present into alcohol and carbonic acid gas, and the gas becomes tangled and stretches out in the glutinous mass, making the porous loaf which at the right moment is stiffened by the heat of the oven.

Yeasts grow best at a temperature of 70° to 90° F., therefore food that is to be protected from their action must be kept well below this point.

I will now take up the second portion of the subject of the sanitary handling of food in the home, that is, to prevent spread of disease by foods which have been infected by undesirable organisms, so as to keep down loss of life.

Water, milk and uncooked foods sometimes become infected with undesirable organisms that cause disease, sickness and sometimes death. Food is a frequent means by which germs of typhoid fever gain entrance

into the intestines of new victims. This is especially true of foods that are eaten raw. Typhoid fever cases have often been traced to oysters fattened in polluted streams or to vegetables soaked in or sprinkled with unclean water. Particular care should be taken in preparing vegetable salads for the table. In order to insure safety all foods should be cooked before using.

Flies also play an important part in carrying disease from one person to another. The fly, as everyone knows, lives in filth. The body of the dead animal, the manure pile and the privy vault are its favorite haunts. It alights upon the sputum of a person suffering from tuberculosis, upon the discharges of a typhoid patient, only to bring this infected matter to our milk and other food. This source of contamination is particularly likely to

occur in places away from large cities, where sanitary facilities are not well developed. For this reason, the free use of chlorinated lime cannot be too highly recommended as a disinfectant in country districts and in all towns and cities where municipal sewerage systems have not been established.

The delivery of milk, groceries, etc., to those families where there is a communicable disease, must be carefully done. Milk and other necessary supplies may be delivered at the infected premises but there must be no contact of any kind between the delivery agents and the attendants of the patient.

Milk should be delivered in bottles only, and such bottles must not be taken from the infected premises during the existence of the disease. Before they are removed from the

premises, after the death or recovery of the patient, they must be sterilized under the direction of the local health authorities. A person recovered from typhoid fever should not be permitted to engage in any manner in the handling or preparation of food stuffs, milk or milk products, including the handling of milk containers, until one month after the date of the recovery and until after the intestinal discharges have ceased to be more copious, liquid, or frequent than normal, or until such time as it has been ascertained that such person is in no danger of spreading infection.

If there is any suspicion as to the freedom from communicable disease in the city, always pasteurize the milk, boil all water before using for food or drinking purposes, and only use cooked food or foods which are positively known to be in a sanitary condition.

Sickness may also be caused by undesirable organisms in food which do not cause communicable disease. Such sickness is generally known and caused by so-called "ptomaine poisoning" or food poisoning.

Bacteriological investigation of many epidemics of ptomaine or food poisoning show that they are due to infection with a number of different varieties of bacteria, practically all products containing the paratyphoid group of organisms. In a very large percentage of cases the infection originated from eating meat or meat products containing paratyphoid bacilli. The paratyphoid bacillus is a saprophyte, that is, it lives only on decayed matter.

The measures for prevention of food poisoning are similar to those for the prevention of typhoid, that is, in regard to filtration of water,

sanitary disposal of fæces and urine, and the pasteurization of milk, together with careful regulation of the preparation of all ground or prepared meats. Cleanliness must be observed in the preparation of all meats, and careful refrigeration must be imposed. The eating of ground foods, containing meat products is a very questionable practice during summer months, since a form of infection is due to eating meat infected with paratyphoid bacilli, which was insufficiently cooked, or if well cooked, was later infected with these organisms. The infected meat comes from sick animals, *e.g.*, cholera hogs, septicæmia of cattle, navel infection of calves, enteritis of cows and calves, metritis and mastitis of cows, peritonitis and pericarditis, osteomyelitis, and suppurative pleuritis of cows, hogs, sheep, and often of chickens, ducks, geese and turkeys.

Another organism which has been attributed to be the cause of ptomaine or food poisoning is the *Bacillus botulinus,* another species of saprophytic bacteria. Fish offer an even more favorable breeding ground than meat for such species of bacteria; and other foods, such as milk, cheese, bread, cake, vegetables, and preserves may be similarly infected. Even meat from a perfectly well animal may become infected with bacteria of this type by unclean handling, by the excreta of the rats and mice which commonly haunt slaughter houses, by contact with impure water, in which the bacilli of this class may retain its vitality for months, or by flies, which have been shown by Dr. Ficher of Berlin to carry around with them living germs for weeks at a time. This class of bacteria grows only on dead animal

matter, etc., outside the human body, and it is in such conditions that it elaborates its extraordinarily fatal poison. Consequently it is not contagious or infectious, but is capable of injuring only those who have taken the food in which it grows.

Food poisoning may also be caused by excessive tin content in certain canned foods—especially those foods having a high acid content by which the acid attacks the tin of the can; or those like sardines in oil,—the oil of which has changed its composition, rendering the tin of the can soluble and into solution. Excessive vomiting and diarrhœa are the chief symptoms in poisoning of this character. Modern factory cannery methods have relieved the situation in this regard by the use of lacquer on the inside of the tin containers holding high acid content foods; and much work

has been done by federal scientists co-operating with the fish canning industry to reduce the tin content in such products.

Besides the things I have mentioned food may be contaminated by mice, rats, insects and worms, which, in addition to destruction of edibles, furnish material which is distasteful, non-æsthetic, and in most cases may be a carrier of disease.

CHAPTER VIII

RURAL SANITATION

In taking up this subject, it will be impossible for the writer to do more than summarize and then enlarge upon the chief points of sanitation of rural districts, since space will permit only a brief account. Rural sanitation treats of preventive measures for the preservation of the health of those who reside in the rural districts, as the definition goes. But in recent years, rural sanitation has meant more than this; it may mean the health of those who reside in nearby town and city, since contagious diseases have been carried to the city from the farm by means of infected food supplies such as milk and meat.

It is due time that the sanitation

of the farm should receive considerable attention. The writer is not going to bore you with statistics of death rate in cities and rural districts, but recently sanitarians have called attention to the fact that the death rate in the cities is falling more rapidly than in the rural districts. The cause of this is simply a matter of sanitation, says Dr. I. W. Brewer. Statistics show that the death rate from malarial fever, influenza, and dysentery is greater in the rural districts. It is also probable that many cases of death from typhoid which are charged to the cities were in reality contracted in the rural districts.

A great many people have a strong prejudice against living in the country, yet there are many advantages in such a life. These are:

1. An abundance of fresh air and sunshine.

2. The small number of persons to a given area.

3. More out-door life.

4. Plainer, simpler, and fresher food.

The disadvantages are:

1. Lack of society and recreation.

2. Exposure to the weather.

3. Poorly ventilated and heated schools and dwellings.

4. Lack of medical attention and inspection.

5. Danger from polluted water.

6. Disregard of the Sanitary Law.

The telephone, the rural free delivery, the parcel post, and the Better Farming Association and Extension Departments of the Agricultural Colleges are largely responsible for ridding us of the first disadvantage, *i.e.,* lack of society and recreation, as they bring the farmers together and into communication with one another;

but the disadvantages, such as poorly ventilated and heated dwellings and schools, the lack of medical attention and inspection, and disregard of the Sanitary Law, stand forcibly before us.

Let us take a trip to the farm. First we will go to the dwelling house. The all important room is the kitchen. It must be kept free from flies and should not be the place for hanging the outer garments of the family. These are generally dirty and in some cases smell of the stable or soil. Running water is very desirable, and where it cannot be had provision must be made for an abundant supply from other sources. A large hot-water tank is a necessity. Screens should be placed on doors and windows during the fly season.

The surroundings of the farm-house should be well kept and there

should be no backyard littered with cans, ashes and other refuse. The house should be located on high ground and ground as dry as possible and should not be connected with the barn. The cellar bottom should be flagged with stone or cement, the walls pointed, the windows screened to prevent flies and entrance of noxious animals. The vegetable cellar should be under the shed or barn. The house walls, especially those of the kitchen, should be painted, not calcimined or papered; they will more easily be kept clean, hence in a more sanitary condition.

Let us see what we can find out about the water supply. Is there an open well into which drains the seepage from the privy, barnyard manure, or cesspool? Such wells should be filled up at once for danger is near. Sanitarians have provided the follow-

ing rules in regard to rural water supply:

1. Use cisterns when the rainfall is sufficient.

2. Use artesian wells when possible.

3. Use springs if from deep sources, when properly protected and when they have been shown to be pure by official tests.

4. Use river, lake, or pond water when it has been passed through a filter bed or when it comes from a sparsely inhabited area and has been shown to be pure by official test.

