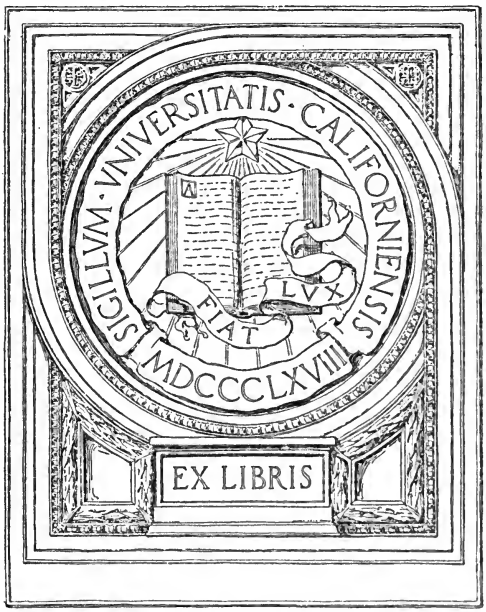
The Home Dietitian

BELLE WOOD COMSTOCK, M. D.



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This little book comes as the result of a call for a brief and scientific review of the subject of foods and body nutrition phrased in the simple terms practical for the busy housewife as well as for the student of dietetics. In it is presented a comprehensive but concise study of foods and their values as related to body needs. Special effort has been put forth to make the tables of caloric value practical as a ready reference in the planning of a balanced ration. The values being given of common measurements of foodstuffs used in cooking greatly simplifies the calculation of the energy value of any recipe that may be used. Sample recipes and menus with appended food values serve to illustrate the principles presented. Special attention has also been given to the question of "protective foods" and vitamines, and to the feeding of children.

No plan for diet in disease can be successful unless based upon a knowledge of the diet that will keep the body in health. With this knowledge the problems of feeding the sick are the more easily solved.

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THE HOME DIETITIAN

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THE AUTHOR AND HER SONS

The Home Dietitian

Scientific Dietetics Practically Applied

BY

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and of
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Introductory Note

Mendel says: "Let us welcome the day when the food market and the kitchen are taken into consideration by the physician as seriously as are the apothecary shop and the fashionable watering place."

When people eat the proper kind and amount of food, there will be little need for the physician save as a teacher and guide. Today the people's greatest need is education along the line of normal living. Little good can come from spasmodic desultory teaching. The mother, the housewife must be thoroughly trained in the science of home-keeping and child culture, a most important phase of which is the feeding of the bodies of those in her care.

"What the average woman at the head of a home does not sufficiently grasp in all its importance is that the very centre of the household—the most important thing in the home—is the spread table with a meal on it. Look at the church. It is by no accident or mere coincident that the central sacrament of the Christian religion takes the form of a common meal. It represents a universal fact of human life. The domestic table is really the pivot upon which the whole home turns."—*Elizabeth Harrison.*

"To keep the body in a healthy condition, to develop its strength that all its machinery may act harmoniously, should be the first study of our lives."—*Ellen G. White.*

"The body is the foundation and not to be ignored. The people of power are those who have an efficient tool to carry out the mental and spiritual ideas."—*Dickenson.*

The mother has the opportunity of developing in her child the physical foundation that makes possible heights of intel-

lectual and spiritual growth. The problem must be solved in the home. Upon the housewife rests the responsibility. To her this book is humbly dedicated in the hope that it may help her in her task.

Belle Wood-Comstock

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Health is a state of physical, mental and moral equilibrium, a normal functionating of body, mind and soul. It is the state when work is a pleasure, when the world looks good and beautiful, and the battle of life seems worth while. Health is the antithesis of disease, degeneracy and crime.

"The laws of health are as inexorable as the law of gravitation, as exacting as eternal justice, as relentless as fate, and their violation is the beginning and cause of all disease, suffering and sin.

"Health is the most desired of earthly blessings. When finally lost, it cannot be purchased by uncounted millions, restored by the alienist, or returned by the pulpit."—S. J. Crumbine.

CHAPTER I.

Food Classification. The Cycle of Life.

In the body, combined in various ways, are sixteen chemical elements: Carbon, hydrogen, oxygen, nitrogen, sodium, potassium, magnesium, calcium, phosphorus, iron, sulphur, chlorine, iodine, bromine, flourine and silicon.

For the successful growing of crops there must be present in the soil a definite number of elements in normal amount and combination. Just so for the normal development of human beings, there must be present in the food these sixteen elements in proper amount and proportion.

These are not taken into the body as elements but are built up first into seven elemental food classes. These seven food classes are: carbohydrates, fats, proteins, vitamines, salts, cellulose and water. Any daily food ration not containing these in proper proportion is defective.

Class I. *Carbohydrate* made up of the chemical elements, carbon, hydrogen and oxygen, includes all starches and sugars and is a fuel food. Its combustion in the body produces heat and energy. The carbohydrates make up a large part of the food value of grains, fruits, and vegetables.

Food Elements

Class II. *Fat* is another but more concentrated fuel food also containing carbon, hydrogen, and oxygen. This food element we have in butter, oils, fat meats, nuts, egg yolks, olives, in the alligator pear, the soy bean; also to some extent in other legumes, in grains, and in vegetables.

Class III. *Protein* is the muscle and tissue builder. It contains, in addition to carbon, hydrogen, and oxygen, another very important chemical element called nitrogen, by reason of which it is often spoken of as nitrogenous food. Protein also contains variable amounts of other chemical elements as phos-

phorus, sulphur, and sometimes iron, but its distinctive element is nitrogen. This food is found in a pure state in egg white, casein of milk, and in lean meat. In a combined form it makes up part of the food value of grains, vegetables, legumes, and nuts.

Class IV. *Vitamines,* our knowledge of which is still somewhat limited, are doubtless the substances out of which the body makes its internal secretions, digestive enzymes, and the ferments of vegetative life processes. They are found in raw, and in fresh vegetables, in fruit, in raw milk, in the outer covering of grains, and in raw meat.

Class V. *Salts,* both organic and inorganic, are made up of many different chemical elements and are necessary for blood making and tissue building, for the carrying on of various metabolic and secretory processes, and to maintain the proper alkalinity of all body fluids. They are found principally in fruits, vegetables, grains, and milk, and are located with the vitamines largely under the skin of fruits and vegetables and in or near the outer covering of grain.

Class VI. *Cellulose* is really a carbohydrate but being practically indigestible, is placed in a class by itself. It makes up the woody framework of fruits and vegetables. Its value is in its bulk which by its presence mechanically stimulates the bowel, thus aiding in normal intestinal peristalsis.

Class VII. *Water* plays an important part in the many chemical reactions and tissue changes continually going on in the body, it holds the various salts in solution, it makes up the principal part of all body fluids and secretions and, as a circulatory medium, it helps to make it possible for the body to regulate its own temperature.

All food is built up in nature's laboratory by a process called *synthesis;* For example, take the apple which is made up chiefly

of fruit sugar and cellulose with accompanying vitamines, salts, and water. The sugar and cellulose both belonging to the carbohydrate class contain the chemical elements carbon, hydrogen, and oxygen.

Nature's Laboratory

The chlorophyll, or green coloring matter of the plant first manufactures starch, obtaining its carbon from the ever present carbonic acid gas or carbon dioxid (CO_2) of the air and giving back to the air the oxygen. Water (H_2O), coming up through the roots with its hydrogen and oxygen, supplies to the chlorophyll these elements to complete the process of starch making.*

From some of this starch cellulose is made and later as the apple ripens the remaining starch is changed into sugar.

In the same way the elements necessary for the vitamines and salts are obtained from the soil. All are combined in a wonderful way until we have as a result the finished product, the apple ripened and tinted by the sun.

Before it can be utilized in the body, however, a very different process goes on. From the time the apple is seized by the teeth the process becomes one of disintegration or *analysis*, begun by the mechanical action of mastication. It is continued by the muscular activity of the digestive tract until the food becomes a thoroughly liquified mass.

A Twofold Phase of Digestion

But these physical changes are not sufficient. That the food may be yet more completely simplified and dissolved, certain juices are poured out along the digestive tract which break up the food molecules into still more simple forms that the next important step may take place with the greatest ease and completeness. Thus chemical action in addition to

*The chemical formula for starch is $(C_6H_{10}O_5)n$. The formation of starch in the plant may be represented by the chemical equation: 6 CO_2 (carbonic acid gas) + 5 H_2O (water) = $C_6H_{10}O_5$ (starch) + O_{12} (oxygen).

The starch remains as a part of the plant—the oxygen returns to the air.

mechanical action prepares the food for the process of absorption into the body proper, where it may repair and build the tissues and produce the necessary heat and energy for the efficient conduct of all body processes.

In this digestive process all starch is changed to sugar (See footnote page 72), all complex sugars to simple sugar or dextrose, fats are emulsified, and proteins are reduced to simpler forms called proteoses, peptones, and amino-acids. Many of these processes can be carried on to some extent outside of the digestive tract; thus we have certain predigested foods such as dextrinized cereals in which the starch has been largely changed to sugar by extreme heat, e. g. oven toast, shredded wheat, corn flakes, etc. Likewise fats may be eaten in an already emulsified form as in nut butter and cream. The sugar of fruit being in the form of dextrose and laevulose (See footnote page 74), needs but little digestion.

Starch digestion begins in the mouth and is completed, with the simplifying of the complex sugars, in the small intestine. The solution of protein and its change into proteoses and peptones begins in the stomach and is completed, with its final reduction to amino-acids, in the intestine. The preparation of fat for absorption is carried on entirely in the intestines; first by a process of saponification (soap formation) and emulsification, then by a splitting up into more simple parts (See page 68).

Thus the digestive tract becomes a great preparation chamber, a carburetor, as it were, where the food is transformed into a simple state and put into solution so that it can easily be taken up by the blood and thus carried to and properly utilized by the body cells.

A Carburetor

Strange as it may seem, the digestive tract must be considered physiologically as outside of the body proper. It is simply a tube extending *through* the body, but not connected

with it except by an absorbing medium, the mucous membrane. It is continuous with the outside world from which it receives food substances and into which are discharged those parts which cannot be prepared for reception by the blood and tissues. The lining membrane of the digestive tract tries carefully to guard the body cavity against intrusion into it of substances which are undesirable or might do harm and, normally, after careful preparation only that part of the food which can serve as material to replace worn out tissue or as fuel to produce heat and energy is passed on into the blood.

A Sentinel

However, as the result of putrefactive processes going on in the intestine certain poisons are also carried through the mucous membrane. These would quickly prove fatal were it not for the faithful liver which stands as a sentinel to prevent these toxic materials from gaining entrance into the general circulation. The liquified and simplified food passing through the mucous membrane of the small intestine enters many tiny bloodvessels or capillaries which carry it to the portal vein through which it is carried to the liver. Here the poisonous substances are filtered out to be transformed by the liver cells into harmless materials and the purified food, passes on into the general blood stream.* The liver also acts as a great storehouse for sugar, this part of the food entering the system according to body demands.

If, as a result of dietetic errors, intestinal putrefaction is excessive, the amount of toxic material taken up by the great absorbing surface of the small intestine may be so great that even the ever vigilant liver is unable to filter out these poisons and to prevent their entrance into the blood where they are carried throughout the body causing various kinds and degrees of ill health.

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*The digested fat, called chyle, does not pass with the other food to the liver, but is absorbed directly into the lymphatic system.

Even though the food has been received by the blood, its analysis is not yet complete but is carried on still further in connection with a form of oxidation or combustion. During this process the nutritive substances are utilized by the tissues and finally, being reduced to a simple state, they are eliminated as waste by the lungs, skin and kidneys. Now they can again be taken up by the plant and combined into materials which may be used as food by animals and man. Thus the cycle of life goes on, nothing ever lost, each chemical element being used again and again.

The Cycle Of Life

Just how these final steps in the process of food analysis are carried on in the tissues, we will consider further in the next chapter, in connection with the study of metabolism.

"Down to the last detail the world is made for what is in it; and by whatever process things are as they are, all organisms find in surrounding Nature the ample complement of themselves."—Drummond.

CHAPTER II.

The Body as a Stove. Metabolism.

It is important that we study more fully the oxidation processes through which the food passes after it is absorbed by the wall of the digestive tract. This final process of food reduction is included in the subject, *metabolism.*

Food does not arrive at its ultimate destination until it reaches the individual cell. Here the nitrogenous portion is built up into the cell itself; the carbohydrate and fat afford energy for cell activity. Thus new cells are made, old cells are renewed, this process of cell building and repair being that part of metabolism known as *anabolism.*

In connection with the activity and life processes of the cell which are made possible by the energy resulting from the oxidation or combustion of the food taken up by the cell, waste material, made up of broken down cells and the products of combustion, is produced which is carried by the blood stream to its proper outlet. This process of tearing down and waste formation is that part of metabolism called *katabolism.*

In connection with these changes of waste and repair, or metabolism, the body may be compared to a stove. The food is the fuel which is as truly burned in the tissues as is gas, wood, or coal burned in a furnace. This slow combustion is a true oxidation process and oxygen is as necessary for the body fires as it is for the more rapid oxidation which goes on in the ordinary stove. The lungs serve both as drafts and flue and a perfect circulation of the oxygen received is made possible by the circulation of the blood. The kidneys are the grates through which the ash is eliminated.