5. The open well is to be condemned.

6. In all cases where there is the least uncertainty as to the purity of water, boil it or otherwise sterilize it.

Let us turn to the method of the disposal of excreta. One of the most disgusting sights is the insanitary privy of the rural districts. All of

you have seen the conditions. There is no need for the writer to try to picture this phase of uncalled for negligence in every rural community. You ask, "How are we going to remedy it?" No, do not build a cesspool; they are likewise dangerous to the health. In the first place, most of them are built of loose stone or are mere excavations in the ground and therefore the liquids drain away and eventually find their way into the wells of the vicinity. Sanitarians have set forth the following plan, which offers the best solution for the disposal of human excreta and household wastes when a sewage system of the city cannot be had. It is the system of subsurface irrigation. This is really a combination of sewage farming, Col. Waring's system and septic tanks. Dr. Henry D. Holton of the State Board of Health of Vermont

gives the following directions for building such a system:

"Build a settling tank of cement in the ground a short distance from the house, divide it in the centre by a partition which should go down to within six inches of the bottom. The sewage is run into the tank on one side; when it is filled a siphon pipe will deliver it into another tank which we will call the distributing tank; from this tank it will flow into the distributing pipes, which should be earthen sewer pipes, two or four inches, the size according to the amount of sewage there is to be distributed. These pipes are laid ten to fourteen inches under ground; between the tiles is left a space of an inch. If there is a large amount of sewage an inch pipe can be run from the main pipe every two or three joints out at the side, extending four to six feet. This

should be laid with one inch fall to ten feet. All of this is to distribute the sewage into the soil so that the earth can absorb it and care for it. If the soil is of heavy clay it is necessary to have the pipes discharge into sand or gravel, of which a considerable quantity must be supplied at the points where the pipes discharge. Another method is to have it discharge on a filter bed, prepared for that purpose. For a family of four or five, a bed forty by fifty feet would be sufficient, if the family is larger, you need to have more surface. You should provide for approximately forty to fifty gallons for each person and about 100 pounds of organic matter. If you cannot have running water with which to flush a closet and the sewer, there should be provided a closet with a tight box so arranged that a horse can be attached to draw

it away each month. In the closet should be kept a box of dry earth to be used for covering anything that is left there."

The principal reason for using septic tanks in this plan as set forth by all leading sanitarians is that in the tanks the organic matter is destroyed by the bacteria which grow in the sewage. All solid organic matter, with the exception of a small portion, is converted into liquid in the septic tank, and the liquid on overflowing is taken up by the soil in the subsurface drainage.

We will next look at the dairy and milk house. Here the problem of cleanliness and fly riddance is of extreme importance. The following summarized rules will be helpful:

1. The dairy should be well ventilated and well lighted.

2. The dairy should always be clean.

3. The cows should be tested to establish the fact that they are not infected with tuberculosis or other disease.

4. The milkers must have clean special suits and clean hands.

5. Clean the udder and flanks of the cow with a damp, clean towel just before milking.

6. All materials with which the milk comes in contact should be thoroughly clean and free from dust.

7. After milking each cow, the milk should be removed from the stable—do not wait until all the cows are milked before doing this, but after each milking, remove the milk to the milk-room and cool it.

8. The milk-room should have cemented walls and floor, so as to be flushed with water, and a proper drain to carry the water off.

9. Always remember that milk ab-

sorbs odors, and is a great carrier of disease germs.

Space will not permit the writer to dwell at length on the sanitary condition of the country stores, jails, roads, slaughter-houses and the care of hogs, nor can I more than briefly mention preventive measures in warding off intestinal parasites, and such ills as malaria, tetanus, diarrhœa, dysentery, and the communicable diseases such as typhoid, smallpox, diphtheria, and tuberculosis. I can but give you a brief account of how the fly and the common rat spread disease, and many other things I cannot mention at all. It is not the intention of this chapter to portray cures, for such measures the family physician must be consulted. When in doubt whether you are in good health or not, go to your medical adviser. The aim of all sanitarians is the prevention of dis-

ease. The following summary in this regard may be of assistance:

1. The keeping of hogs back of slaughter-houses and the feeding of offal should be strictly prevented by law, since infected offal from tuberculous cattle will infect the hog with tuberculosis.

2. Trichinosis is transmitted to the hog through the fæces of animals or man that are infected, as well as through the refuse and rats from slaughter-houses. Man contracts the disease by eating undercooked meat, raw pork or ham.

3. Tapeworm is a very common infection. The disease is transmitted to the animal through the fæces of other animals infected with the disease or through the fæces of man. Man contracts the disease by eating food that has been contaminated by being washed in infected water, or by

eating raw or partially cooked pork, or directly through his own hands, which have come in contact with the eggs of the parasite and have not been washed.

This is one of the most serious infections, as the parasite may find its way into the brain, the eye, or other organs and cause death. The worms in the intestines of men do not cause serious symptoms, but there is reason to believe that they pave the way for more dangerous diseases of the body.

4. Malaria is more prevalent in the rural districts than in the city districts. It is caused by a minute organism that passes a portion of its life in the red corpuscles of man. The rest of its life is passed in the body of the mosquito of the family *Anopheles*. The disease is transmitted from man to man through the agency of this mosquito. In order to pre-

vent malaria, it is necessary to adopt measures against the mosquito. Mosquitoes have to have water to complete their life cycle. Remember that mosquitoes breed in the water of privies, rain barrels, and cesspools.

5. Tetanus or lockjaw sometimes occurs in the rural districts. It is caused by a germ which lives in the soil, especially in that of gardens, and stables. The dung of horses often teems with tetanus germs. The prevention consists in keeping all cuts, bruises, etc., free from such infected material.

6. Diarrhœa and dysentery are symptoms of diseases which are not fully understood. One group of these diseases is the so-called summer complaint of children. Behring, the German scientist, attributes the disease to an infected milk supply during infancy.

7. Typhoid is a preventable disease. The germs of this disease are given off from the body in the fæces, the urine, and the excretions from the skin of those who have contracted the disease. The disease is transmitted to man through milk, water, and other foods, and by direct contact with infected clothing or other articles. The house or typhoid fly is a great carrier of this disease. It is a well-known fact that the house fly is found feeding voraciously upon excrement, sputum, and all kinds of accessible filth. Also, if the opportunity is offered to the house fly, it may next feed upon food stuffs, either in the grocery, market, or on the table, leaving in its wake a trail of sickness and death. The house fly is known to carry typhoid fever, tuberculosis, cholera infantum, and dysentery; and it is possible that it may carry smallpox, leprosy, plague,

erysipelas, and other dangerous diseases.

The house fly, as I have said before, breeds in filth and manure, and you can readily see the logic of keeping the rural communities free from such breeding places. The house fly breeds rapidly, and in the season from April to September, providing no flies are injured or killed, we have from one female fly in the beginning of April, the total of over five trillions of flies by about the middle of September.

8. I will but briefly mention the stable fly. This annoying species of fly differs from the so-called house fly principally by its piercing mouth parts. It is second in abundance to the house fly, and breeds in horse manure, as well as in decaying vegetable matter and straw stacks. It has been surmised that this insect may be an agent by which infantile paraly-

sis is spread, as it has proven the most abundant insect found in the vicinity of patients having the disease. The stable fly may be of importance in three ways, namely as a tormentor of live stock, as a carrier of diseases of domestic animals, and as a transmitter of diseases of man. With the stable fly, the natural point of attack is found in the immature stages of its development, and there is every reason to believe that by properly caring for substances in which it breeds the insect may be kept under control.

9. Tuberculosis—just a word in regard to consumption or tuberculosis. This is a preventable disease and with proper precautions can be stamped out. It is transmissible to persons through the medium of germs which are given off in the expectorations and

in the minute drops of mucus which are expelled during the act of coughing of one who has contracted the disease. The prevention of this disease consists in enforcing regulations against expectorating in public places. Milk from tuberculous cows must be excluded from the market. Nearly all milk contains a small amount of cow dung, and when the cow passes the germ of tuberculosis in her excreta, they will always be found in the milk. Fresh air and sunshine, plenty of good wholesome food and absolute rest are the greatest cures and preventives known for tuberculosis.

SUMMARY

To be clean is, in a measure, to be safe from infectious disease.

Cleanliness applies not only to the person but extends also to the per-

sonal environment and especially to the food, water and milk supply, etc.

Cook your food thoroughly, especially ham, pork, and all meats, and you will be free from parasitic diseases, as trichinosis and tapeworm.

Remember, the house fly is a carrier of typhoid fever, tuberculosis, cholera, and cholera infantum, and may be a carrier of smallpox, leprosy, plague, erysipelas, etc. Hence, use strict measures for stopping its breeding. (1) By doing away with all filth or refuse in which the fly breeds; (2) keep screens on doors and windows during fly season; (3) keep sticky fly-paper around in fly season to catch as many flies as possible, then burn this paper; (4) fly-traps are effective.

Remember that most intestinal diseases such as typhoid, etc., are carried from insanitary out-houses or privies: (a) By means of the house fly

that carries the germs on the tiny hairs of its feet from the excreta to the food supply; (b) by means of seepage or drainage from the privy into the well water supply.

Remember that rural insanitary slaughter-houses and insanitary yards of slaughter-houses may breed the following diseases, which may be transmitted to animals: tuberculosis, anthrax, hog cholera, and swine plague. For this reason, it has been advised that animals which enter the pens at the slaughter-house should not be returned to the herd unless quarantined for sufficient time to insure that they are free from disease. Aside from this, insanitary rural slaughter-houses and yards are generally infested with rats, which are one of the means of spreading trichinosis to hogs. Dr. Stiles of the United States

Public Health Service has found that 50 per cent. of slaughter-house rats have been so infected. Then again insanitary rural slaughter-houses and yards are the breeding places of countless flies and these walk at liberty over the carcasses of the animals which are hung up to cool.

Remember, that good clean food, plenty of fresh air, good ventilation in sleeping-rooms, and plenty of exercise will keep the body in a fine state in which to ward off most diseases which infest rural communities.

I wish to quote a poem written by Dr. W. C. Rucker of the United States Public Health Service on insect transmission of disease.

The flea and the fly, the mosquito and the louse,
All lived together in a very dirty house.
The flea spread the plague,
And the skeeter spread the chills—
All worked together to make undertakers' bills.

The fly spread typhoid, and the louse spread
typhus, too;
Folks in that house were a mighty sickly crew.
Along came a man and he cleaned up the house,
Screened out the skeeter and swatted the louse.
The fly and the flea he pinned against the wall;
Now the people in that house are never sick at all.

CHAPTER IX

IMPORTANT PHASES OF THE FOOD PROBLEM

As new experiments are being performed, the food problem develops important phases. As stated in the introductory chapter applied sanitary food principles, nutrition, flavor, the use of former waste products and the knowledge of food constituents are becoming subjects of much thought. The conservation of our food supply must likewise be taken into account. War between different countries sometimes makes the food problem an international issue. In case the food supply is cut off from one country and particularly necessary food articles which are not grown in that country or the consumption of a necessity is greater than the country

can supply, we find many substitutes used and invented to supply the demand for the original article of food.

One of the food products now generally known as "oleomargarine" was the outcome of a substitute for butter. The manufacture of oleomargarine is to-day one of the highly important branches of the meat packing trades, although but some forty years ago it was an imperfect infant industry under the protection or patronage of the French government. In 1870, under instructions from Napoleon the Third, Mege Mouries, a Frenchman, succeeded in producing from foreign fats taken from beef a substitute for butter, similar but less expensive. This Frenchman patented his process in the United States in 1873, and began making improvements on it. The "oleomargarine" of to-day is a product made from oleo oil (the fresh

clear oil from intestinal and caul fats, including the omentum and sometimes the suet from freshly killed beef), neutral (from the fat of freshly killed pork), and milk. Some grades of oleomargarine contain in addition to the above certain per cents. of vegetable oils such as cottonseed oil, peanut oil and sesame oil.

In France, at the instance of the legislative commission investigating methods to provide a remedy for the increasing cost of food, scientific experts of the French Institute are testing artificial meat produced by a Belgian chemist from the residue of malt after breweries have used it for beer making. The albumen thus extracted is washed and pressed into solid bricks, treated first with sulphuric acid and then with lime-water, and afterwards submitted to a number of operations of filtration and vacuum

evaporation. The pasty substance thus resulting is said to bear an extraordinary resemblance in taste to beef and to possess alimentary properties three times greater than ordinary meat.

Nearly every food product has many market substitutions and in recent years science has worked and is working on this problem. This substitution is perfectly legitimate provided the substituted product is not sold for the genuine and also provided the substitution is harmless to the health of the consumer. At this place the writer wishes to impress his readers with the fact that there are certain elements in food products such as proteins or nitrogen bodies which have been found of late years to be different in various food stuffs, and there is a question as to the substitution of one kind of protein for another

to still get the desired results from this complex food constituent. Many products have never been substituted successfully; one of which is milk. The digestibility of food stuffs by the average person is another associated phase of this particular problem.

There is very little known about the comparative digestibility of foods by the average person. As a rule, cooking facilitates digestion, partly by inducing chemical changes, which would otherwise have to be induced by functional activities. Fat retards digestion, as it has to undergo a long process of emulsifying before being absorbed. This is said to be the reason for the indigestibility of pork.

Under normal conditions it is well that the digestive process should not be prolonged beyond four and one half hours. For invalids and others

with weak stomachs the time should be much less. As a result of repeated experiments, the *Scientific American* prepared a table from these experiments. Among other foods given the following are of interest: It takes one hour for boiled rice, grilled venison and boiled tripe to be digested; one hour and thirty minutes for sweet apples, boiled asparagus, barley soup, purée, beans, boiled celery, raw whipped fresh eggs, boiled fish (other than fat variety), stewed spinach, boiled fresh salmon, and boiled trout; one hour and thirty-five minutes for green stewed apples, boiled brains and boiled sago; two hours for boiled barley, boiled chicken, roasted duck, raw fresh eggs (not whipped), boiled milk and boiled tapioca; two hours and fifteen minutes for raw milk and boiled turkey; two hours and a half for boiled beans, roasted goose,

warmed hash meat, fried or sautéed calves' liver, grilled lamb, boiled lentils, boiled peas, roasted suckling pig, fried or baked potatoes and roasted turkey; two hours and forty-five minutes for stewed tender beef, boiled fresh salted beef, fricasseed chicken, and boiled custard; two hours and fifty-five minutes for raw oysters; three hours for roasted lean beef, grilled beefsteak, soft boiled eggs, scrambled fresh eggs, fried or sautéed ox liver, fried fish (other than fat variety), boiled broiled mutton, fried soles; three hours and fifteen minutes for roasted lean mutton, boiled salt pork, and raw salad; three hours and a half for baked fresh bread, melted butter, old cheese, stewed oysters, stewed onions, grilled sausage and boiled turnips; three hours and forty-five minutes for boiled beets, bread and butter (with coffee); four hours for

roast chicken, hard boiled fresh eggs, boiled fowl, roasted fowl and boiled smoked salmon; four hours and fifteen minutes for roasted game (all kinds); four hours and a half for pickled cabbage; five hours for nuts, smoked sausage, and roast or grilled veal; five hours and fifteen minutes for roasted fat pork; and six hours for boiled old salt beef, roasted eel and raw stone fruit.

While it is necessary in the food problem to consume foods which digest easily, it is quite important to have a balanced ration. In this day of the high cost of living we naturally turn to the cheaper food stuffs, regardless of their variety or their value to the human system. The mineral elements in nutrition are important. Langworthy of the United States Department of Agriculture publishes an estimate, based upon conclusions of

Sherman and of Von Noorden, of the daily mineral requirement of an adult human being.

ESTIMATED AMOUNT OF MINERAL MATTER REQUIRED PER MAN PER DAY

	Grams.	
Phosphorus	1.31	1.75
Sulphur	0.80	1.40
Potassium	1.66	2.49
Sodium	2.97	4.45
Calcium	0.50	0.71
Magnesium	0.18	0.30
Iron	0.006	0.012
Chlorine	6.00	8.00

These are maintenance requirements for mature persons. Growing children doubtless need very much more of some, at least, of these mineral nutrients. Women and children need more iron in their food than do mature men, since growth, lactation, and pregnancy all call for more iron than is needed for mere maintenance.

In studying 20 American dietaries Sherman found that about half of

them contained less calcium than the body needs. About a third of them were low in phosphorus. These deficient dietaries could have been improved by substituting milk and cheese for a part of the meat (which without bone is deficient in calcium) and by using fruits and vegetables in place of part of the starch and sugar.

Beans, peas, milk, graham flour and eggs contain considerable calcium, and these same foods are good sources of phosphorus. Meat is rich in phosphorus but poor in calcium.

Those foods which we use in considerable quantity which are poor in the mineral nutrients are rice, hominy, bolted cornmeal, patent flour, potatoes, sugar and fat meat. If one makes large use of these foods, he should also use others containing much more mineral nutriment.

Most human foods are rich in potas-

sium salts, especially fruit, vegetables, milk and meat, while the cereal products are low. The necessary amount of the mineral magnesium appears to be present in all practical rations—likewise sulphur. Common salt furnishes us with the sodium which the body needs.

The above digest from known authorities regarding the minerals in our diet brings us to the subject of food economy, but this economy should not be based merely on the generally supposed theory that all we need to get in our daily ration is proteins, carbohydrates and fats, as can be readily seen from the above digest, relative to the mineral matter required. Nevertheless we must have the proteins or nitrogenous matter, carbohydrates or starches and sugars, and fat for body development. To get these constituents of food with the

least expenditure of money and still have variety and those things which invite the appetite is a hard problem. This subject of food economy will be taken up in a later chapter.

There has recently been brought into the food problem a factor hitherto unrecognized which must be taken into consideration in respect to the essential food elements necessary for normal metabolism. This constituent has been given the name "vitamine," and this term now expresses the idea that in addition to the usual proteins, fats, carbohydrates, etc., contained in ordinary food stuffs there must be present also a sufficient amount of vitamine in order that normal metabolism be maintained. This subject together with another new factor, "enzyme," will be taken up in a later chapter.

Bechhold says that food substances

are mainly in colloidal condition and the problems of food analysis and of cooking are applications of colloidal chemistry. Examples from the literature show the applications of colloid chemical methods such as the determinations of ability to imbibe water, coagulation conditions, surface tension, viscosity, and the use of ultra-filtration. He says that these give better indication of nutritive value than ordinary chemical determinations and he makes a plea for their more extended use.

CHAPTER X

THE HIGH COST OF LIVING AND FOOD ECONOMY

THERE is one thing we can all agree upon and that is the high cost of living—particularly the high cost of food products. All do not agree as to the cause for it. Some blame the housewife for her carelessness in buying and the inefficient methods used in the home; others put the blame on the middleman's or commission man's profits; some go higher up the scale and point to trusts or monopolies; others say it is due to the storing of the food necessities in large quantities, either in cold-storage plants and warehouses, or in the case of cereals in terminal elevators, there to await larger prices. There is perhaps no one particular cause and there is no

doubt that all the above causes and others not mentioned contribute toward the high cost of living, especially the food supply.

Bradstreet has kept an accurate record of prices on what are termed staples of living comprised of ninety-six commodities. These reports run through a period of twenty-nine years and show the prevailing prices during all that time and the falling off or advance in price each article has made each month.

For illustration, the month of October the index was $9.4515, or one unit for the ninety-six commodities would have cost that sum. For November it had increased to $9.4781. Where it cost $94.51 for a living in October, it would cost $94.78 in November.