The Fuel

The oxidation of carbohydrate results in the production of heat, ever transformable into energy, the end products being carbonic acid gas (CO_2) and water (H_2O). These are elim-

inated through the lungs, skin and kidneys as simple gas and water. There is *no ash,* just as there is none from the burning of gas in a gas heater. Starches and sugars are simply fuel foods necessary for heat and energy, but have nothing to do with tissue repair.

Tissue repair is the additional work of protein. Protein contains nitrogen in addition to its carbon, hydrogen, and oxygen. The nitrogen is used in the work of cell building and cell repair. It is the iron of the stove and, while not needed in such large amounts, is of vital importance; for the body stove if not kept in constant repair would soon enter a state of dissolution. As protein contains the three elements, carbon, hydrogen and oxygen, heat and energy may result from the oxidation of this part of the protein molecule, some carbon dioxid and water being given off, but the distinctive work of this food element has to do with its nitrogenous portion.

Tissue Building

The protein molecule is very complex and varies within wide limits. Its nitrogen is always combined with carbon, hydrogen and oxygen, but is combined with these in many different ways to form different kinds of proteins. The arrangement of the nitrogenous combinations in the food proteins is different than in that of the tissue proteins, so after the breaking down process that the food undergoes in connection with digestion the nitrogenous links are put together again in the various necessary combinations to form the many kinds of tissue. A complete protein contains seventeen or eighteen of these nitrogenous units which are called amino-acids and have been likened to building stones. (See chapter VI, page 60.) Rearrangement of these amino-acids makes possible the formation of the tissues that go to make up the body. (An amino-acid contains the radical $N H_2$.)

Building Stones

As the result of cellular activity and oxidation a definite *solid ash* is formed in which form the nitrogen is eliminated through the body grates, or kidneys, in solution in the urine. Urea, uric acid, purins, creatin and other allied bodies make up this solid ash. The most completely reduced form is *urea* which is the most important end product of protein metabolism, and the form in which the greater part of the nitrogen is eliminated. There is normally, however, a certain small part of the ash not so completely metabolized which must be eliminated as uric acid and purins, but these in excess soon become abnormal.

The Body Grates

Any protein not needed for tissue building may be used by the body to produce heat and energy, the nitrogen being split off and eliminated in the usual way. But this would be a waste of nitrogen, and a needless task imposed on the excretory organs. It could not, therefore, be considered economy if it were possible to obtain this energy from the strictly fuel foods that leave no nitrogen for elimination. This use of nitrogen would be analogous to burning iron in a furnace. While it might be possible it would hardly, under ordinary circumstances, be considered wise or economical.

An Expensive Fuel

Thus as the result of oxidation and reduction processes, the food, whether carbohydrate, fat, or protein, is reduced to a simple state which makes complete elimination from the body possible. If for any reason oxidation is incomplete the process of elimination is greatly hindered; the ash is not finely divided but is full of clinkers, the grate becomes clogged and waste products are retained which further clog the body stove and the more hinder normal oxidation processes.

Clinkers

For this reason it is important that the body fuel, while sufficient, be not excessive, that the drafts be kept well open, and that there be a free circulation of oxygen. Then the fuel will

be thoroughly burned, the ash finely divided and elimination will be complete; clinkers will not clog up the grate, back up into the stove and the stove will not smoke. The vital fires will burn brightly and all organic functions will be carried on in a normal way that makes for health and strength.

"I catch my breath
As children do
In woodland swings
When life is new
And all the blood
Is warm as wine
And tingles with
A tang divine."

—James Whitcomb Riley.

CHAPTER III.

Defective Food Analysis. Auto-intoxication.

We have seen that the passage of the food through the body means a gradual reduction from a complex to a simple state. That this reduction should go on in a normal way and at a normal rate is all important. Certain conditions, chiefly dietetic errors, result in great interference with these processes, both while the food is still in the digestive tract and after absorption when it has been taken up by the blood and tissues. The first—slow and imperfect digestion; the second—faulty and incomplete metabolism.

The first and most common defect in food analysis is in the process of mastication. Carelessness in regard to this most important initial process lies at the foundation of much of the imperfect digestion in the lower alimentary tract.

A Serious Defect

As the result of imperfect disintegration in the mouth food substances are hurried into the stomach faster and in larger amounts than they can properly be received and cared for. Food received by the stomach in normal, well masticated portions, already in a semi-liquid state, begins at once to leave the stomach, the amount taken in continually bearing such a relation to that passing out that at no time is the organ over distended and thus handicapped in its muscular movement.*

*X-ray study has shown that the liquid portion of the food begins at once to leave the stomach, the more solid portions remaining for further digestion. As the acid contents of the stomach rush through the pylorus (the outlet of the stomach) into the first part of the small intestine, or duodenum, the pylorus closes, the bile and the pancreatic juice flow through a common opening into the duodenum neutralizing by their alkalinity the acidity of the food material from the stomach. As the contents of the duodenum become neutral or alkaline the pylorus relaxes and more of the gradually liquifying food, or chyme, passes out of the stomach. Again the reflex effect of the acid fluid on the duodenal mucous membrane causes a contraction of the pyloric sphincter and the stomach outlet is closed, the same alternating process to be continued until stomach digestion is complete and the organ is at rest. The length of time required depends upon the amount, kinds, and combination of food taken into the stomach and varies normally from two to six hours.

But the rapid introduction into it of improperly prepared material at once tends to overwhelm the stomach and would, could it be seen, produce as unsightly a spectacle as the crowding of the mouth so full of food that mastication be made awkward and almost impossible. This food not having been properly reduced before swallowing, requires an excessive amount of churning by the stomach wall which is already handicapped by over distention.

An Unsightly Spectacle

Incomplete mastication means hurried eating. Hurried eating leads to overeating because the introduction of food has been so rapid that the nerve impulses have not had time to return with their message "enough", and thus by the time the sensation of hunger has disappeared an excess of food has been taken. Everyone knows how, if called away from a hurried meal, appetite perhaps still keen, he may return later only to find himself satisfied with the food already taken. The nerve impulses of satiety take a little time to report, hence the advantage of slow eating. If one must eat hurriedly his only safety lies in eating within safe limits as to the amount, and stopping his meal while yet the appetite may call for more.

Indigestible food substances, wrong combinations, eating at too frequent intervals, all play their part in causing slow and difficult digestion and thus hindering the normal passage of the food through the alimentary tract.

Stagnation in the stomach or intestine, whatever the cause, means one or all of three abnormal processes. Food must be properly digested and absorbed or carbohydrates will ferment, protein will putrify, fats will become rancid. These processes take place in the digestive canal as quickly as outside of it and often sooner because the conditions of temperature and moisture are ideal for germ growth.

Three Results of Delay

In the stomach, because of the presence of the germicidal hydrochloric acid, germ activity is hindered and under normal conditions made impossible. But under the conditions mentioned above fermentation often takes place resulting in "sour stomach", gas formation, and a general bad state of affairs.

In the intestine, the food having been longer on the way and the secretions being alkaline instead of acid, germ activity goes on to a great extent. Under normal conditions this may even assist in the dissolution of the food, but very quickly under conditions of slow digestion and retention food decomposition becomes abnormal, fermentation and putrefaction are set up, resulting in the formation of gases and irritating substances that greatly interfere with peristalsis and with the completion of digestion. The amino-acids, instead of being allowed to pass unhindered through the mucous membrane into the blood, are broken down by the germs into decomposition products. Poisons are formed which being absorbed often overwhelm the liver, get by into the blood stream, and slowly but surely intoxicate the individual. As the result of carbohydrate fermentation alcohol and kindred products may be formed, the absorption of which may produce symptoms of chronic alcoholism in the total abstainer. The absorption of the products of protein putrefaction, becoming excessive and acute, spells "bilious attacks" or perhaps "ptomain poisoning," but oftener in a chronic way these poisons gradually do their work causing abnormal fatigue, lowered nerve tone, irritable nerves, headaches, sallow skin, lowered vitality, and functional disturbances of any or all of the organs.

Germs at Work

Self Poisoning

Thus in this great preparation chamber there may be prepared for absorption, poisons as well as food. The food itself being incompletely digested, much of it may not be absorbed and so may never reach its destination. The cells instead of receiv-

ing their needed nourishments are handicapped by poisons and their activity is enfeebled. This condition of poisoning from one's own digestive tract is known as "auto intoxication," or self poisoning and is widespread, lying at the foundation of many of the ailments and diseases that beset the civilized race.

A Reckoning Time

With those who are naturally robust it may seem that the limit of work imposed upon the stomach and intestine need only be determined by the appetite and inclination of the individual. But be the digestive organs ever so strong, what with the ingestion of incompletely masticated food in unlimited kind, variety, and amount, perhaps improperly prepared or in combination with substances difficult of digestion, there will come a time when these faithful organs will be unable to do the work given them to do, even though the amount of work be decreased to normal limits. And often long before symptoms directly referable to the digestive tract manifest themselves, the amount of putrefaction may have reached the stage where the vitality is greatly lowered, signs of toxemia appear, and gradually but surely the health and efficiency of the individual is undermined.

There are many who, having a smaller amount of inherent strength in the digestive organs, feel sooner the results of the conventional careless habits of eating. Not realizing the cause of their earlier symptoms they continue in their dietetic mistakes until a radical program which admits to the alimentary canal only the simplest and most easily digested food is necessary to give the organs of alimentation the opportunity to catch up as it were, and to lay in a store of reserve strength that they may perchance at some future time be able to carry on a normal amount of work.

This type of person is sometimes spoken of as the auto-intoxication type and he is found in all stages and in all grades. Under this head comes the one who eats but grows thinner and wonders why; the one who suffers from the occasional bilious attack and certain type of sick headache; the nervously exhausted individual with aches too numerous to mention and symptoms as varied as temperament and susceptibility may differ; the dyspeptic, sallow, thin, despondent, suffering from indigestion, gastric distress, constipation and "gas", the digestive organs unequal to their task accomplishing the little they do by much coaxing, the tenderest of care, and artificial aid.

A Type

The cause of anemias and serious organic disorders of the nervous system is coming more and more to be considered referable to excessive putrefaction in the intestine, with a slow absorption of poisons.

Anemias

And thus we have a picture of some of the various conditions often resulting when the first steps in body food analysis or reduction are not carried on properly. No one can estimate the reserve strength of his digestive organs. Often the one who early has evidence of a weak digestion is the one fortunate because he is of necessity led to careful dietetic habits. And therefore it were well could all adopt a sensible, sane plan of eating, following natural law, eating for strength and not for drunkenness, wisely selecting and preparing their food, and partaking of it in such a way as to assist instead of hinder nature in her efforts to utilize it to the best advantage.

"Is life worth living? It all depends on the liver."

CHAPTER IV.

Defective Food Analysis—Continued. Suboxidation.

As has already been suggested, there are those who suffer little, if any, from digestive disturbance, because they are endowed by nature with great vitality and organic strength.

Results More Remote

They can "digest anything", can eat at any time, anything their palate calls for, and never suffer the discomforts of indigestion. One's first thought might be, How fortunate are these! but that is not entirely true of them; for their carelessness and ignorance in connection with alimentation will lead to a condition of ill health more remote perhaps, but as truly the result of dietetic errors as are those of the previous class and often these results prove more disastrous in the end.

These diseases come under the head of metabolic disorders and, in the light of our comparison of the body to a stove, we will speak of them as conditions due to suboxidation and of the individual suffering from them as belonging to the suboxidation type. In these persons oxidation is imperfect, elimination of cell waste is incomplete, the tissues become clogged with substances which should be eliminated, the grates or kidneys do their work incompletely and "the stove smokes." The "fires are banked."

Another Type

As has already been made plain in a previous chapter, protein metabolism results in the formation of a solid ash which is in the form of urea, uric acid*, purin bodies, creatin, and

*Uric acid ($C_5 H_4 N_4 O_3$) and the purin bodies as Xanthin, hypo-Xanthin, etc., are very closely related both chemically and physiologically to each other and to the caffeine ($C_8 H_{10} N_4 O_2$) of tea and coffee and the theobromine ($C_7 H_8 N_4 O_2$) of cocoa. Uric acid and the purins result principally from the metabolism of the neucleo-proteins. Neucleo protein is abundant in meat, especially in glandular tissue as liver, sweetbreads, etc. A purin free diet is one in which meats, and tea and coffee are excluded. Purins are found also to an extent in some other foods as, e. g. eggs and legumes.

certain other related substances. The most important of these is urea in which form most of the nitrogen is eliminated.