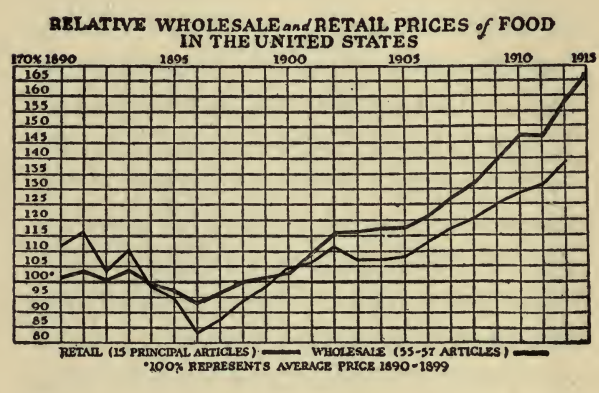
The low point according to their records was in 1896, when the living cost was $59.12. There has been a

rise of 16.2 per cent. over the average of 1902 and 17.7 over 1892. The average for the ten year period, 1892 to 1901, was $69.69, on which rise the index for 1912 showed an advance of 31 per cent. in the living cost.

It will not do to say that we must produce more and consume less for this does not meet the exigency. It does not solve the great problem of living. That must be done more speedily and more effectively than through equation of production and consumption, says an editorial writer commenting upon this subject. There is something radically wrong when the consumer must pay so much in excess of the sum the producer gets for a commodity.

The United States Bureau of Labor Statistics announced in 1912, that during the year 1911 prices were higher than at any time during the

previous 30 years. During 1911 wholesale prices advanced sharply, the most important feature being the marked increase in the great groups of farm products, food, fuel and lighting, and metals and implements.



Food as a group increased 6.2 per cent., the most pronounced increase being in sheep, 24.4 per cent., and cattle, 29.4 per cent. Drugs and chemicals advanced in price 2.2 per cent. The writer is giving these figures for

1911 so that the European War cannot be given as an excuse.

What is the remedy? What are we going to do about it? When you read according to the storage man's own figures that there are millions and millions of pounds of butter, millions of dollars worth of fruit and fish, over a billion eggs, and millions of cattle, calves, sheep and lambs and hogs at the present time in hundreds of cold-storage plants, it cannot but make one think that this has something to do with the high cost of food, especially meats, dairy products, eggs and certain fruits at times of the year when these articles are not in the open market.

When we have completely solved the regulation of food prices made by stock exchange markets, which price is handed in turn to the retail food market, we have made another stride in knocking down the cost of living.

When you hear one say that the wealth and prices are held by a few dozen men in this country, perhaps your informant is not far wrong. The law should stop the gambling with our necessities of life.

But don't blame the high cost of living entirely on the man higher up. It may be that it is the cost of high living instead of the high cost of living.

What does it cost to exist at the present time? W. D. Mahan, President, Amalgamated Association of Street and Electric Railway Employees of America, in setting up the contentions of the street railway men for a demand for higher wages in Chicago, gives a table, per annum cost, from which the writer summarizes as follows:

Housing expenses including rent, coal, kindling wood and gas	$326.00
Clothing for man	82.75

Clothing for wife	$47.00
Clothing for three children	37.50
Food for the Family:	
Meat, 40c. per day	$146.00
Bread, 15c. per day	54.75
Cake and Pastry, 10c. per day	36.50
Milk, 10c. per day	36.50
Potatoes	16.00
Sugar, 5 lbs. per week, 8c. per lb	20.80
Flour, 24½ lbs. per month, 85c	10.20
Tea, 15c. per week	7.80
Coffee, 30c. per week	15.60
Breakfast foods and cereals, 25c. per week	13.00
Butter, 4 lbs. per week, 32c. per lb	66.56
Lard, 1 lb. per week, 16c. per lb	8.32
Eggs, 1½ doz. per week, 25c. per doz	19.50
Cheese, ½ lb. per week, 20c. per lb	5.20
Total of these food products,	$456.73
Other food products such as fruits:	
1 barrel of apples	$3.00
Bananas, lemons and oranges	10.00
Total of fruits	$13.00
Such Products as Vegetables	
Cabbages, 5c. per week	$2.60
Onions, 5c. per week	2.60
Turnips and carrots, 5c. per week	2.60
Lettuce, radishes, etc., 15c. per week	7.80
Total of Vegetables	$15.60

Fruit for Preserving	
Strawberries	$1.50
Raspberries	1.50
Peaches	2.50
Pears, plums, etc.	3.00
Sugar for preserving	4.00
Total of these items	$12.50
Canned Foods	
Corn, 15c. per week	$7.80
Tomatoes, 15c. per week	7.80
Peas, 15c. per week	7.80
Total, canned foods	$23.40
Food Sundries	
Vinegar	$1.00
Pepper	.40
Salt	.50
Mustard	.40
Matches	.50
Ginger, nutmegs, spices	1.50
Pickles, 5c. per week	2.60
Catsup	1.00
Total of food sundries	$7.90

He then gives the cost per year of furniture and household goods including brooms, brushes, gas mantles

and lamp glasses, stove and shoe polish, soaps for family use, starch, bluing, renewals on furniture, bedding and kitchen utensils, which together sum up to $65.50.

Miscellaneous expenses per annum total $122.00, which includes life insurance, lodge dues, ice, insurance on household goods, street car fare, school supplies for three children, repairing of shoes, donation to church, daily paper, doctor and medicine bills, theatre attendance once a year, vacation and park amusement. For theatre attendance he places only $2.50 and for vacation and park amusements only $5.00.

In summing up the actual existing cost per year, it amounts to $1,209.88 and does not provide for luxury of any kind.

The total food material cost plus $12.00 annual ice bill was $541.13,

or in other words 44.73 per cent. of the total cost of existing. When the cost of existing is below the figure given, it may be reasonably assumed that the family is not being fed, housed and clothed properly and decently.

Another investigator, a woman, independently figured the family budget per year, and found practically the same results, as follows:

Food (husband, wife, three children)	$447.15
Shelter	144.00
Clothes	100.00
Operating expenses (light, heat, service, etc.)	150.00
Advancement: (Insurance, savings, recreation, health and cost of keeping child of 14 in school instead of at work)	312.00
Incidentals	46.00
Total	$1200.00

The food material cost in this estimate was 37.36 per cent. of the total cost of living.

We must have food and it means a fight from the start to obtain the right kind of food at the least possible prices. It has been found that in the food of an ordinary mixed diet about 92 per cent. of the protein, 95 per cent. of the fats, and about 97 per cent. of the carbohydrates are utilized by the body. The proteins, that is substances similar to the white of an egg, curd or casein of milk, lean meat, and glutin of wheat, etc., are used as nutrients in the human body to form tissues. The fats, such as fat of meat, olive oil, butter, oils of corn, cotton-seed, wheat, etc., are used as nutrients in the body and are stored as fat. Carbohydrates, such as sugar, starch, etc., are transformed into fat. Mineral matter (ash), that is phosphates of lime, ash, soda, etc., shares in forming bone, assists in digestion, etc. All these constituents serve as fuel energy

in the forms of heat and muscular power.

Much has been written of late years on food economy in the home, and its relation to the high cost of living. There is no doubt but that this plays a part in the *buying of the right kind of food, and the utilization of so-called waste products in the home, which generally are thrown out by the careless housewife.*

Since the heat and energy constituents of food have been described, it may be well to know that the protein forms 18 per cent. of the body of the average man, water 60 per cent. of the body weight, fat about 15 per cent. of the body weight, mineral matter 5 per cent., and carbohydrates less than one per cent., although this last named constituent furnishes the chief source of heat and energy. We must have food to keep these constituents of

the body repaired, also to make heat to keep the body warm, and to give us energy to do the work of the body.

An elaborate apparatus called a respiration calorimeter was first used to get factors by which we might calculate the fuel value of any food provided we first found out by chemical means the amount of protein, fat and carbohydrates such food contained. Investigators have compared, by the use of the respiration calorimeter, the heat actually produced by an animal with that which would be produced by the burning of the same materials outside the body. Rubner conducted the first accurate investigation of this sort in Germany in 1894. He has been followed by other investigators, notably Laulanie in France, in 1898, and later in America by Atwater, Benedict, Milner, Armsby and Fries. Armsby sums up the results of these

experiments as follows: "These results may be taken as demonstrating that the animal heat arises exclusively from the combustions in the body, but they have a much broader significance. They show that the transformation of chemical energy into heat and work in the animal body take place according to the same equivalencies as in our artificial motors and in lifeless matter generally. . . . The body neither manufactures nor destroys energy. All that it gives out it gets from its food and all that is supplied in its food is sooner or later recovered in some form. We are fully justified, therefore, in speaking of the food as body fuel. . . ."

By the use of the "Bomb" calorimeter, the fuel value of foods can be approximated. The amount of heat given off in the oxidation of a given quantity of food is called its "heat

of combustion," and is measured by its potential energy. The unit is known as the calorie, the amount of heat which would raise the temperature of one pound of water 4 degrees F., or the amount of heat required to raise the temperature of one kilogram of water one degree Centigrade. Fuel values, therefore, are measured by the calorie.

Cheese, meat, fish, poultry, eggs and oysters contain the most expensive element in the human diet,—namely protein. Full cream cheese contains 25.9 per cent. protein; beef, according to the cut obtained, from 13.9 per cent. to 19.0 per cent. protein; veal 15.1 per cent. to 16.2 per cent. protein; mutton 13.5 per cent. protein; fresh pork 13.5 per cent. protein and cured pork, such as ham, 14.2 per cent. and bacon 9.1 per cent. protein; fish, such as halibut steaks, contains 15.3

per cent. protein, dressed cod 11.1 per cent. protein, canned salmon 21.8 per cent. and canned sardines 23.7 per cent. protein; poultry contains from 12.8 per cent. to 16.1 per cent. protein; hens' eggs are rich in protein to the extent of 13.1 per cent.; oysters 6.0 per cent. and crabs 7.9 per cent protein.