In order for this ash to be properly eliminated it must be finely divided by a process of oxidation and analysis. Imperfect metabolism is always associated with suboxidation and the result is an excess of an incompletely oxidized protein ash, which backs up in the blood stream as "clinkers." These accumulate in the joints producing rheumatism, so called, and in the muscles they are the cause of lumbago and myalgia; along the nerve sheaths their irritating presence may produce neuritis; accumulating in the blood vessel walls, they cause the arteries to lose their supple, elastic quality and to become hard, stiff, and brittle, which in the end means high blood pressure, an over-worked heart, and often apoplexy, angina pectoris, and heart failure. The kidneys in their effort to eliminate an excess of waste and that in an imperfectly prepared form are over-worked and Bright's disease may be the result.

Rheumatism

While all of these conditions do not come to one individual, and to many only in minor degree, yet the ever increasing occurrence of these diseases with, because of them, the lowered life expectancy of the man past forty bears witness to the fact that metabolic disorders are becoming more prevalent and must be reckoned with in the struggle for race conservation.

With defective protein metabolism is ever associated suboxidation of carbohydrate and fat, which still further clogs the body stove. (See page 68.) Carbohydrate, containing the same chemical elements as fat, is readily changed over in the tissues into fat, and these two food classes instead of being used up in energy production may be stored excessively as adipose tissue and this often at the expense of muscle.

A Cause Of Obesity

So in this type we have the obese, rheumatic, gouty individual, short of breath, for whom exercise becomes difficult

thus adding another factor in the causation of the ever increasing condition of suboxidation.

But this "suboxidation type" of person has a good digestion with its accompanying good appetite, is fond of rich concentrated food and, unaware that his ills are directly due to his wrong habits of eating, he goes blindly on overloading his body furnace with fuel that it can not oxidize or eliminate and that only serves to increase the clinkers that hinder the burning of the vital fires.

Often it is not the bulk of the food intake, but its concentration in fats and sweets that determines its excess, and as we study further the question of food values it will be seen how easily food can be taken in excess of body needs.

While some may suffer from under feeding, yet in conditions of prosperity the diseases of the race due to improper alimentation are the result, almost entirely, of an excess of food, rather than the result of a deficient amount, a condition of underfeeding sometimes following on as the result of conditions caused primarily by a too abundant food intake.

Again we will enumerate the conditions necessary for perfect oxidation and thereby make evident the remedy.

Important Conditions

1. Proper kind and amount of fuel—a properly balanced food supply in direct proportion to body needs.

2. Open drafts—(a) An ample supply of oxygen through the lungs. (b) The carrying of the oxygen to every cell by a free circulation of the blood, made possible only by exercise.

3. A finely divided ash, free from clinkers, so that thorough elimination may be possible. This may necessitate a limited intake of fuel for a time, giving the body a chance to burn up what is already on hand in excess.

The subject of eating cannot be separated from that of the oxygen we breathe in, and the exercise we are able to take.

Exercise

An ample supply of oxygen must reach the lungs, but oxygen which goes no further than the lungs does the tissues no good. It must be carried throughout the body by the blood, a perfect circulation of which is possible only under conditions of more or less vigorous exercise. The freely moving blood stream carries both fuel and oxygen to the cells and thoroughly washes tissue, muscle, and organ from waste matter, carrying these wastes to their avenues of elimination.

Often the person suffering from suboxidation reaches the point where, because of obesity, fatty heart, or high blood pressure, exercise is impossible. Under these conditions the problem of increasing the circulation and the metabolic processes, becomes largely one of diet regulation, the exercise, of necessity, being largely passive as in massage and manual Swedish movements.

The intelligent treatment of obesity, with its allied conditions, by diet adjustment upon the basis of measuring the fuel supply is most satisfactory, the treatment of no abnormal condition promising more sure results.*

Defective food analysis, whether in the digestive tract or in the tissues, lessens the alkalinity of all body fluids producing a more nearly acid condition of the blood. Acids are formed as the result of fermentation and abnormal food decomposition in the intestinal tract, and as the result of cell waste and katabolism in the tissues. (†) These wastes not being prop-

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*To those who desire to study more fully the dietetic treatment of obesity, we would recommend that amusing and instructive little book by Dr. L. H. Peters, "Diet and Health with Key to the Calories."

†(b)There is a difference in the acidity of the ash resulting from the metabolism of various foods, e. g. the metabolism of meat yields an acid ash, that of vegetables an alkaline ash. Most fruits are base forming, thus increasing the alkalinity of the blood, (See chapter VIII) while cereals furnish in their metabolism a preponderance of acid.

erly oxidized and eliminated lessen the alkalinity of the blood because of the excess of acid products. (See footnote page 69.)

As diseases of metabolism are so common and most of them due to an improper food supply, the understanding of food values, both as to quality and quantity, becomes a very important matter. How we may measure our food intake easily, but scientifically, and make this knowledge of practical value, we will consider in our next chapter.

"Our bodies, in other words, should be such good machines that their running will cause no creaking or jolting."—Hoxie.

CHAPTER V.

The Food Unit or Calorie.

Of the seven food classes three are oxidized in the body and may be measured by the calorie or heat unit. In this way we may as easily measure our body intake of fuel as can the manufacturer who estimates the amount of coal necessary to furnish the energy required to run the machinery of his plant. Every ounce of protein, fat, or carbohydrate taken into the tissues produces a definite amount of heat. Heat can always be converted into energy.

How Much Fuel?

The instrument used in measuring the heat value of food is called a calorimeter, and simply described is this:—A double chamber, in the inner chamber a given quantity of food, e. g. an ounce of sugar; in the outer chamber a given quantity of water of a known temperature. The food in the inner chamber is ignited by an electric spark. When the burning is complete the temperature of the water in the outer chamber is taken and the increase in temperature shows the energy or caloric value of that food.

The Calorimeter

The amount of heat required to raise the temperature of a pound of water 4 degrees Fahrenheit, or 1 degree centigrade is a *calorie*. The slow combustion of an ounce of food in the body tissues will produce the same amount of heat as though oxidized rapidly in a calorimeter.

The Calorie

By experiment it has been found that the heat value of a gram of pure water-free protein, e. g. the casein of milk, egg albumen, fibre of meat is four calories; of a gram of pure carbohydrate as starch or sugar, four calories; but of a gram of fat more than two times as much, or nine calories.*

*More accurately—1 gram of protein equals 4.1 calories; 1 gram of carbohydrate equals 4.1 calories; and 1 gram of fat equals 9.3 calories.

An ounce equals about thirty grams, therefore multiplying the above figures by thirty, gives the number of calories per ounce.

Different foods contain varying amounts of these oxidizable substances; accordingly the caloric value of food stuffs depends upon the amount of protein, fat or carbohydrate they contain; e. g. an ordinary slice of bread weighing 1¼ ounce, or 38 grams, contains approximately 4 grams of protein, 2 grams of fat and 16 grams of carbohydrate, the 16 grams remaining being water and cellulose.

4 grams of protein equals	16 calories
2 grams of fat equals	18 calories
16 grams of carbohydrate equals	64 calories
Total	98 calories

Or approximately 100 calories.

By a little study one may very easily become familiar with the approximate values of common foods and be able to arrive at some conclusion as to the correctness of one's daily food ration in its amount and proportion of food elements. Many would be surprised to find how far short their diet comes from the ideal which if followed would result in the maximum of health and strength.

A Practical Application

It is very easy to remember that one slice of bread contains 100 food units, one egg 75, a glass of milk 150, an average potato 125, a tablespoonful of average cream about 40, a serving of cooked cereal 75 to 100 calories, an ordinary serving of green and leaf vegetables 25 to 50, depending upon the amount of fat or milk added, average serving of legumes 100 to 150 calories; also that desserts are higher in food value, ranging from 125 calories for a simple custard or junket to 350 for one-sixth of a pie. See table given below. These and many others in a short time become very familiar to the housewife interested in food values.

Food Requirements

The amount of food required by the individual varies with height, age, sex and muscular activity, but for the average person 2000 calories may be taken as a working basis. One above average height will need more perhaps. Other things being equal, men need about ten per cent more than women. If engaged in active, muscular labor, the requirements may be 2500 to 3000, or even more in the case of a farmer, a lumberman, or a soldier. Those of sedentary habits often do better on less than 2000, even as low as 1500 or 1600. This will depend upon the height, temperament, and natural tissue activity.

An obese individual or one suffering from the results of imperfect oxidation, as manifested in rheumatic joints, high blood pressure, may do well for a time on as low as from 1000 to 1200 food units daily, with marked relief from symptoms and, if obese, a reduction of from one to four pounds per week.

How Much Protein?

The amount of protein needed does not vary within such wide limits. The amount remains more nearly constant and should be from 200 to 300 calories in twenty-four hours, even though the total ration be low. On the average ration this would be about ten per cent of the entire daily food intake, but if one does well on the low ration as suggested above, the protein must not be reduced proportionately but should be kept near the normal of at least 200 calories; for the body, not being able to store this repair material in excess, must have it supplied to it in regular daily amounts.

How Much Fat?

The fat intake should be from 400 to 800 food units per day.* A study of food values soon makes it very evident that the average individual takes much more than this amount in his daily food ration. The remainder of the total calor-

*This need not be in the form of free fat. Many foods contain a high proportion of fat, as milk, eggs, olives, nuts.

ies is made up of carbohydrate. Fat and carbohydrate can to an extent be substituted one for the other, but an excess of fat should be avoided. This we will discuss in a later chapter.

Food Values

The first of the following tables gives the approximate energy value of the cooked and ready to serve foods commonly used. An effort has been made to arrange them so that the housewife may be able to see at a glance the food value of the average helping of the various dishes appearing upon her table, and the proportion of protein, fat, and carbohydrate contained in each. These percentages are of the *total number of food units* and *not of the weight.* Fractions and decimals have been disregarded in most cases.

Because of the variation in recipes for the same dish, many of the figures in the following tables can only be approximate, but given the ingredients, the value of any dish may be estimated with a fair degree of accuracy by the use of table No. 2. (See page 48.) This table gives the value of staple food stuffs, both raw and cooked, used in cooking and in the making up of various recipes. From this table the housewife may easily estimate the calories contained in a serving of any dish she may prepare.

Take for example the following recipe:—

Spinach Soup

	Protein Calories	Fat Calories	Carbohydrate Calories	Total Calories	
Spinach 1 quart (4 oz.)	9	6.5	12	27.5	See p. 41
Onion 1 thin slice	.5	.5	4	5	See p. 40
Stale bread 2 slices	26	12	162	200	See p. 34
Skim milk 1 qt	128	24	192	344	See p. 36
For 6 servings divide by 6	163.5	43	370	576.5	
	27	7	62	96	

Therefore each serving of soup will contain 96 calories, of which 27 is protein, 7 is fat, and 62 is carbohydrate.

Put the spinach and onion through the meat chopper, following them with the bread to prevent waste. Put into a double boiler with the milk and cook until tender. This is a relatively high protein dish, over ¼ of the calories being protein, and shows a good use for skimmed milk and stale bread. *Try it.*

"All that is taken into the stomach, above that which the system can convert into good blood, clogs the living machine.

"The system receives less nourishment from too great a quantity of food, even of the right quality, than from a moderate quantity taken at regular periods."—White.

Table I. Caloric Value of Ready to Serve Foods*

Breads and Cereals

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Barley, pearled	2 hp. tbsp.	3⅓ oz.	10	3	91	104	10	3	87
Biscuits, soda or bkg pwdr	1 small	1 oz.	9	8	58	75	12	10	78
Bread, corn	small sq.	1 oz.	12	16	72	100	12	16	72
Bread, graham	1 slice	1⅓ oz.	14	6	80	100	14	6	80
Bread, rye	1 slice	1⅓ oz.	14	4	82	100	14	4	82
Bread, white	1 slice	1⅓ oz.	13	6	81	100	13	6	81
Bread, whole wheat	1 slice	1⅓ oz.	17	4	85	106	16	4	80
Buns, cinnamon	1 bun	1½ oz.	16	29	105	150	11	19	70
Buns, plain	1 bun	1⅓ oz.	12	10	78	100	12	10	78
Crackers, graham	1 cracker	¼ oz.	3	7	25	35	9	20	71
Crackers, oatmeal	1 cracker	¼ oz.	4	8	23	35	11	23	66
Crackers, soda	1 cracker	1/10 oz.	1	1	8	10	10	10	80
Uneeda biscuit	1 biscuit	⅛ oz.	2	5	18	25	8	20	72
Corn flakes	2 hp. tbsp.	½ oz.	4	1	33	38	11	1	88

*As a basis for the estimation of the food values in tables I and II, reference has been made to Government Bulletin No. 28, "Chemical Composition of American Foods"; to the Battle Creek Sanitarium Diet List; to Pattee's Practical Dietetics, and to Locke's Food Values. Much personal work in weighing and measuring has also been done. The values in table I are for foods as ordinarily prepared and served, except in the case of the cooked vegetables; the value of each of these being computed for the vegetable cooked plain without the addition of milk, cream or fat of any kind. The housewife may easily estimate the caloric value of any seasoning that she may add. The percentages given are **of the total food value** and **not of the weight.**

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Corn meal	2 hp. tbsp.	3⅓ oz.	7	9	64	80	9	11	80
Gluten Mush	2 hp. tbsp.	3⅓ oz.	11	1	49	61	18	1	81
Granola	2 hp. tbsp.	1⅓ oz.	20	1	113	134	15	1	84
Granuto	2 hp. tbsp.	1⅓ oz.	26	6	122	154	17	4	79
Grape-Nuts	2 hp. tbsp.	1⅓ oz.	17	47	112	176	10	27	63
Granose biscuit	2 biscuits	1 oz.	14	2	84	100	14	2	84
Griddle cakes (buckwheat)	1 cake	3 oz.	12	12	116	140	9	9	82
Gruel—Cracked wheat	⅔ cup	5 oz.	14	30	44	88	16	34	50
Gluten	⅔ cup	5 oz.	22	23	73	118	19	19	62
Oatmeal	⅔ cup	5 oz.	16	35	41	92	18	38	44
Hominy	2 hp. tbsp.	3⅓ oz.	9	2	73	84	11	2	87
Hominy grits	2 hp. tbsp.	3⅓ oz.	6	2	50	58	10	3	87
Krumbles	2 hp. tbsp.	⅔ oz.	7	3	59	69	11	4	85
Oatmeal	2 hp. tbsp.	4 oz.	14	5	56	75	19	7	74
Rice biscuit	2 biscuits	1 oz.	8	1	97	106	8	1	91
Rice flakes	2 hp. tbsp.	½ oz.	4	1	48	53	8	1	91
Rice, polished	2 hp. tbsp.	3⅓ oz.	12	2	114	128	93	1	90
Rice, puffed	2 hp. tbsp.	⅓ oz.	4	—	31	35	9	1	90
Rice, whole	2 hp. tbsp.	4 oz.	30	5	142	177	16	3	81
Shredded wheat biscuit	1 biscuit	1 oz.	13	3	93	109	12	3	85
Wheat, cracked	2 hp. tbsp.	4 oz.	14	4	86	104	14	4	82

Breads and Cereals (Continued)

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Wheat, cream of	2 hp. tbsp.	3⅓ oz.	7	2	47	56	12	4	84
Wheat flakes	2 hp. tbsp.	½ oz.	7	1	41	49	13	2	85
Wheat grits	2 hp. tbsp.	3⅓ oz.	7	3	51	61	12	5	83
Tapioca	2 hp. tbsp.	2 oz.	3	1	52	56	5	2	93

Dairy Dishes

Butter	1 pat or 1 lev. tbsp.	½ oz.	—	114	—	114	—	100	—
Buttermilk	aver. serv.	6 oz.	23	8	35	66	34	12	54
Cheese, American pale	1½ cu. in.	1 oz.	25	73	2	100	25	73	2
Cheese, cottage	2 hp. tbsp.	3 oz.	60	38	15	113	53	33	14
Cheese, full cream	1 cu. in.	⅔ oz.	20	54	—	74	27	73	—
Cheese, Neufchatel	1 cu. in.	⅔ oz.	15	50	1	66	23	76	1
Cheese, Swiss	1 slice	1 oz.	33	96	1	130	25	74	1
Cream, average	1 tbsp.	½ oz.	2	25	3	30	5	85	10
Cream, rich (40%)	1 tbsp.	½ oz.	1	54	2	57	2	95	3
Eggs	1 large	1½ oz.	25	50	—	75	33	67	—
Kumyss	aver. serv.	6 oz.	20	34	36	90	22	38	60
Milk, evap. unsweetened	½ glass	4 oz.	30	85	45	160	19	52	29
Milk, skimmed	aver. serv.	6 oz.	24	5	36	65	37	8	55
Milk, whole	aver. serv.	6 oz.	22	64	34	120	19	52	29
Yogurt	aver. serv.	6 oz.	24	5	36	65	37	7	56

Soups

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Cream of asparagus	aver. serv.	5 oz.	16	92	23	131	12	70	18
Cream of barley	aver. serv.	5 oz.	11	73	36	120	9	61	30
Cream of celery	aver. serv.	5 oz.	14	95	24	133	11	71	18
Cream of Corn	aver. serv.	5 oz.	17	93	50	160	11	58	31
Cream of lentil	aver. serv.	5 oz.	30	73	66	169	18	43	39
Cream of lettuce	aver. serv.	5 oz.	27	144	48	219	12	66	22
Cream of lima bean	aver. serv.	5 oz.	34	72	108	214	16	33	51
Cream of navy bean	aver. serv.	5 oz.	47	20	123	190	25	11	64
Cream of pea	aver. serv.	5 oz.	30	90	66	186	16	48	36
Cream of spinach	aver. serv.	5 oz.	18	110	32	160	11	69	20
Cream of tomato	aver. serv.	5 oz.	14	100	30	144	10	69	21
Cream of veg. oyster	aver. serv.	5 oz.	12	104	23	139	8	75	17
Fruit soup	aver. serv.	5 oz.	7	—	135	142	5	—	95
Tomato Bisque	aver. serv.	5 oz.	16	52	12	80	19	66	15
Tomato, clear	aver. serv.	5 oz.	15	35	35	85	18	41	41
Vegetable soup	aver. serv.	5 oz.	5	29	35	69	8	42	50
Vegetable bouillon	aver. serv.	5 oz.	35	21	36	92	38	23	39
Vegetable broth	aver. serv.	5 oz.	14	—	2	16	85	—	15

The cream soups are rather high in fats, because of cream used. The same soups made with milk would be lower in calories of fat and in total food units. See Chapter XXII. These soups are, however, very delicious soups and may well be eaten if the balance of the meal is not too high in fat. For recipes see Lenna Francis Cooper's "New Cookery."

Meats and Fish

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Bacon, fried	1 slice	½ oz.	13	57	—	70	19	81	—
Bacon, smoked, uncooked	1 slice	1 oz.	12	178	—	190	6	94	—
Beef boiled, lean	aver. serv.	3 oz.	123	14	—	137	89	11	—
Beef roast, fat	aver. serv.	3 oz.	54	410	—	464	12	88	—
Beefsteak, round	aver. serv.	3 oz.	112	72	—	184	61	39	—
Beefsteak, tenderloin	aver. serv.	3 oz.	97	189	—	286	34	66	—
Bouillon	aver. serv.	5 oz.	12	1.5	1.5	15	80	10	10
Chicken, broilers	aver. serv.	6 oz.	152	48	—	200	76	24	—
Chicken, roast	aver. serv.	3 oz.	132	41	—	173	76	24	—
Clams	aver. serv.	4 oz.	30	4	—	34	88	12	—
Codfish	aver. serv.	5 oz.	99	5	—	104	95	5	—
Goose	aver. serv.	3 oz.	54	285	—	339	16	84	—
Haddock	aver. serv.	3 oz.	95	5	—	100	95	5	—
Halibut	aver. serv.	3 oz.	65	41	—	106	61	39	—
Ham, boiled	aver. serv.	2 oz.	51	131	—	182	28	72	—
Ham, fried	aver. serv.	2 oz.	65	73	—	138	47	53	—
Lamb chop, boiled	aver. serv.	2 oz.	50	160	—	210	24	76	—
Lamb, leg roast	aver. serv.	3 oz.	67	100	—	167	40	60	—
Liver	aver. serv.	3 oz.	65	42	—	107	61	39	—

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Lobster	aver. serv.	2 oz.	38	10	—	48	80	20	—
Mutton chop	aver. serv.	3 oz.	100	50	—	150	67	33	—
Mutton leg, boiled	aver. serv.	2½ oz.	72	135	—	207	34	66	—
Oysters	aver. serv.	3 oz.	21	10	—	31	68	32	—
Salmon	aver. serv.	2 oz.	40	83	—	123	32	68	—
Sausage	1 sausage	1 oz.	20	144	—	164	12	88	—
Shad	aver. serv.	2 oz.	44	51	—	95	45	55	—
Trout	aver. serv.	2 oz.	44	111	—	155	28	72	—
Turkey	aver. serv.	2 oz.	48	118	—	166	29	71	—
Veal	aver. serv.	2½ oz.	75	25	—	100	75	25	—
		Vegetables and Legumes							
Asparagus	8 stalks	4 oz.	8	3	14	25	32	12	56
Beans, lima, green	2 hp. tbsp.	2½ oz.	12	2	42	56	21	4	75
Beans, lima, dried	2 hp. tbsp.	2½ oz.	24	5	86	115	21	4	75
Beans, navy, baked	2 hp. tbsp.	4 oz.	37	8	105	150	25	5	70
Beans, navy, boiled	2 hp. tbsp.	2⅓ oz.	19	3	50	72	25	5	70
Beans, pink or kidney	2 hp. tbsp.	2⅓ oz.	18	2	47	67	27	3	70
Beans, soy	2 hp. tbsp.	2 oz.	32	41	27	100	32	41	27
Beans, string	2 hp. tbsp.	2 oz.	4	1	5	10	40	10	50

Vegetables and Legumes—Continued

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Beets	2 hp. tbsp.	2½ oz.	7	1	21	29	24	3	73
Beet greens	2 hp. tbsp.	3 oz.	9	10	13	32	28	3	69
Cabbage, chopped, raw	2 hp. tbsp.	1 oz.	5	2	3	10	50	20	30
Cabbage, cooked	2 hp. tbsp.	2 oz.	2	1	1	4	50	20	30
Carrots	2 hp. tbsp.	2 oz.	2	1	10	13	14	10	76
Cauliflower	2 hp. tbsp.	4 oz.	4.5	1	2.5	8	55	12	33
Celery	3 stalks	2 oz.	5	1	14	20	24	5	71
Corn, canned	2 hp. tbsp.	3 oz.	11	11	78	100	11	11	78
Corn, green	1 ear	3 oz.	13	10	77	100	13	10	77
Cucumber	aver. serv.	2 oz.	2	1	7	10	20	10	70
Eggplant	1 slice	1½ oz.	2.5	1.5	8	12	21	12	67
Lentils	2 hp. tbsp.	2 oz.	18	1	48	67	27	1	72
Lettuce	aver. serv.	1 oz.	1.5	.5	4	6	25	14	61
Mushrooms	2 large	1½ oz.	7	2	12	21	33	11	56
Onion	one	3 oz.	5	3	32	40	12	8	80
Parsnips	2 hp. tbsp.	3 oz.	1	1	7	9	10	10	80
Potatoes, baked	average	3 oz.	10	1	89	100	10	1	89
Potatoes, boiled in skins	aver. serv.	3 oz.	10	1	89	100	10	1	89
Potatoes, mashed	2 hp. tbsp.	3⅓ oz.	10	26	70	106	9	25	66

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Peas, dried, cooked	2 hp. tbsp.	2 oz.	28	2	70	100	28	2	70
Peas, green	2 hp. tbsp.	2 oz.	14	2	41	57	25	3	72
Potatoes, sweet	average	3⅓ oz.	12	19	175	206	6	9	85
Radishes	5 large	2½ oz.	2	1	10	13	18	3	79
Spinach	2 hp. tbsp.	3 oz.	8	6	11	25	35	24	41
Squash, Hubbard	2 hp. tbsp.	3 oz.	3	4	36	43	8	9	83
Tomatoes	1 medium	5 oz.	7	2	24	33	21	7	72
Turnips	2 hp. tbsp.	4 oz.	2	1	4	7	20	10	70
Vegetable oyster, creamed	2 hp. tbsp.	2 oz.	4	24	12	40	10	60	30
		Salads							
Apple and celery	aver. serv.	2 oz.	4	8	52	64	6	3	91
Cabbage	aver. serv.	2 oz.	10	37	18	65	15	58	27
Carrot and cottage cheese	aver. serv.	2 oz.	18	59	20	97	19	61	20
Combination	aver. serv.	2 oz.	8	40	32	80	10	50	40
Date and walnut	aver. serv.	1¼ oz.	7	43	72	122	6	35	59
Fruit	aver. serv.	2 oz.	4	5	52	61	7	8	85
Mayonnaise	1 hp. tsp.	⅓ oz.	—	50	—	50	—	100	—
Peas and celery	aver. serv.	3 oz.	19	48	36	103	18	46	36
Potato	aver. serv.	2 oz.	9	51	30	90	10	57	33