Since it is necessary to have food which contains protein to form tissue and serve as fuel energy in our body, and since this form of nutriment is the most expensive in our diet, we must substitute other forms of protein in the shape of such vegetable food as dried beans, which contain 22.5 per cent. protein and when they are baked contain approximately 6.9 per cent. protein. Other foods which are cheaper than meats, cheese, fish and poultry and which contain large per cents. of protein

are white bread, 9.2 per cent., soda crackers 9.1 per cent., rye bread 9.0 per cent., graham bread 8.9 per cent., brown bread 5.4 per cent., oat breakfast food 16.7 per cent., corn meal 9.2 per cent., shelled peas in season 7.0 per cent., canned peas 3.6 per cent. and canned succotash 3.6 per cent. protein.

Carbohydrates such as the starches sugars etc., are, as stated before, stored as fats in the body and also serve as fuel energy in the forms of heat and muscular power. They are much cheaper than the proteins or nitrogenous matter, and are found most abundantly in the vegetable products, and also in considerable amount in milk. Whole milk also contains 3.3 per cent. protein.

The fats are in greatest quantities in animal foods and nuts and so far as cost is concerned are next to the

proteins. Whole milk, which averages 4.0 per cent. fat, may be used with cereal products such as bread to supply a cheap substitute for meat fat and protein.

It should be born in mind that meat, cheese, poultry, fish, eggs and oysters have other good qualities besides the protein and fat elements. Such food products even though expensive are rich in flavor and are great aids to digestion. The object in pointing out to you other food products which can be substituted in part is solely in the interest of economy. These expensive food products in our diet should not be entirely eliminated but a judicious use of them would no doubt cut down your grocery bill.

All foods contain mineral matter in small amounts.

When buying the raw food in the market, it should also be noted that

meat, fish, milk, eggs, fresh vegetables and fruits contain the most water and refuse.

Fresh fruits, such as apples, bananas, grapes, oranges, pears, raspberries and watermelons are considered great aids to the digestion and when they are in season are generally cheap enough for the average family to buy. It certainly pays to buy apples which can be kept through the winter in quantities, especially where the climate is suitable for storage of such product. The smaller fruits such as raspberries, strawberries, etc., are economically bought in season and canned for winter use. In this connection the writer might mention that in preserving fruits it is always best to buy sugar long before the canning season since sugar is always cheaper at that time.

CHAPTER XI

LAW REMEDIES APPLIED TO THE HIGH COST OF LIVING

THERE is never a problem but that someone is attempting to solve it. The solution of the high cost of living has ever been a national political issue for years. For illustration, take the tariff with arguments pro and con, one side of the controversy claiming that a high protective tariff builds up home industries and keeps out cheap food stuffs and wares produced in foreign countries. The other side alleges that a high protective tariff makes food commodities and other materials expensive by creating monopolies or "trusts," as they are commonly called. If we have a high protective tariff on imported food stuffs and other necessities, and the

alleged trusts are formed, it is, of course, necessary to make Federal laws to curb these combinations or better to regulate them. If we have a low tax on imported necessities, it is necessary to compete with the incoming product. We have had both low and high tariff on imported necessities and there does not seem to be much difference so far as food prices are concerned. As pointed out in a previous chapter prices on food stuffs are gradually increasing year by year. This is the fact we must face.

There is no doubt but that we have many large food concerns—call them "trusts" if you wish. Not many years ago, the Federal government sought by various Anti-Trust Laws, notably the Sherman Act, to break down large combinations of industries. These laws have not been an entire success only so far as they

broke the combinations into smaller units with practically the same stockholders.

The latest national laws dealing with large corporations became effective on October 15, 1914, and September 20, 1914, and are commonly known as the Clayton Law and Federal Trade Commission Act. These were merely supplements to the Sherman and other Anti-Trust Laws. Anti-Trust Laws are to prevent, if possible, restraint of trade and to encourage competition. Competition makes an article sell on its merits and tends to make the price of the commodity within the reach of all. The new Clayton Law and the Federal Trade Commission Law are complementary laws, the latter embodying the means of carrying the former into effect. The Federal Trade Commission is composed of five members and it has

the power to employ attorneys, special experts, examiners, clerks and other employes as it may from time to time find necessary. It has its principal office in Washington. This Commission is given great arbitrary powers to say what acts are prohibited by these laws, and what ones are not. It makes readjustment of the business, if upon investigation it finds unfair methods and restraint of trade are practised. These laws do not allow discrimination in price between purchasers of commodities *except* on account of quality or on account of differences in the grade, or on account of quantity of the commodity sold. The discrimination in price must be made in good faith to meet real competition. In other words, no monopoly of any line must be created in commerce. These laws forbid the acquiring of the control of competing

corporations by the acquisitions of the stock thereof where the effect of such acquisition may be to substantially lessen competition. The Commission is the entire judge in such matters, and shall give orders for the enforcement of the intent of these laws, or the courts may give the orders. Refusal to obey the orders of the Commission or the Court in these matters results in punishment to the offender.

This new Federal Clayton Law and the Federal Trades Commission Law, if properly carried out in a fair and impartial manner, cannot help but aid the consumer. If we can establish uniform competition, there is no doubt but that prices will not be inflated by a few so-called "trusts"; and food stuffs, such as grain, meat, eggs and other staple articles generally "held" for price by large concerns will be more plentiful at seasons of

the year when such articles are "high." Thus prices lower when competition comes.

There is said to be another remedy commonly known as the "Stevens Bill," which was introduced in Congress by Representative Stevens of New Hampshire last year, but failed to pass. During the 1916 session of Congress, Representative Ayers of Kansas had introduced the measure which is now considered the "Ayers Bill." This bill, if passed, is said to be a remedy for the unfair competition of great trading monopolies with the independent or retail merchants of the country. Chiefly in advertising at "cut prices" well-known goods as a means of inducing the public to buy unknown goods of doubtful quality. The bill explicitly states that its provisions shall not apply to any article that is produced or controlled by a

monopoly. It is alleged for this measure that if any manufacturer asked higher prices than his goods were worth, the public would refuse to buy, and new makers would quickly enter the field. It is a question whether price cutting is in the interest of the public. The advocates of this measure claim that price cutting means the destruction of the usual retail channels by which goods reach the consumers to their best advantage. That it also forces the sale of unknown articles, often of cheap and shabby quality, instead of reliable goods which leave their maker's reputation behind them; and that it also promotes substitution.

Aside from the laws of this country that tend to give us pure food, there will be seen at a glance at the following statistics that there is need of "Anti-Trusts" or better, "Regulation

of Trusts'' laws. We have in the United States 935,000,000 acres of arable land, only 400,000,000 of which are under cultivation, on which is produced one-sixth of the world's wheat, four-ninths of its corn, one-fourth of its oats, one-eighth of its cattle, one-third of its hogs and one-twelfth of its sheep. Our fisheries yield a return of $70,000,000 per year. The 1910 census shows vegetable food manufacturing processes valued at $2,237,000,000 and annual meat product factories yielding products valued at $1,700,000,000. The farmers of the world handled 2,329,000,000 bushels more of grain in 1912 than 1911, and yet they got $1,216,000,000 less for the big crops than for the small one. They produced three quarters of a billion bushels of grain less in 1907 than in 1906, and they received nearly two billion dollars less for the large crop

than for the small one of 1907. Out of the 4,000,000,000 bushels of wheat raised in the world there are said to be only 600,000,000 bushels found in the channels of international trade. Rice is fairly cheap to the consumer, and it is because the United States produces only a very small part of the rice grown in the world, and cannot control the price. The United States produces more than 700,000,000 pounds of rice annually, but Asia produces 159,000,000,000 pounds.

Let us think over the above statistics and then wonder at the high cost of food stuffs, which increases each year. Even if our supply is greater in any given year, and the farmer does not get as much as when the crops or supply of food animals are less, *the price to the consumer is gradually increasing.* Is it not time that regulations are made more stringent,

especially with large concerns who have the money to buy the products up and give them out to us after the market has been cornered and the price regulated *by them?*

Large cold storage plants are wonderful and truly economical institutions; but *not* for the public consumer if the so-called alleged "interests" use them to advance prices on food necessities which are held until the market price can be inflated.

Do you wonder that we need to fight for food if regulating prices by "interests" is not curbed?

CHAPTER XII

VITAL FORCES IN OUR FOOD

THE food question, so far as the vital and hidden forces in the animal and vegetable foods which we eat are concerned, is becoming a very complex problem. Besides the usual proteins, fats, carbohydrates, etc., spoken of in the preceding chapters, there must be present a sufficient amount of "vital force" in our food in order that normal metabolism may be maintained in our body. Recently this so-called "vital force" has been termed "vitamine." All attempts to find out the composition of a vitamine have failed. But we know it exists in small and different quantities in all food stuffs which have not been previously heated above the body temperature, but more especially not heated above the boil-

ing point. Heat in any excess kills these important vitamines. In the case of an ordinary mixed diet, a supply of vitamines ample for the needs of the body will no doubt be present, especially if some foods are eaten which do not have to be cooked.

The true power of these so-called vitamines has just been recently discovered by Seidell of the Hygienic Laboratory, United States Public Health Service. The main trouble with former investigators has been their inability to isolate enough of these vitamines for general experimental purposes. Seidell in the latter part of 1915 worked out a chemical method of concentrating the vitamine in brewer's yeast, and with this concentrated substance proved that it had great power, especially in the cure of diseases of nutrition or lack of proper food. His discovery was published in

the United States Weekly Public Health Reports for February 18, 1916. In the feeding experiments which he conducted on pigeons, which were paralyzed by the disease beri-beri, due to nutritional deficiency in eating a lone diet of polished rice, he showed that the concentrated dose of vitamine which he gave the diseased pigeons was responsible for a cure. He also proved that the beri-beri disease could be prevented by first giving a dose of vitamine to the pigeons, no effect of beri-beri being evident when the pigeons were fed on a polished rice diet. The wonderful thing about these experiments was the powerful effect this vitamine had. The diseased pigeon showed unmistakable improvement within an hour after a dose of vitamine was given it and to all outward appearances was normal the next morning.