Fruits, Fresh

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Apple	average	3½ oz.	2	4	54	60	3	7	90
Apricot	average	1 oz.	1.5	1	20.5	23	6.5	4.5	89
Banana	average	3½ oz.	7	6	87	100	7	6	87
Blackberries	2 hp. tbsp.	2⅓ oz.	3	6	30	39	6	15	79
Cantaloupe	½ melon	½ lb.	6	—	87	93	6	—	94
Cherries	aver. serv.	3 oz.	3	5	49	57	5	8	87
Currants	2 hp. tbsp.	2 oz.	3	—	30	33	9	—	91
Figs	1 large	1 oz.	3	—	57	60	5	—	95
Gooseberries	2 hp. tbsp.	1⅔ oz.	1	—	24	25	4	—	96
Grapefruit	½ large	8 oz.	7	4	89	100	7	4	89
Grapes	1 bunch	5 oz.	5	10	85	100	5	10	85
Huckleberries	2 hp. tbsp.	1½ oz.	1	3	34	38	3	8	89
Lemon	average	2 oz.	2	3	15	20	9	15	76
Orange	average	6 oz.	5	2	69	76	7	3	90
Peach	average	3 oz.	3	1	36	40	7	2	91
Pear	average	4 oz.	4	6	80	90	4	7	89
Pineapple	2 slices	2 oz.	1	1	15	17	5	6	89
Plum	average	1 oz.	2	—	27	29	6	—	94
Raspberries, black	2 hp. tbsp.	2 oz.	4	5	27	36	10	13	77

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Raspberries, red	2 hp. tbsp.	2 oz.	2	—	30	32	7	—	93
Strawberries	2 hp. tbsp.	2⅓ oz.	3	4	23	30	10	12	73
Watermelon	1 slice	10 oz.	5	5	70	80	6	6	88
Fruits, Dried									
Apricots	one	⅓ oz.	1.5	1	20.5	23	6.5	4.5	89
Dates	one	⅓ oz.	.5	2	24	26.5	2	8	90
Figs	one	½ oz.	3	1	50	54	6	1	93
Prunes	one	⅓ oz.	1	—	24	25	4	—	96
Raisins	~~one~~ tin	½ oz.	2	4	44	50	4	8	88
Stewed Fruits, Fruit Juices, Jellies, etc.									
Apple, baked	1 large	4 oz.	2	5	118	125	1.5	4	94.5
Apple juice	1 glass	6 oz.	—	—	17	17	—	—	100
Apple sauce	2 hp. tbsp.	4 oz.	2	4	94	100	2	4	94
Apricot sauce	2 hp. tbsp.	3 oz.	4	—	63	67	6	—	94
Blackberry juice	1 glass	6 oz.	—	—	150	150	—	—	100
Blackberry sauce	2 hp. tbsp.	2 oz.	1	6	60	67	2	8	90
Cherry Sauce	2 hp. tbsp.	2 oz.	3	4	60	67	4	6	90
Cranberry sauce	2 hp. tbsp.	3 oz.	1	3	146	150	1	2	97

Stewed Fruits, Fruit Juices, Jellies, Etc.

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Currant jelly	1 hp. tbsp.	1 oz.	1	—	99	100	1	—	99
Lemonade	1 glass	6 oz.	—	—	85	85	—	—	100
Lemon juice	1 tbsp.	½ oz.	—	—	5	5	—	—	100
Orange juice	1 glass	6 oz.	—	—	90	90	—	—	100
Orange Marmalade	1 hp. tbsp.	1 oz.	1	—	99	100	1	—	99
Peach juice	1 glass	6 oz.	—	—	120	120	—	—	100
Peach sauce	2 hp. tbsp.	3 oz.	2	1	57	60	4	1	95
Pear juice	1 glass	6 oz.	—	—	150	150	—	—	100
Pear sauce	2 hp. tbsp.	2 oz.	1	2	47	50	2	4	94
Plum juice	1 glass	6 oz.	—	—	150	150	—	—	100
Plum sauce	2 hp. tbsp.	2 oz.	—	—	70	70	—	—	100
Prune marmalade	2 hp. tbsp.	2¼ oz.	2	1	97	100	2	1	97
Raspberry juice, black	1 glass	6 oz.	—	—	150	150	—	—	100
Raspberry sauce, black	2 hp. tbsp.	2 oz.	3	—	50	53	6	—	94
Raspberry juice, red	1 glass	6 oz.	—	—	120	120	—	—	100
Raspberry sauce, red	2 hp. tbsp.	2 oz.	2	—	42	44	5	—	95
Strawberry juice	1 glass	6 oz.	—	—	120	120	—	—	100
Strawberry sauce	2 hp. tbsp.	2 oz.	1	1	48	50	2	2	96

Desserts and Sweets

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Cake, chocolate layer	aver. serv.	2½ oz.	18	55	177	250	7	22	71
Cake, coffee	aver. serv.	2 oz.	15	82	133	230	7	35	58
Cake, fruit	aver. serv.	1½ oz.	11	44	116	171	6	23	71
Cake, frosted	aver. serv.	2 oz.	14	48	150	212	6	23	71
Cake, gingerbread	aver. serv.	2 oz.	14	50	156	220	6	23	71
Cake, jelly roll	aver. serv.	3 oz.	17	28	256	301	6	9	85
Cake, nut	aver. serv.	2 oz.	18	70	134	122	15	57	28
Cake, sponge	aver. serv.	1½ oz.	19	21	143	183	10	11	79
Chocolate cream	aver. size	⅓ oz.	.5	1.5	33	35	1	4	95
Chocolate, unsweetened	—	1 oz.	15	124	34	173	9	72	19
Cocoa	1 tbsp.	¼ oz.	12	37	21	70	17	53	30
Custard	2 hp. tbsp.	3 oz.	16	39	37	92	17	42	41
Dates, stuffed	1	⅓ oz.	2	14	25	41	5	34	61
Doughnuts	1	2 oz.	12	90	98	200	6	45	49
Fruit mold	aver. serv.	3 oz.	1	—	99	100	1	—	99
Honey	1 tsp.	¼ oz.	—	—	25	25	—	—	100
Ice cream	2 hp. tbsp.	3½ oz.	25	100	75	200	12.5	50	37.5
Junket	1 cup	7 oz.	28	78	44	150	19	52	29
Lady fingers	three	1 oz.	10	12	78	100	10	12	78

Desserts and Sweets—Continued

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Macaroons	2	1 oz.	6	33	61	100	6	33	61
Molasses	—	1 oz.	3	—	78	81	4	—	96
Pie, apple	1/6 pie	4 oz.	16	114	220	350	5	33	62
Pie, custard	1/6 pie	4 oz.	25	80	145	250	10	3	87
Pie, lemon	1/6 pie	4 oz.	17	104	169	290	6	36	58
Pie, mince	1/6 pie	4 oz.	30	136	184	350	9	39	52
Pie, pumpkin	1/6 pie	4 oz.	25	105	120	250	10	42	48
Pie, raisin	1/6 pie	4 oz.	16	140	244	400	4	35	61
Pudding, bread	2 hp. tbsp.	3 oz.	15	40	145	200	7.5	20	72.5
Pudding, brown Betty	aver. serv.	4 oz.	14	24	162	200	7	12	81
Pudding, rice	2 hp. tbsp.	3 oz.	13	66	60	139	9	48	43
Pudding, tapioca	2 hp. tbsp.	3 oz.	24	57	91	172	13	33	54
Prune whip	2 hp. tbsp.	2 oz.	6	10	59	75	8	13	79
Sherbet	2 tbsp.	2 oz.	5	—	75	80	6	—	94
Sugar, granulated	1 hp. tsp.	1/3 oz.	—	—	40	40	—	—	100
Sugar, loaf	1 cube	1/4 oz.	—	—	30	30	—	—	100
Sugar, maple	small sq.	1 oz.	—	—	100	100	—	—	100
Syrup, homemade	1 tsp.	1/4 oz.	—	—	25	25	—	—	100
Syrup, maple	1 tsp.	1/4 oz.	—	—	25	25	—	—	100

Nuts

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Almonds	10	1 oz.	25	146	6	177	14	83	3
Brazil nuts	3	½ oz.	10	86	4	100	10	86	4
Chestnuts	10	1 oz.	5	10	35	50	10	20	70
Cocoanut, shredded		1 oz.	7	156	37	200	3	78	19
Filberts	10	⅓ oz.	7	62	6	75	9	83	8
Pine nuts	80	½ oz.	22	74	4	100	22	74	4
Peanuts	15	1 oz.	26	82	22	130	20	63	17
Pecans	10	1 oz.	13	199	16	228	5	88	7
Walnuts	10	1½ oz.	30	250	20	300	10	83	7

Miscellaneous

Coffee	1 cup	6 oz.	The food value is equivalent to milk, or cream, and sugar added.						
Macaroni baked with cheese	2 hp. tbsp.	4⅔ oz.	78	190	170	438	18	43	39
Macaroni, boiled	2 hp. tbsp.	3⅓ oz.	12	14	65	91	14	15	71
Malted milk	1 hp. tbsp.	½ oz.	9	11	40	60	15	18	67
Malted nuts	1 hp. tbsp.	1 oz.	28	74	51	153	18	48	34
Meltose	1 tbsp.	⅔ oz.	—	—	57	57	—	—	100
Nut butter	1 tbsp.	½ oz.	17	62	10	89	18	71	11
Nuttolene	aver. serv.	2 oz.	29	55	16	100	29	55	16
Olives	5 olives	1⅓ oz.	5	85	10	100	5	85	10
Protose	aver. serv.	2 oz.	46	32	20	98	47	33	20
Tea	1 cup	6 oz.	The food value is equivalent to milk, or cream, and sugar added.						

Table II.

Food Stuffs, Both Raw and Cooked, Commonly Used in Cooking

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Apples, diced	1 cup	2 oz.	1.5	3	40.5	45	3	7	90
Apples, dried	1 cup	3 oz.	6	16	230	252	3	5	92
Apricots, dried	1 cup	5 oz.	26	13	362	401	6	3	91
Arrow root	1 tbsp.	½ oz.	—	—	57	57	—	—	100
Barley, crushed	1 tbsp.	½ oz.	4	1	44	49	10	2	88
Barley, pearled	1 tbsp.	1 oz.	9	3	80	92	10	3	87
Beans, Lima, dried, cooked	1 cup	7 oz.	67	13	242	322	21	3	76
Beans, Lima, dried, uncooked	1 cup	6 oz.	122	24	466	612	21	4	75
Beans, Lima, green, cooked	1 cup	8 oz.	38	6	136	180	21	3	76
Beans, Lima, mashed	1 cup	8 oz.	76	15	276	367	21	3	76
Beans, navy, cooked	1 cup	7 oz.	56	10	150	216	25	5	70
Beans, navy, mashed	1 cup	8 oz.	64	11	171	246	25	5	70
Beans, navy, uncooked	1 cup	6½ oz.	171	31	451	653	25	5	70
Beans, pink or kidney, cooked	1 cup	7 oz.	56	4	140	200	28	2	70
Beans, pink or kidney, mashed	1 cup	8 oz.	66	4	173	243	28	2	70
Beans, pink or kidney, uncooked	1 cup	7 oz.	175	23	455	653	27	3	70
Beans, soy, cooked	1 cup	6½ oz.	112	145	93	350	32	41	27

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Beans, string, cooked	1 cup	6 oz.	12	3	15	30	40	10	50
Bran	1 cup	2½ oz.	31	13	173	217	14	6	80
Bread crumbs, dry	1 cup	2½ oz.	26	12	162	200	13	6	81
Bread crumbs, moist	1 cup	6 oz.	35	16	215	266	13	6	81
Butter	1 tbsp.	½ oz.	—	109	—	109	—	100	—
Butter	1 cup	8 oz.	—	1744	—	1744	—	100	—
Cabbage, raw, chopped	1 cup	2 oz.	9	3	6	18	50	20	30
Carrots, grated or chopped	1 cup	4 oz.	11	8	56	75	15	11	74
Carrots, mashed	1 cup	7 oz.	7	7	36	50	14	10	76
Celery, chopped	1 cup	2 oz.	7	1.5	21.5	30	24	5	71
Cocoa	1 tbsp.	¼ oz.	12	37	21	70	16	53	31
Cocoanut, shredded	—	1 oz.	6	135	32	173	3	78	19
Corn, canned	1 cup	8 oz.	30	30	200	260	11	11	78
Corn meal, cooked	1 cup	8 oz.	17	22	161	200	9	11	80
Corn meal, uncooked	1 tbsp.	⅓ oz.	3	2	28	33	10	5	85
Corn meal, uncooked	1 cup	3 oz.	52	23	427	502	10	5	85
Corn starch	1 tbsp.	½ oz.	—	—	38	38	—	—	100
Corn starch	1 cup	5½ oz.	—	—	790	790	—	—	100
Cottage cheese	1 cup	6 oz.	120	76	30	226	53	33	14
Cracker crumbs	1 cup	5 oz.	66	81	440	587	11	14	75

Food Stuffs, Both Raw and Cooked, Commonly Used in Cooking—Continued

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Cranberries, raw	1 cup	4 oz.	2	—	18	20	10	—	90
Cream, average (16%)	1 cup	8 oz.	24	408	48	480	5	85	10
Cream, heavy (40%)	1 cup	8 oz.	15	854	30	899	2	95	3
Crisco	1 cup	8 oz.	—	2160	—	2160	—	100	—
Cucumber pulp	1 cup	4 oz.	4	2	14	20	20	10	70
Currants, dried	1 cup	8 oz.	22	34	672	728	3	5	92
Currants, fresh	1 cup	5 oz.	8	—	72	80	10	—	90
Dates with stones	1 cup	8 oz.	16	50	643	709	2	7	91
Egg	1 large	1½ oz.	25	50	—	75	33	67	—
Egg plant	average	1 lb.	25	15	80	120	21	12	67
Flour, barley	1 tbsp.	½ oz.	4	2	46	52	8	4	88
Flour, barley	1 cup	7 oz.	60	32	630	722	8	4	88
Flour, buckwheat	1 tbsp.	½ oz.	3	1	47	51	7	3	90
Flour, buckwheat	1 cup	6 oz.	42	18	540	600	7	3	90
Flour, graham	1 tbsp.	½ oz.	8	3	41	52	15	5	80
Flour, graham	1 cup	5 oz.	77	30	416	523	15	5	80
Flour, rice	1 tbsp.	½ oz.	5	—	40	45	9	1	90
Flour, rice	1 cup	8½ oz.	77	6	767	850	9	1	90
Flour, rye	1 tbsp.	⅓ oz.	2	1	31	34	8	2	90

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Flour, rye	1 cup	5 oz.	39	12	459	510	8	2	90
Flour, white	1 tbsp.	1/3 oz.	4	1	29	34	12	3	85
Flour, white	1 cup	5 oz.	63	15	438	516	12	3	85
Flour, whole wheat	1 tbsp.	1/3 oz.	5	2	28	35	15	5	80
Flour, whole wheat	1 cup	5 oz.	80	25	420	525	15	5	80
Gluten meal (20%)	1 cup	6 oz.	110	10	501	621	20	2	78
Gluten meal (40%)	1 cup	6 oz.	279	15	306	600	40	2.5	57.5
Granola	1 cup	5 oz.	78	6	425	509	15	1	84
Hominy, uncooked	1 cup	8 oz.	76	14	716	806	9	2	89
Lemon juice	1 lemon	1½ oz.	—	—	15	15	—	—	100
Lemon juice	1 tbsp.	½ oz.	—	—	5	5	—	—	100
Lentils, cooked	1 cup	8 oz.	72	4	192	268	30	2	68
Lentils, uncooked	1 cup	7 oz.	210	19	483	712	30	2	68
Lettuce	1 large hd.	8 oz.	12	4	32	48	25	14	61
Macaroni, cooked with milk	1 cup	8 oz.	40	32	144	216	18	14	68
Macaroni, uncooked	1 cup	3⅘ oz.	59	9	324	392	15	3	82
Malted milk	1 tbsp.	½ oz.	9	11	38	58	15	19	66
Meltose	1 tbsp.	⅔ oz.	—	—	57	57	—	—	100
Milk, whole	1 cup	8 oz.	30	86	44	160	19	54	27
Milk, skimmed	1 cup	8 oz.	32	6	48	86	37	7.5	55.5

Food Stuffs, Both Raw and Cooked, Commonly Used in Cooking—Continued

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Milk, evaporated	1 tbsp.	½ oz.	4	10.5	5.5	20	19	52	29
Milk, evaporated	1 cup	8 oz.	60	172	88	320	19	52	29
Molasses	1 tbsp.	⅔ oz.	—	—	54	54	—	—	100
Molasses	1 cup	8 oz.	—	—	645	645	—	—	100
Nut butter	1 tbsp.	½ oz.	17	62	10	89	19	69.5	11.5
Nuts, almonds, chopped	1 cup	6 oz.	147	878	35	1060	14	83	3
Nuts, almonds, shelled	1 cup	5½ oz.	135	805	33	973	14	83	3
Nuts, Brazil, chopped	1 cup	7 oz.	139	1117	57	1313	11	85	4
Nuts, filberts, chopped	1 cup	6½ oz.	118	959	99	1176	10	82	8
Nuts, filberts, shelled	1 cup	6 oz.	109	885	91	1085	10	82	8
Nuts, peanuts, shelled	1 cup	5 oz.	141	444	121	706	20	63	17
Nuts, pecans, shelled	1 cup	5½ oz.	61	1034	98	1193	5	88	7
Nuts, walnuts, chopped	1 cup	5½ oz.	106	930	100	1136	10	83	7
Nuts, walnuts, shelled	1 cup	4½ oz.	90	750	60	900	10	83	7
Nuttolene	—	1 lb.	230	443	130	803	29	55	16
Nuttolene, diced	1 cup	6 oz.	86	166	49	301	29	55	16
Oatmeal, cooked	1 cup	8 oz.	28	10	112	150	19	7	74
Oatmeal, uncooked	1 tbsp.	½ oz.	10	4	44	58	18	7	75
Oatmeal, uncooked	1 cup	5 oz.	100	40	440	580	18	7	75

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Oats, rolled, cooked	1 cup	8 oz.	28	10	112	150	19	7	74
Oats, rolled, uncooked	1 tbsp.	¼ oz.	5	2	22	29	18	7	75
Oats, rolled, uncooked	1 cup	2½ oz.	50	20	220	290	18	7	75
Oil, cooking	1 tbsp.	½ oz.	—	135	—	135	—	100	—
Oil, olive	1 tbsp.	½ oz.	—	135	—	135	—	100	—
Oil, salad	1 tbsp.	½ oz.	—	135	—	135	—	100	—
Olives, chopped	1 cup	6 oz.	12	415	30	457	2	91	7
Onion	one	3 oz.	5	3	32	40	12.5	7.5	80
Onions, grated	2 tbsp.	2 oz.	3	2	24	29	1	1	98
Onion juice	1 tbsp.	½ oz.	—	—	12	12	1	1	98
Peaches, dried	1 cup	3 oz.	17	6	225	248	7	2	91
Peach sauce	1 cup	8 oz.	5	3	152	160	3.5	1.5	95
Peas, dried, cooked	1 cup	7 oz.	98	7	245	350	28	2	70
Peas, dried, uncooked	1 cup	6 oz.	174	18	408	600	29	3	68
Peas, green, cooked	1 cup	6½ oz.	48	6	136	190	25	3	72
Peas, mashed	1 cup	7½ oz.	66	8	191	265	25	3	72
Peas, puree	1 cup	8 oz.	68	8	204	280	24	3	73
Pineapple, canned	1 cup	8 oz.	4	7	155	166	2	4	94
Potatoes, Irish, mashed	1 cup	8 oz.	24	64	166	254	9	25	66
Potatoes, sweet, mashed	1 cup	8 oz.	28	45	393	466	6	10	84

Food Stuffs as Used in Cooking—Continued

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Potato water	1 cup	8 oz.	23	—	4	27	85	—	15
Protose	—	1 lb.	368	256	160	784	47	33	20
Prunes, cooked	1 cup	8 oz.	7	2	211	220	3	1	96
Pumpkin, cooked	1 cup	8 oz.	9	2	49	60	15	3	82
Radishes, grated	1 cup	4 oz.	6	1	27	34	18	3	79
Raisins	1 cup	4 oz.	12	35	355	402	3	9	88
*Raspberries, red, fresh	1 cup	5 oz.	6	—	74	80	8	—	92
Raspberries, black, fresh	1 cup	5 oz.	10	13	73	96	10	13	77
Raspberry sauce, black	1 cup	8 oz.	15	10	175	200	7.5	5	87.5
Raspberry sauce, red	1 cup	8 oz.	10	—	176	186	5	—	95
Rhubarb, uncooked	1 cup	2 oz.	1.5	1.5	9	12	12	12	76
Rice, boiled	1 cup	8 oz.	26	3	228	257	9	1	90
Rice, uncooked	1 cup	8½ oz.	74	6.5	734	814.5	9	1	90
Spaghetti, cooked	1 cup	8 oz.	40	32	144	216	18	15	67
Spaghetti, uncooked	1 cup	3 oz.	43	1	271	315	13	—	87
Spinach, cooked	1 cup	6 oz.	16	12	22	50	32	24	44
Spinach, raw	1 qt.	4 oz.	9	6.5	12	27.5	32	24	44
Squash, cooked	1 cup	8 oz.	8	10	98	116	7	8	85
Strawberries, fresh	1 cup	6 oz.	7	10	52	69	10	12	78
Strawberry sauce	1 cup	8 oz.	7	8	182	197	3.5	4	92.5

*For fruit juices see Table 1.

Food—	Amount.	Weight.	Protein.	Fat.	Carbohydrate.	Total.	Per Cent Protein.	Per Cent Fat.	Per Cent Carbohydrate.
Sugar, granulated	1 tbsp.	½ oz.	—	—	60	60	—	—	100
Sugar, granulated	1 cup	7½ oz.	—	—	840	840	—	—	100
Sugar, powdered	1 tbsp.	½ oz.	—	—	48	48	—	—	100
Sugar, powdered	1 cup	6½ oz.	—	—	736	736	—	—	100
Sugar, loaf	1 tbsp.	½ oz.	—	—	48	48	—	—	100
Sugar, loaf	1 cup	6½ oz.	—	—	736	736	—	—	100
Syrup, Karo	1 cup	8 oz.	—	—	960	960	—	—	100
Syrup, maple	1 tsp	¼ oz.	—	—	25	25	—	—	100
Tapioca, pearled	1 tbsp.	½ oz.	—	—	50	50	—	—	100
Tapioca, pearled	1 cup	6½ oz.	—	—	640	640	—	—	100
Tomatoes, canned	1 cup	8 oz.	11	4	38	53	21	7	72
Tomatoes, raw	1 medium	7 oz.	2	24	33	59	4	41	55
Tomatoes, strained	1 cup	8 oz.	12	5	40	57	21	7	72
Vegetable oysters, cooked	1 cup	6 oz.	6	32	25	63	10	50	40
Water cress	—	1 oz.	1.4	.8	3	5	25	15	60
Wheat, cracked, cooked	1 cup	8 oz.	28	8	172	208	13	4	83
Wheat, cracked, uncooked	1 tbsp.	½ oz.	7	2	44	53	12	4	84
Wheat, cracked, uncooked	1 cup	6 oz.	78	27	528	633	12	4	84
Wheat, cream of, cooked	1 cup	8 oz.	21	6	144	171	12	4	84
Wheat, cream of, uncooked	1 tbsp.	½ oz.	7	2	44	52	12	4	84
Wheat, cream of, uncooked	1 cup	7 oz.	92	29	614	735	12	4	84

CHAPTER VI.

A Balanced Ration—Protein.

As has been made plain in previous chapters, it is very necessary that the food supply be correct, not only as to total amount, but also as regards its proper balance, i. e. it must contain the various food elements in proper relation one to the other and to the entire intake. While this is true of all the food elements, it is undoubtedly in the normal adjustment of the protein part of the diet that mistakes are most often made and with the most serious results. While an excess of fat is harmful, yet a comparatively small amount may not be deleterious providing it is of the right kind and the necessary food units are made up in carbohydrates. But with the protein, error may easily be made on either side and, while much has been said in regard to protein in excess, quite as much stress should be laid on the importance of getting enough.

Ample Supply Important

Tissue repair being dependent upon nitrogen, it is obvious that enough protein is needed in the food to supply the necessary nitrogen to rebuild worn out cells.* The ideal balance is

*The normal adult body should be kept in nitrogenous equilibrium, i. e., the protein intake equal to the outgo. The intake is proportionate to the food ingested; the outgo is indicated by the nitrogen eliminated in the urine, which can be determined by laboratory tests. The body is out of nitrogenous equilibrium when the protein intake is not sufficient to replace worn out tissue as in cases of depleted food supply, or in disease with insufficient food ingestion or assimilation. Here the intake is less than the outgo and if continued death must finally result.

The body is also out of nitrogenous equilibrium when protein is used not only to replace worn out cells, but also to construct new tissue. This is the case in convalescence from wasting disease, as in fevers, tuberculosis, etc. In these cases the ingestion is in excess of the elimination, and should continue so until a normal balance is reached. Normally the growing child takes in more protein than eliminated because of continually developing cells and tissues. Here again the body is out of nitrogenous equilibrium, but necessarily so, and should be on the safe side of an ample supply. In some cases of suboxidation the nitrogen eliminated is less than the amount ingested because of an excessive intake and insufficient activity of the organs of elimination. This lack of balance is abnormal and results in disease.

the one that supplies to the tissues the amount and kind of protein essential for its specific purpose and not a great deal in excess of that amount. Protein cannot be stored in the tissues in excess and so must be supplied to the body in regular daily amounts, the amount needed varying within much narrower limits than that of fat and carbohydrate and much less dependent upon varying conditions of exercise.