As stated, the exact composition of a so-called vitamine is not known, but it is believed by various other scientists, who have experimented somewhat on the substance, that it is of a complex nitrogen composition—somewhat crystalline in character.

In a letter received by the writer from Prof. H. C. Sherman, Nutrition Expert at Columbia University, Professor Sherman says that he does not see any reason for assuming an especially close connection between enzymes and vitamines and that vitamines seem to be crystalline substances of only moderately high molecular weight, while all the typical enzymes are colloidal substances and apparently of enormously high molecular weight. He says that enzymes and vitamines might both be classed as catalysts or carriers in a chemical

reaction and are probably of a nitrogenous nature.

The enzymes are known in chemistry to be merely carriers or catalysts in complex chemical reaction in and out of the cell body of both animal and vegetable metabolism. The name enzyme or unorganized ferment is given to animal or vegetable substances which, either in the organism itself or independent of the cells in which they arise, are able to initiate or promote chemical reactions.

A secretion from a cell of animal or vegetable life which is poisonous to the host cell is a *toxin.* Toxins are enzymes which are poisonous to the host cell but not all enzymes are toxins.

Enzymes may be grouped according to the nature of the reactions which they bring about as follows: Hydrolytic, oxidizing, molecule splitting,

synthetic and reducing. For simplicity it is not necessary to go into further detail, but it is enough to know that enzymes are *not* bacteria or germs—*they are activators or starters in complex chemical reactions* and are capable of causing the decomposition of from 500,000 to 1,000,000 times their own weight of organic matter. It has been established that some enzymes are retained within the cell of animal and plant life to perform metabolistic duties, others are secreted outside to digest or dissolve certain food materials, so that they can enter the cell, and that it is these extra cellular enzymes which cause all the decay in the world. Thus we begin to see the magnitude of the work accomplished by these substances and get an idea of their importance.

The synthesis or building up by

plants of complex carbohydrates and proteins from simple compounds is largely the work of enzymes.

Animals cannot use or utilize the simple inorganic compounds as a food, but must have the complex compounds, such as starches, sugars, fats and proteins which were built up or synthesized by the chlorophyl or color-bearing plants. When food is taken into the mouth, there is secreted by the salivary glands certain enzymes which act upon the starches, converting them into sugars. In the stomach and intestines the proteins are soluble forms; likewise, in the intestines the fats are split up into fatty acids and glycerin. In fact, all the food materials are reduced to a soluble form so that they can be absorbed. In the digestive tract the cells furnish the digestive enzymes for converting the food into a soluble form. The pro-

teins build up tissue while the fats and carbohydrates are split up so as to liberate energy; some may be stored as a future supply, but sooner or later may be broken up liberating heat. This liberated heat was the same energy which was stored by the chlorophyl-bearing plant. In other words, animals are dependent upon plants for their food and energy supply.

Our knowledge of enzymes has been compared to our knowledge of electricity. We do not know the composition of electricity, if it has any, or its nature, or limits of action; but we do know some of the effects of both electricity and enzymes. From a chemical standpoint, we may define an enzyme as a catalytic or carrier compound produced by a living cell.

Pepsin, a substance quite familiar at least by name, is a proteolytic ferment or enzyme obtained from the

glandular layer of the fresh stomach of the hog and proved to be capable of digesting not less than 3000 times its own weight in freshly coagulated and disintegrated egg albumin. Pepsin is used in a number of medicinal preparations. *Rennet,* another ferment or enzyme, is an aqueous or vinous infusion of the dried stomach of the calf, though that of the sheep or other animal would probably answer the same purpose. It is much used, as every one knows, for curdling milk, a property which it owes to a portion of the gastric secretion, retained and dried in the mucous tissue of the stomach. To the same material it probably owes the property which it possesses of converting glucose or corn syrup into lactic acid, and there is little doubt that it is capable, in greater or less degree, of exercising the solvent property of gastric juice

over albuminated and fibrinous food. It is highly probable that the preparation usually employed to curdle milk may contribute to the ready digestibility of the curds and whey.

Enzymes are so susceptible to mechanical action that moderately violent agitation completely destroys most of them. With suitable temperature, moisture and reaction, the action of an enzyme begins as soon as the enzyme comes in contact with the medium. One reason we know so little about the chemical composition of these soluble inorganized ferments or enzymes is due to the fact that the enzymes are so sensitive to external factors that they lose their characteristic catalytic or carrier activity when more or less free from the proteins, carbohydrates or salts which always accompany them.

The study of enzymes has thrown

more light upon obscure and hidden physiological processes than any other study. There are immense fields for discovery in enzymes in connection with our food supply. We will be able to explain many of the life processes of plants and animals, understand the complex chemical reactions that go on during decay, preserve food almost indefinitely, and successfully combat diseases which are at the present time very little understood.

If "vitamines," which the writer has mentioned in the first part of this chapter, prove to be enzymes with but another given name, or prove to be different complex substances, it stands to reason that many of the high temperature processes used in the canning of our food stuffs will be superseded by more improved processes whereby the vital forces of our food will not be destroyed, since heat

used under the present methods of canning food destroys these vital principles which have been proved of such value in nutrition.

Before closing this chapter the writer merely wishes to mention another subject of much importance in food nutrition, and that is organic iron in our daily diet. It has been demonstrated that we need organic iron in our body to successfully carry out certain processes of metabolism. While the amount of iron in the animal is exceedingly small, so is its amount in foods also small. Its function in the body is exceedingly important, and in certain abnormal conditions it becomes a matter of great practical importance that we consider the iron content of human foods.

In considering sources of iron in the food, students of nutrition naturally have turned to the first food that

the baby gets—it's mother's milk. Most of us have been in the habit of considering that milk is a perfect food. So it is for some purposes, but not by any means for all, *because it is very poor in iron.*

Investigators say that there is an accumulation of iron in the body of the unborn infant, apparently in anticipation of the poverty of milk in this element. During the suckling period, there is a gradual reduction in the per cent. of iron in the body, until at the age of about one year, when it reaches that of the normal adult, says Sherman. Yolk of egg makes *ideal* food for supplying the additional iron needed at this time. Many physiologists believe that at the time of sexual maturity of female animals, there is a withdrawal of some of the iron from the circulation and a storage of this portion in the re-

productive organs, in anticipation of its need. Thus students of nutrition say that this would indicate the desirability of unusual attention to the diet at this time. Most people get enough iron in their food, but we do see especially some women and children at certain stages of their development anæmic, due in most instances to lack of organic iron.

From chemical analyses, it has been found that the foods that are the best sources of iron for human beings are vegetables and fruits generally, and cereal preparations such as contain the germs and outer seed-coats of the grains. Food richest in iron in order named are egg yolk, dried beans and peas, whole wheat foods, spinach, raisins, oatmeal, beef, and eggs. Those foods commonly in use which contain the smallest percentage of iron are milk, corn meal, rice, and wheat

flour. Whole wheat contains four times as much iron as white flour. Although we have very little evidence as to the comparative availability of iron in these different foods, it is generally conceded that the iron in them is in an organic combination, and it has been found out by nutrition experts that most of the iron taken in this form has been used by the body.

We *cannot* supply a deficiency of iron in our food by using medicines, such as "iron tonics," because this form of iron is not taken up to any degree by the body, but has been found to be mostly eliminated by the natural passages of elimination, and even if stored in the body, it is not used by the blood. Hence it is important to know what foods would supply us the needed iron should occasion demand.

CHAPTER XIII

FLAVOR AND THE GRADING OF FOOD PRODUCTS

It has been said that more than one-half of all the foods in the world have a sweet or sweetish taste, while only one-third possess a salty taste, and one-tenth a bitter or sour taste. This is taken by the writer to mean the natural food product and not the manufactured article. A great many food products are graded by both the consumer and seller for flavor, while other food products in addition to the flavor are graded by size, appearance and general keeping qualities.

As to market value, meat is not considered as to actual nutritive worth, but to the consumer at large it depends on its usefulness and flavor.

Experts claim that its usefulness and flavor are based principally upon the firmness and tenderness of the muscle fibres, the arrangement and contents of the connective tissue, the deficiency or richness of fat, and the amount of the extractive matter on which the taste of the meat depends. As these relations vary considerably in the different regions of the animal body, the sale value of the meat of certain parts varies likewise. This is also influenced, however, by fondness for certain cuts in different parts of the country. It is said that corresponding with these conditions various meat qualities are distinguished in all animals and the regional limits, valuations and designations differ considerably in the various countries and territories.

The following table shows the classification of meat cuts as distin-

guished by the trade in Germany. The meat cuts in the United States are placed in parentheses. It should be borne in mind that these meat cuts are classed in quality solely according to their usefulness and flavor and not their nutritive value.

The tongues of all animals and the udder of cattle are sold as meat. Those pieces of fat and trimmings which are not suitable for sale in the shop are melted for lard, or are conveyed to soap, grease and other factories, where they are utilized in the industrial arts. The blood of hogs, as a rule, is worked up for sausage—only in rare cases is the blood of other animals used for this purpose. The heart, liver, lungs, kidneys, spleen, brain and thymus gland of calves (sweet bread) are either sold in their fresh state or worked up for sausage or other meat products.

Kind of Meat	First Quality	Second Quality	Third Quality	Fourth Quality
Beef	Tenderloin; invisible in cut Surloin (English roast) Rump	Double round (the medium part of the round is not visible on the cut) Thick flank Best ribs Chuck (only part of the same)	Shoulder; brisket; (partly covered by the shoulder) Chuck Plate Neck	Short ribs Flank Shank Shin Head Tail
Veal In the U. S. veal cuts are leg, loin, flank, breast, shoulder, and neck	Leg (cutlet) Loin roast Chops	Shoulder Chuck Breast (partly covered by the shoulder)	Neck Flank Shank Shin	Head Feet
Mutton In the U. S. the mutton cuts are leg, loin, back or rib, breast, shoulder, and neck	Leg Loin	Shoulder	Ribs (partly covered by shoulder) Breast Flank Neck	Head
Pork In the U. S. the pork cuts are ham, loin, belly, shoulder and head	Leg (ham) Loin (chops) cutlet and roast	Neck piece Shoulder (shoulder ham)	Short ribs Belly Shank	Head, with jowl (cheek) Snout Feet

The market value of fish is affected by various conditions. Among these may be mentioned the locality from which they come, the season in which they are taken, and the food on which they have grown. Government publications state that fish from clear, cold, or deep water are regarded as preferable to those from shallow water or warm water, while fish taken in waters with a rocky or sandy bottom are preferable to those from water with a muddy bottom. Some fish, for instance shad, are said to be at their best during the spawning season, while others should not be eaten during this period. The mode of capture also affects the market value. The quality of the fish is often injured by improper handling in the fishing boats before placing on the market. The flavor of oysters is affected more or less by the locality in

which they have grown, those from certain regions being regarded as of very superior quality, and in addition to this, the market value is affected by the season of the year and methods of transportation.

The market value of various varieties of fruits is the final test of their commercial worth. Some fruits, such as apples, pears, peaches, plums, etc., are graded on the variety, size, shape, color, and flavor. This grading is for fancy fruit only and fancy prices are obtained. The cooking and canning grades are generally in great demand at canning factories, and in the home where canning is done. Oranges sell to the consumer on the merits of their sweetness and juiciness, and if these qualities are combined with size, thinness of skin, and the fruit is seedless, the demand is still greater. At any rate, a pleasant flavor to fruits is

demanded by the consumer. Investigators have shown that fruits that are at their prime or even a little overripe are apparently best for sauce. The size of the fruit makes but little difference in the cooking quality of apples for sauce. Good dessert apples do not necessarily make equally good products when cooked. The same may be said for other fruits. The shipper of various fruits generally grades the fruit according to such sizes as "very small," "small," "below medium," above medium," "large" "very large," and "extremely large." It is said by investigators that there is little or no evidence to show that any fruit of to-day, though grown from the most carefully "pedigreed" stock, is permanently any better than its predecessors, or from others of less favored surroundings. To get new qualities or new combina-

tions of qualities in fruits, we must have new kinds. New kinds and varieties of fruits are gradually increasing. Much credit is due Luther Burbank for his work along this line.

There are no fixed standards for canned goods, though the canner and the trade do recognize and describe certain qualities in jobbing, and prices are made accordingly. The consumer has not been educated to know these differences. The labels usually carry descriptive terms implying superlative quality, as extra select, extra choice, fancy, extra standard, and, less commonly, standard. Bitting, the food technologist, says that there are too many designations for the same product, and furthermore, Mr. A's "fancy" may not be the same as Mr. B's. The grade may not be the same in two consecutive seasons, due to drought,

excess of rain, intense heat, or other cause; neither may it mean the same in different sections of the country, in a normal year. In other words at the present time the grade, as a rule, does not have a fixed character.

Since the consumer, as a rule, does not know or is not sure of quality in canned goods, the packer or canner does sell to the wholesaler a somewhat graded product. Especially is this true regarding canned fruits put up in syrup, or in water. Sugar is expensive, hence the higher the degree of syrup the more expensive the wholesale market value; but the consumer is not informed by the label whether he is getting 20°, 30°, or 40° syrup in his canned fruit. Government experts say that a heavy syrup may mean anything between 35° and 60°, a medium between 20° and 45°, and a light syrup between 10° and 30°,

depending on who uses it. These variations are too wide to be carried under such elastic terms.

One wholesale grocery firm, who are very careful in buying canned fruits and vegetables, and who place these products under their own private labels, told the writer that aside from general appearance of the fruit, they graded the canned fruit product as follows: 60 per cent. syrup of the canned fruit was graded "extras," 40 per cent. syrup "extra standards," 30 per cent. syrup "standards," 10 to 15 per cent. syrup "seconds," 6 per cent. syrup covering the fruit "waters" and fruit put up in large tins with only water, used by bakeries, etc., as "pie variety." This "pie variety" grading consists of overripe fruit or the fruit which could not be used for appearance's sake for so-called higher grades. As a matter of

fact this last classed canned product, consisting of "dead ripe" fruit, contains more flavor, and if the housewife or consumer wishes to add a small amount of sugar to it, much economy can be practised, besides having a deliciously flavored product.

Canned vegetables such as peas, are bought by those who wish to put on their own private labels, according to the following: "extras" mean to the wholesaler peas which have fine flavor and which will go through a sieve or screen called number 1 or number 2; "sifted" grade means those that pass through number 3 sieve, and "early June" peas are those that go through number 4, and number 5 sieve. String beans are graded as to their stringless qualities. Beets are graded as to their tenderness and number put up in small cans —the smaller the beet, the more ex-

pensive and higher quality. Corn according to its texture, style of packing and general nature of the product.

Canned tomatoes within the last few years have received considerable attention by both packer and the wholesaler with the private label. The grading, which is generally recognized by the trade and by a number of food officials, is as follows:

No. 3 Standard; gross weight 37 ounces, of average ripe tomatoes, not necessarily all red.

No. 3 Standard; gross weight 37 ounces, 19 ounces of average ripe tomatoes, selected ripe tomatoes.

No. 3 Fancy; gross weight 38 ounces, and 20 ounces of hand packed, whole ripe tomatoes.

No. 2 Standard; gross weight 23 ounces, and 12 ounces of average ripe tomatoes, not necessarily all red.

These are the size cans generally

bought by the consumer. In grading canned tomatoes contents of a number of cans in the shipment are tested by draining through a one-fourth inch wire mesh flat screen for two minutes.

The value of tea is in the young tender leaf. Tea is graded by experts by flavor or testing in the cup. There are about 200 varieties of teas, and perhaps ten times as many flavors. Tea ranges in value from a few cents per pound for stems up to $10.00 for the very finest leaf. Teas are divided into two general groups, green and black teas. Black tea is the result of oxidation or fermentation caused by exposing the leaves to the sun, which turns them black. Green tea is prepared by steaming the fresh green leaf and then drying it. In this way, the bright color is preserved. The United States Government inspects all teas entering the country, and

those below a certain standard are not allowed to enter. The demand for different kinds of tea to-day has created many varieties, having a common origin, but manipulated so as to produce styles, flavors and other cup qualities distinct from each other, which have been grouped under heads for commercial purposes.

There is much lack of uniformity in the present practice of grading olives. It is claimed by experts on the subject that the separation of olives into size grades is necessary for the best results in pickling and marketing. No standard has been established for size grades. It has been suggested that a more suitable grading would be one based on a percentage difference; one in which each size was a certain per cent. of the next larger size. The current practice is to use on labels of bottled olives

words descriptive of five sizes. These are: 1, Jumbo, Mammoth or Extra Fancy; 2, Extra Large or Fancy; 3, Large; 4, Medium; 5, Small. Some packers label the various sizes 1, 2, 3, etc., others x, xx, and xxx. Experiments and investigations conducted by the California Experiment Station show that these gradings have no common standard or meaning.

Wheat, from which our daily bread is made, is graded in the northern market of the United States as follows:

No. 1 Hard, No. 1 Northern, No. 2 Northern, No. 3 Northern, No. 4 Northern, rejected, and no grade. This grading is done by the terminal elevator companies by means of the number of pounds to the bushel when taken in by the local elevators. After the wheat has been shipped to the terminal elevators there is claimed

by the North Dakota Experiment Station to be a juggling of the results by a system of mixing and regrading which is alleged to have increased the selling price of North Dakota wheat by $1,978,060. This increase, it is alleged, has not come from any change or improvement in quality, but rather through a system of mixing and regrading. According to the above, it may be assumed that the practice noted is done by other terminal wheat markets in this country and elsewhere, and the farmer is thereby cheated by unfair grading. Since North Dakota produces 100,000,000 bushels of wheat a year, somebody must be reaping enormous profits, and flour milled at the terminal elevator points cannot be said to be graded of such extra quality of product as is often claimed if mixtures of the graded wheat are used as alleged.

The writer has given the reader enough food for thought in showing that some grades of food products as mentioned need revision. The consumer is entitled to know the flavor, quality and grade of product he is buying, if flavor, quality or grade can be measured by the price paid for the article of food purchased.

CHAPTER XIV

ADDED POISONS AND DRUGS IN OUR FOOD

Do we need or want added poisons or drugs in our food? The writer has mentioned this subject under the phase "misuse of drugs" in the introductory chapter of this book, and has pointed out to you that this is and has been considered by the public at large as a *real* problem.

Why force added drugs and chemicals into the foods stuffs? It does *not* seem to be merely a question as to the amount put in, as so many believe, and have contended, both by experiment and legal procedure. If individuals wish to put chemicals into foods and if the drug or chemical does not poison, you have the privilege of buying the drug or chemical at the drug store and dosing your own

food. But the writer does not believe you have the right to force this upon others.