Unless engaged in very active muscular exercise, 2000 to 2500 food units is sufficient for the person of average height, and many leading sedentary lives do much better on from 1600 to 1800 in twenty-four hours. All, however, need from 200 to 300 calories daily of protein. If one requires 2000 calories total and 200 calories of protein the amount of protein necessary would be 1-10 or ten per cent of the total ration. But if an individual of sedentary habits needs only 1600 calories, total, he would still need the 200 protein units, making his necessary protein 12½ per cent. It is very important then to bear in mind that the amount of protein should remain comparatively constant and that if, for any reason, the total food intake be low the protein must not be materially reduced.

Protein Ration Constant

This is well illustrated in the treatment of obesity. If the daily amount of protein be kept up to nearly normal, a marked reduction in the total food intake may be made without inconvenience to the patient.

On a ration of 1000 or 1200 food units daily, with an upkeep of protein of from 200 to 250 calories, a weekly loss in weight of two to four pounds may be accomplished and the individual not suffer from hunger but maintain his strength and carry on his regular daily duties. In fact the body being gradually relieved of an unnecessary burden, various associated ailments due to suboxidation (See chapter IV) disappear and one feels well rewarded for any self-denial necessi-

An Obesity Cure

tated. Such a regimen should, however, be carried out under the supervision of a physician and often combined with graduated exercise and tonic baths.

An abnormally low protein aliment leads to anemia, tuberculosis, malnutrition, nervous exhaustion, and other chronic and functional disorders.

But how may we know whether or not our protein ration is properly related to our total daily intake? By referring to the tables of food values as given in Chapter V the percentage of protein in various foods may readily be seen and, with a knowledge of these proportions, the higher protein foods may be combined with the foods lower in nitrogen in such a way as to maintain the necessary protein percentage, thus giving to the body this tissue building element in the normal amount.

How to Know

Those who partake freely of meat are in no danger of deficiency in protein, their danger lies in getting an over supply; but vegetarians often make the mistake of unbalancing their daily ration so as to overeat and to undereat at the same time. Their foods are often combined in such a way that it is necessary for them to overeat of the total amount in order to obtain the body requirement of nitrogenous food; thus we frequently find such an individual poorly nourished and unsatisfied while at the same time he suffers the effects of overeating and indigestion.

Overeat and Undereat at The Same Time

In the preparation of food the protein balance is often disturbed by the addition of an excess of fat or sugar or both. Take for example an Irish potato containing 100 calories, ten calories or ten per cent of which is protein. Add to this 50 calories of butter. The protein calories still remaining ten, the percentage of protein is now $6\frac{2}{3}$. Likewise

Protein Balance Disturbed

beans, always considered a high protein dish, may be made a medium or even a low protein food by the addition of a free amount of fat in their preparation. An ordinary serving of oatmeal with whole milk contains about 150 calories of which 27 calories or 18 per cent are protein. If to this, 50 calories of sugar are added, and cream with its high percentage of fat used instead of milk, the serving has been reduced from a high to a low protein dish, the amount of protein being even as low as 8 per cent of the total food units. If cream were used but no sugar, the percentage of protein would drop to 9½. The addition of the cream and sugar greatly increases the total food value without adding any protein.

Bread as a Protein Food

Even the homely but much depended upon article of diet, bread, has a goodly proportion of protein, 12 to 16 per cent. (See table, chapter V.) But as ordinarily eaten with butter, marmalade or jelly it descends greatly in the scale as a protein food. For example, one slice of whole wheat bread equals 100 calories, of which 15 calories are protein. Adding to this 50 calories of butter, the total food value becomes 150; the protein calories still 15 makes the relation of protein to the total just 10 per cent. Foods served in this way may be most excellent foods, but if every dish is so prepared that it contains 10 per cent or less protein it is quite evident that there is great danger of the protein intake being too low unless the entire food ration be kept high, which might in many cases make the total more than necessary for body needs.

Then too it must be remembered that many foods, as fruit, desserts, sweets, etc., contain practically no protein so that somewhere in the daily ration there must be food containing much more than 10 per cent protein.

A farmer who needs from 3000 to 3500 food units daily, or perhaps more, easily gets his necessary protein even while living on medium and low protein foods. He uses

up the excess of carbohydrate and fat in the energy he expends in his active labor; but the one who needs, because of a sedentary life, to be careful not to overeat must take the more highly protein foods. Brain workers, or those who expend nervous rather than muscular energy, need a comparatively high protein ration with a low total intake. They must live on the higher protein foods.

The Brain Worker

A person convalescing from a wasting disease must have ample protein to rebuild tissue, but often his digestive organs are not equal to the task of caring for a total amount of 2000 or more calories. So the diet for such a one must be so planned that the proportion of the tissue building elements be high in order that enough of this may be supplied even though the entire daily intake must of necessity be lower than normal.

The Convalescent

Many thin people would gain in weight more readily on a diet supplying a goodly amount of protein, with less of the carbohydrate and fat and even a low total daily ration, than on one in which the entire food intake is pushed to an extreme degree, imposing an extra tax on the digestive organs in their effort to care for an excessive amount of food material which never can be gotten ready for absorption and utilization by the tissues.

If You Are Too Thin

There is another important phase of the protein question that must be considered. We have referred in chapter II to the complex structure of proteins and to the fact that complete proteins contain some seventeen nitrogenous combinations called amino-acids. These seventeen parts may be arranged in many different ways to form various kinds of body tissue. Proteins, in order to repair every kind of tissue, must contain all of these seventeen units and such proteins are said to be complete.

Complete Proteins

There are other proteins in which some of these important combinations of nitrogen, or "building stones," are missing and so are incomplete. Some of the important amino-acids are, tyrosin, trytophan, leucin, lysin, glycocoll, cystin, histidin, and arginin.

It is quite evident then that all proteins are not of equal value to the body and that a diet may be deficient in the quality of its protein as well as in the quantity. While this question is not yet well understood, yet as the result of animal experimentation something of the nature of the various food proteins has been ascertained. For example, it has been shown that some proteins will maintain but will not induce growth. Rats fed on corn fail to grow, but develop properly if their diet is supplemented by casein of milk, egg yolks, the proteins of other grains as the glutenin of wheat, glycenin from the soy bean, globulin from squash seed, globulin from cotton seed, excelsin from Brazil nuts, and globulin from maize or corn.*

Quality As Well As Quantity

It has been found that an animal does not thrive if fed on a single cereal grain even though the amount of protein be theoretically correct and the total food units be sufficient. This seems to be due, in part at least, to the fact that many of the grain proteins are incomplete. *This does not mean that grains are not good foods*, but simply that the diet must be varied enough so that incomplete proteins may be supplemented by complete proteins or with proteins supplying the missing links.

Grain Proteins

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*Quoting from L. B. Mendal, who has done much work along this line: "When the gliadin of wheat, a prominent protein of this seed, is fed as the sole protein, adult animals are suitably maintained; but growing animals cease to increase in body weight, remaining in nutritive equilibrium without growth unless the amino-acid lysin is added to the gliadin food. Thereupon growth is promptly resumed. The explanation becomes apparent in the fact that gliadin is almost entirely devoid of the amino-acid lysin; and inasmuch as this is obviously needed for new protein construction, growth can not proceed until the missing unit is supplied. Again zein, the most conspicuous protein of

Two proteins both incomplete may be deficient in different ways so that the combination of two or more incomplete proteins may be sufficient to supply all the nitrogenous combinations and thus make a complete protein food.†

Combination Important

A monotonous diet of grain being also deficient in alkaline salts (see footnote, page 27) and, as ornarily prepared, lacking in certain vital substances called vitamines by Funk, care must be taken that these be supplied in other ways. (See Chapter IX.)

A single grain usually contains more than one protein as, e. g. wheat with its gliadin, a protein that will maintain body weight, and its glutenin, one which will stimulate growth, and while zein a prominent protein of corn is unable to even maintain the body, yet corn also contains another protein called globulin which will maintain and even cause growth. If intelligently combined with other foods, corn is a valuable addition to the dietary. It, however, could not be depended upon as a sole source of protein. It is interesting to note that the protein of green vegetables will supplement the protein of corn.

The Protein Of Corn

The proteins of meat, milk, and eggs have been found to be complete in themselves. Accordingly a diet of grains and milk is a complete food in so far as its proteins are concerned. Recent experiments have shown that the protein of the peanut and the soy bean are of very good character.

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the maise kernel, fails to yield either lysin or tryptophan or glycocoll, and accordingly is entirely inadequate to meet the nitrogenous needs of the animals in respect to either maintenance or growth. It may be fed in the greatest abundance, yet the animals decline in health unless the zein is supplemented by some more perfect protein. If the amino acid tryptophan is added to the imperfect maise, protein maintenance of body weight without growth is promptly established. . . . If both tryptophan and lysin are added to the zein, the diet thereupon becomes suitable for growth."—Journal of American Medical Association, Sept. 5, 1914.

†The proteins of the pea or bean, when taken as the sole source of nitrogen, are of very low biologic value, and they will not supplement the protein of corn though they improve the protein of wheat. Bean protein will not supplement those of oat, though pea proteins and oat proteins are said to supplement each other.

Again we would emphasize the need for a knowledge, by the vegetarian, of foods and their values that the meatless diet may not prove to be a deficient one. A complete diet without the use of flesh food is very possible and a great advantage, but care must be taken that intelligent combinations be made and that monotony be avoided. Green vegetables and fruits supply many elements lacking in grains and with a knowledge of food values and an intelligent daily variation in foods served, one need be in no danger of limiting his diet to one deficient either in quantity or quality of protein. But how important that the housewife be educated along these lines and so be understandingly efficient as she carries on the important work of supplying the family table.

Know Foods

Avoid Monotony

Following are grouped some of the more important staple protein foods in such a way as to show at a glance those having the highest proportion of the nitrogenous element.* With these, many attractive dishes may be prepared and, as meat substitutes, supply the necessary protein.

*The percentages of protein in these tables are of the total food values and **not of the weight.**

Class 1.

Very high protein foods. (Foods of high total food value of which the protein is above 20%.)

Food—	Percentage of Protein.
Beans, Lima	21
Beans, Navy	25
Beans, kidneys or pink	28
Beans, Soy†	32

†"Soy beans introduced in the U. S. more than 100 years ago primarily for use as a forage crop, are in reality one of the most nutritious of the legumes when used as human food, according to specialists of the U. S. Department of Agriculture. . . . Since they fur-

Food—	Percentage of Protein.
Buttermilk	23
Cottage Cheese	33
Eggs	33
Gluten Meal or Flour (40%)	40
Lentils	27
Meat, lean	33½ to 100
Nuttolene	29
Peas	25
Protose	46.5
Skimmed Milk	37

CLASS 2.

High Protein Foods. (Foods with high total food value of which the protein is from 15 to 20%.)

Food—	Percentage of Protein.
Bread—wholewheat	16
Gluten Meal or Flour (20%)	20
Granola	15
Granuto	17
Milk (whole)	19
Oatmeal	18
Peanuts	20
Rice (whole)	16

CLASS 3.

Medium Protein Foods. (Foods with high total food value of which the protein is from 11 to 15%.)

Food—	Percentage of Protein.
Almonds	13
Bread—rye	14

nish proteins and valuable fat they are especially important to turn to as an emergency addition to the usual dietary or as a substitute for other foods furnishing protein and fat. Moreover, the fact that they contain no starch makes them valuable for invalids who cannot eat starchy foods."—Food thrift series No. 2, U. S. Department of Agriculture.

Food—	Percentage of Protein.
Bread—white	13
Bread—graham	13.5
Cracked Wheat	13
Cream of Wheat or Farina	12
Macaroni	13
Shredded Wheat Biscuit	12
Wheat Flakes	14

CLASS 4.

Foods with low total food value of which a high proportion is protein.* See Chapter IX.

Food—	Percentage of Protein.
Asparagus	32
Beets	24
Cabbage	50
Carrots	14
Cauliflower	55
Celery	24
Cucumbers	20
Egg Plant	21
Greens—beet—dandelion, etc.	28
Lettuce	25
Radishes	18
Spinach	32
String Beans	40
Tomatoes	21
Turnips	20

*Complete proteins, or proteins containing all of the tissue building stones, are found in the foods of Class 4 as well as in the outer layer of all other vegetables, the outer layer and germ of grain, and in milk, eggs, and meat.

CHAPTER VII.

A Balanced Ration—Fat

Fat makes up an important part of the dietary. It is fuel for the body in a concentrated form. It contains carbon, hydrogen, and oxygen and, with the carbohydrates, furnishes heat and energy* in its oxidation in the body.