The subject of the æsthetic in adulterating foods has been briefly summarized for you in a preceding chapter, hence will not be repeated here. The æsthetic reason for adding chemicals to our foods has no foundation. The writer has likewise mentioned in another chapter that poisons should be excluded since much information is lacking as to their accumulation in the body. He has also pointed out to you that organic diseases are on the increase and even if "slow poisons" do not cause many of them, it is fair to assume that if our organs are not healthy, we do wrong in giving them bigger loads to carry, in the eliminations of poisons or of even harmless chemicals.

Why are drugs and chemicals

added to food stuff? Some add small amounts for preserving purposes, others for hardening the food, still others for coloring, staining and bleaching the food articles. Some use chemicals for sweetening agents, polishing agents, and to give a bitter and sour taste to the food.

The writer can see no use for drugs and chemicals as preserving agents, since heat and extreme cold are the best natural preserving agents,—heat by correct sterilization and cold by refrigeration. For illustration, a bottle of catsup made from fresh and good material carefully sterilized, will keep very well until opened. When not in use, if kept in a refrigerator, the bottled catsup will keep a reasonable time before spoilage.

The use of hardening agents such as alum or aluminum salts in pickles, etc., covers up inferiority and makes

the pickles appear better than they really are. The Federal Government allows the use of alum for hardening pickles, but a number of State Governments do not. It is conceded by a number of authorities that alum in pickles is not needed and that its use in this connection makes the pickles less digestible. Alum baking powders are allowed in all States and by the Federal Government, since in the baking of pastry the alum is changed into end products that the Referee Board of Consulting Scientific Experts of the Federal Government found not to be detrimental to health if not used in excess. Alum should not be used in our food when consumed as alum no matter how small the dose.

The coloring of vegetables such as canned peas with salts of copper has been forbidden by the Federal Gov-

ernment and also all State Governments. Likewise the staining of tea by drying on copper pans.

The "bleaching" of flour by nitrous acid or by chlorine is forbidden by a number of State Governments but is allowed by the Federal Government under protest and by a number of States following the Federal Government's action. This subject was taken up in a previous chapter.

Sweetening agents used in place of sugar, such as the coal-tar product, saccharin, has been prohibited by the Federal Government. The former Referee Board of Scientific Experts of the Federal Government after careful experiments and a long investigation reported in substance as follows:

(1) Saccharin in small quantities (0.3 gram per day or less) added to the food is without deleterious or

poisonous action and is not injurious to the health of *normal* adults, so far as is ascertainable by available methods of study; but that the addition of saccharin as a substitute for cane sugar or other forms of sugar reduces the food value of the sweetened product, and hence lowers its quality. (2) Saccharin in large quantities (over 0.3 gram per day and especially above one gram daily) added to the food, if taken for considerable periods of time, especially after months, is liable to induce disturbances of digestion. From these conclusions, you may see that saccharin is an accumulative poison. You will also note that 0.3 gram or less would not be harmful to the health of *normal adults.* Since we cannot regulate the sale to *normal* adults, and since those not normal and also children would imbibe sac-

charin in their daily food, it is a wise measure to prevent its sale in foods in every State and in Inter-State commerce.

One State, namely Missouri, was enjoined from enforcing the law prohibiting saccharin in non-alcoholic beverages. This law was declared unconstitutional because class legislation was enforced in that the State did not prohibit saccharin in all foods and beverages. The Missouri Supreme Court based its principal decision as follows: "Whether it is deleterious to health or not, it is certainly an arbitrary distinction to prohibit the use of saccharin in non-alcoholic drinks and not prohibit its use in other foods and drinks. If it is deleterious to health in one case, it would be so in the other." Evidently not much victory for saccharin manufacturers, since probably a law pro-

hibiting saccharin in all food stuffs and drinks in that State would be legal.

Since the European War, benzoic acid and its salts such as benzoate of soda has increased in price so as to make this preservative almost prohibitive for such uses. The Federal Bureau of Chemistry at Washington, D. C. has recently permitted not more than 1/10 of one per cent. of sulphite of lime as permissible at this time until otherwise ruled, and the statement that such preservative together with the amount is on the label. The United States Dispensatory says the influence of this sulphite of lime on the system in health is feeble. From the largest doses of the sulphites only a laxative effect and an increased secretion of the urine are obtained. Their long continued use, says the Dispensatory, is said to prove injuri-

ous, by inducing debility and anæmia. Almost all acids decompose the sulphites, and should not be administered with any acid food or substance.

The use of *free* tartaric acid in our food stuffs and beverages has been tabooed by a number of food officials for the reason that it is an intestinal irritant and the continued use detrimental to health. "Taken in large amounts" says the United States Dispensatory, "and in concentrated form it has caused fatal gastro-intestinal inflammation." There is no doubt in the writer's mind but that the use of free tartaric acid in lemon drops and other confectionery and in imitation beverages would be deleterious to the health of children, since they are great users of such products, and would, no doubt, obtain a considerable dose and accumulation of this particular acid.

No doubt but that the reader has witnessed the effects of tartaric acid being used in so-called "pink lemonades" sold at fairs and other public places. Cramps in the bowels and stomach, from drinking the "lemonade" of certain venders who used tartaric acid in this product has been experienced.

Benzoic acid and benzoate of soda are allowed by the Federal Government as preservatives in food stuffs pending final settlement as to their harmfulness. If these preservatives are used in prepared food stuffs, they must not exceed 1/10 of one per cent. and the label must give this information. There is a difference of opinion as to the harmfulness of benzoic acid and its salts, but the United States Dispensatory says that benzoic acid is an irritant to the alimentary mucous membrane. As a stimulant ex-

pectorant it is of some value as a drug in chronic bronchitis and the later stages of the acute disorder. Benzoic acid and benzoates (notably sodium benzoate) are ingredients in many antiseptic preparations. Patented preservative mixtures containing benzoic acid are numerous.

Boric acid and its compounds and salicylic acid and its compounds are prohibited by the Federal Government, since their continued use as preservatives are considered injurious to health.

The Creator has distributed many chemicals and drugs in our natural food stuffs,—but these are in the natural foods in such an infinitesimal amount as to be negligible. Evidently there was some purpose for this, and with very few exceptions, the infinitesimal amounts found are not of sufficient amount for preserving proc-

esses. The abuse of drugs is perpetrated upon the consumer of food when man tries to be a creator and improve on nature.

When critics of the food and drug authorities say that because ordinary garden spinach contains arsenic; rhubarb contains oxalic acid; plums and apricots contain prussic acid; wines, plums, cherries, gooseberries, oranges, lemons, figs, pears, and apples each contain boracic acid; huckleberries and cranberries contain benzoic acid; strawberries, raspberries and grapes contain salicylic acid; all smoked meats contain formaldehyde; honey and the fat of milk each contain formic acid; molasses contains proteids, which in turn carry sulphur; vinegar, acetic acid; tea contains caffeine and tannin, that these should be added to other foods or increase in the above named foods, they are

straining at a gnat and swallowing a camel, because in combination and in such minute quantity, they are perfectly harmless. If these chemicals and drugs are used in the foods in which they normally occur in nature, it is safe to assume that the Creator intended them to be there for a definite purpose, but not for the purpose of extracting and adding to other food stuffs.

It is said that many foods such as vegetables are aids to good health, but it is not because they contain any appreciable amount of drugs. Lettuce has a soothing effect on the nerves and is said to be excellent for people who cannot sleep. The ancients believed that lettuce had the property of producing a deep sleep. It is now believed that the general experience is that it is devoid of narcotic properties. The concrete milk juice of let-

tuce is known by the name "lactucarium." The extract of this juice has been found to contain a peculiar acid substance called "lactucic acid." This has as much claim as any other discovered substance in lettuce juice to be considered the active principle.

The ordinary celery of the gardens is believed by some persons to possess anti-spasmodic properties, and has been used as a nerve stimulant. It contains "apiol," although in much less quantity than does parsley. "Apiol" is a yellowish oily liquid, not volatile, heavier than water, of a peculiar and tenacious odor distinct from that of the plant, and an acrid pungent taste.

Parsley root is said to be an aperient and diuretic, and is occasionally used in nephritic and dropsical affections. Parsley contains "apiol."

Onions, by virtue of their volatile

oil, if taken in moderate quantities are a stimulant to the stomach and promote digestion, but in large quantities they are apt to cause gastric uneasiness.

Water-cress has mild medicinal properties. It is thought to be useful in scorbutic affections and visceral obstructions. It also has mild astringent properties. It contains a volatile oil, while Hofman states its chief constituent to be a body called the nitril of phenyl proprionic acid. The expressed juice of water-cress is sometimes given in the dose of one or two fluidounces; but the herb is more frequently used in the form of a salad.

Raw carrots are said to correct indigestion. This is probably due to the part all vegetables play in the diet. The coarse fibres of all vegetables act in the intestines as mechanical laxatives by irritation or by giving bulk.

Such fruits as apples are excellent for constipation for the same reason.

Tomatoes are said to be good for a torpid liver, but should be avoided by gouty people, since the tomato is an exceedingly acid vegetable. The principal acid of the tomato is citric —although there is a small per cent. of oxalic acid present.

Potatoes as used in the home are often said to contain the poisonous solanin. This is not true, since the solanin is only found in the sprouts of the potato and sometimes in the upper stalk of the plant. The potato itself does not contain any solanin whatsoever. Potatoes are excellent for people who wish to put on flesh, due to the large amount of carbohydrate, namely starch, which they contain.

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