A Concentrated Fuel

Ordinarily about ¼ to ⅓ of the food supply should be fat or from 600 to 800 calories. Under conditions where the body fires need to burn more brightly, as in cold climates or in excessive exercise, the body needs more fuel and so can utilize and take care of more of this concentrated food.†

How Much Fat?

However, the menu of the average family contains much more of this food element than the ⅓ given as the normal proportion. Instead of 600 or 800 calories, the amount usually runs up to more than 1000 calories. Four hundred to 600 food units of butter alone may be daily consumed by the one who, not realizing the need for a more nearly balanced ration, carelessly follows his inclination in this respect. When to this is added the fatty seasonings in the other foods served, the normal fat content of such foods as olives and nuts, legumes and grains, cream and milk, the excess of fat not only tends to bring the total food ration far above the normal, but often overwhelms the diges-

An Excess

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*The three common classes of fat are, stearin, palmatin and olein. Stearin (C_{57} H_{110} O_6) makes up a large part of beef and mutton tallow, and having a higher melting point than the other fats, is in a solid form at ordinary temperatures. Palmatin (C_{51} H_{98} O_6) is found in human fat, in all animal fats and to an extent in vegetable fats. Olein (C_{57} H_{104} O_6), having a low melting point and so in the form of oils, is found to a greater extent in vegetable fats as in olive and cotton seed oils.

†Recent scientific investigation goes to show that of the vitamines essential for life some are soluble in fat and of the fats included in the diet some should be in such form as to ensure the provision of this valuable vitamine. (See chapter IX, page 83.)

tive tract and tissues with an amount of fat far exceeding the ability of the body to properly utilize and eliminate.

Recent calculations show that the average consumption of fat per capita a day in the U. S. is 150 grams, which equals 1350 calories daily. (See page 29.) While Hoover reports that during his two years' experience in Belgium the ration allowed contained 40 grams or 360 calories of fat, 60 grams or 240 calories of protein and 300 grams or 1200 calories of carbohydrate, making a total of 1800 food units daily. This was found entirely sufficient for the entire population except for adolescent children, for whom an extra allowance of fat was made. Surely the difference between the 360 fat units actually required and the 1350 used by the American people represents a great excess in the use of this kind of food.

Average Per Capita

Fat is supplied to us in two forms: free fat and combined. Combined fat is found in nuts, olives, grains and in legumes, especially the soy bean. It is also found in other vegetables and in some fruits, as the alligator pear. Fat is not found in nature as a free fat, but by mechanical processes can be isolated. So we have butter, oils, free animal fats as suet, tallow, lard, etc. The fat of cream is in an emulsified form and is not a free fat until it is made into butter.

Fat Free And Combined

Tht fat-soluble vitamine (See Chapter IX) is found in milk, eggs, and butter, and also in green vegetables. In this respect it becomes largely a question of quality rather than of quantity, and while vegetables can not be said to supply fat to any great extent, yet they contain a sufficient amount to hold in solution this valuable vitamine.

Taking a hint from nature it would seem that the plan was not for our food to contain fat in a free state, but in a form which could more readily mix with the digestive juices.

In the stomach an excess of free fat, by lubricating the food and thus preventing its mechanical action, hinders the flow of gastric juice and also interferes with the thorough mixture of the digestive fluid with the stomach contents.

All free fat must be thoroughly emulsified before it can be digested or before the digestion of other food elements can be accomplished. This process of emulsification takes place in the intestine and until it is accomplished all digestion is to a greater or less degree hindered. This is particularly true of protein. The oily coating about the protein particles hinders the action of intestinal fluids on the protein, thus furnishing another factor in the causation of intestinal putrefaction and auto-intoxication. This stagnation also allows the fat itself to become rancid, producing products irritating to the mucous lining.

Digestion Hindered

After fat is digested and absorbed it should be completely oxidized into carbon dioxide ($C O_2$) and water ($H_2 O$) with resulting heat production and, as carbon dioxide and water, eliminated through the lungs, skin and kidneys. If more fat is ingested than can be oxidized into $C O_2$ and $H_2 O$, one of two things happens: either the excess is laid up as fat in the tissues with perhaps resulting obesity, or an attempt is made to throw off the excess in an imperfectly oxidized form and again we have a "stove that smokes."

Fat Metabolism

Fatty acids are combinations of carbon, hydrogen, and oxygen into which the complex fat molecule is broken up on its way to complete disintegration. To an extent they are formed normally in the process of fat digestion. Abnormally they are formed when fats become rancid either on the pantry shelf or in the digestive tract as the result of delayed digestion. The subjection of fats to extreme heat as in frying also results in the formation of fatty acids.

Fatty Acids

If in connection with metabolism the oxidation of fats is incomplete, the process often stops at the fatty acid stage and in this form the body seeks to eliminate them.*

Eczema
Pimples
Catarrh

The excretion of these products of an imperfect metabolism takes place through the skin and mucous membranes and, because of their irritating action, they increase the tendency of a susceptible skin to eczema, acne, pimples, boils, etc., and of the mucous membranes to catarrh.

This result is often made the more probable because of the accompanying intoxication resulting from the intestinal stasis (stoppage) brought on or increased by the presence of a large amount of free fat in the intestinal canal.

These conditions of irritation are increased if before fats are eaten they are broken up by heat into these same fatty acids, as happens in most frying and cooking at extreme heat.† This decomposes the fat so that it at once manifests its irritating properties as it reaches the delicate lining of the stomach; and at the same time the coating of fat which the food receives in frying greatly hinders the mixing of the gastric juice with the food particles.

Frying

So it is important that in our dietetic program which is to make for health our plan should be, first—to properly balance our daily fat ration, second—to eat the minimum amount of free fat and, third—to eliminate as far as possible the use of fried or greasy foods. An ample amount of fat can be supplied the body in the form of olives and nuts and in other combined forms without the use of fat in a free state. It should be remembered that the fat

The Ideal

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*This excess of fatty acids in the blood may be a factor in the production of a lessened alkalinity of the body fluids, often spoken of as acidosis. (See page 27.)

†The peanut as it is ordinarily prepared for the market loses much of its dietetic value. The roasting at a high temperature to a certain extent decomposes the fat of the nut, thus lessening its digestibility. Peanuts would serve a better purpose as a food if they were prepared by boiling or baking as are other legumes.

taken in olives can be utilized by the body to much better advantage than if taken as olive oil. For those who need for a time an extra amount of concentrated food, cream may be taken with advantage, but this can easily be overdone.

Whenever fat is used as seasoning it is much better to add it after the food has been removed from the fire so that it may not be subjected to intense heat. The addition of fat to vegetables greatly lessens their digestibility and if cooked property, it is surprising how palatable such foods may be without the addition of butter or oil. (See recipe number 51, Chapter XXII.)

It is a fact worthy of mention that the vegetable oils, especially olive oil, are not so quickly broken up into fatty acids as are animal fats, more particularly butter. Butter being rather unstable, quickly becomes rancid and soon decomposes when subjected to heat. For this reason it is not ideal for the seasoning of cooked foods and should be used carefully. This with the fact that disease of animals is rapidly on the increase makes the question of the free use of butter one not only of economy, but also of health.

Instead of the excessive use of fats and oils in frying, equally satisfactory results may be obtained by braising or broiling.

To Fry Without Grease

using only enough fat to slightly oil the pan. Even an egg may be "fried" without grease by dropping it on a perfectly smooth hot iron skillet or on a soapstone griddle.

With a little interest and care we will find it possible and quite as easy to prepare our foods in a way that will yield results in added health, and at the same time satisfy the most epicurean taste.

CHAPTER VIII.

Carbohydrates—Their Place in the Daily Ration.

The total food ration being kept near normal limits and fat and protein taken in proper amounts, the question of the proportion of carbohydrate obviously takes care of itself; but there are a few things in regard to this important fuel food that should be kept in mind.

The great bulk of food is carbohydrate, one of the seven great food classes. To this class belong starch, sugar and cellulose. Cellulose is not digested and serves merely as bulk, but when acted upon by strong acids it may be changed from cellulose to starch; from starch, through the stages of dextrin and maltose, to glucose the simple sugar which all digestible carbohydrate becomes before it is absorbed from the intestinal tract. All plant fibre is cellulose, the woody framework of trees, and even cotton. A story is told of a man who took a dirty shirt which had been worn by a tramp and, after washing it, put it through various chemical processes which changed it from the cellulose, which it really was, into glucose from which he made a delicious confection. However the digestive tract can not digest cellulose, so it passes through unchanged, simply serving as a broom to keep the bowel clean and as bulk upon which this muscular tube can exercise itself.

Cellulose

All sugar is at first starch. Unripe fruit contains starch rather than sugar, but as the fruit ripens the starch is changed to fruit sugar and this sugar is the simple form of carbohydrate which requires no digestion and is known by the names, glucose and dextrose. In vegetables starch is stored up in the plant, only a small portion of it becoming sugar. The carbohydrate of grains is mostly in the form of starch. Certain foods such as the Irish potato, polished rice, white bread contain a large proportion of carbo-

Starch

hydrate in the form of starch and are often spoken of as starchy foods.

The important difference in these forms of carbohydrate is that the starch must be changed into sugar during the process of digestion. Sugars may be classified as: Dextrin, Maltose, Sucrose, Glucose (or dextrose) and Laevulose (see footnote, page 74). The formation of dextrin is the first step in the process of the change of starch into sugar. (See page 12.) Maltose is the next step. It is formed in the malting of grains, during thorough mastication, and in the intestine where the process of starch digestion is completed by the action of the amylopsin of the pancreatic juice.

Sugar

Cane sugar or sucrose is the most complex sugar. It is formed in plants such as the sugar cane, the maple, and the sugar beet. In the process of digestion it is changed into the absorbable glucose.* Honey is a combination of cane sugar and fruit sugar, and because of its content of predigested fruit sugar it has an advantage as a food over the pure cane sugar.

A Complex Sugar

The process of digestion completed, carbohydrate is absorbed in the form of glucose. It is then changed in the liver to a form called glycogen and is dealt out to the body as it is needed.

Glycogen

In the tissues the oxidation of sugar produces heat and energy, and it is eliminated as carbonic acid gas ($C\ O_2$) and water ($H_2\ O$). Normally a certain amount of carbohydrate is changed over into fat and deposited in the tissues as reserve fuel. In this respect carbohydrate and fat differ from protein in that protein can not be stored as reserve for future use.

A Reserve Fuel

*The chemical formula for starch is $(C_6\ H_{10}\ O_5)n$, for dextrin $(C_6\ H_{10}\ O_5)n$, for maltose $C_{12}\ H_{22}\ O_{11}$, for cane sugar $C_{12}\ H_{22}\ O_{11}$, for dextrose or glucose $C_6\ H_{12}\ O_6$. The change from starch into sugar may be represented by the following chemical equation: $2\ (C_6\ H_{10}\ O_5) + H_2\ O = C_{12}\ N_{22}\ O_{11}$, or maltose. The change from maltose or from cane sugar, as the case may be, into the simple sugar glucose, is shown by the following: $C_{12}\ H_{22}\ O_{11}$ (maltose) + H_2O (water) = $C_6H_{12}O_{26}$ (glucose) + $C_6H_{12}O_6$ (glucose) or two molecules of glucose.

In cases of suboxidation due to lack of exercise or where the food intake is in excess of body demand, this storing of the carbohydrates in the form of fat may become excessive and obesity result.

Diabetes

Diabetes is an abnormal condition in which the oxidation of sugar is interfered with and sugar, instead of being used by the tissues, is dealt with by the blood as a foreign substance and, eliminated by the kidneys as glucose, is found as such in the urine. This metabolic disorder is not well understood, but is probably due to some abnormality in the internal secretions which govern the oxidation processes.

Starchy Food In Excess

One great harm resulting from an excess of food containing starch is in the extra tax placed upon the digestive tract because of the amount of digestion required by starch, mastication so often being incomplete. The increased length of digestion time may mean fermentation with the formation of irritating acids and gases which distend the bowel and prevent peristalsis, thus causing distress and flatulence.

This dietetic error is often a mistake made by vegetarians, who, not understanding how to balance their daily ration, take an excess of starch in their effort to get enough food. Starchy foods are often devitalized foods (See chapter IX), another reason for a tendency toward sluggishness in the process of their digestion. Well cooked rice, however, because of the mechanical ease with which it mixes with the gastric fluids, is easily digested. As browned or dextrinized rice (See recipe 21) it becomes one of the most easily digested of foods.

The individual who has a good digestion may eat a large amount of starchy food and suffer no inconvenience, save perhaps an increase in avoirdupois. This increase in weight is, however, more liable to be the result when an excess of sugar or fat is taken.

The amount of cellulose well tolerated by the digestive tract all depends on the inherent strength of its muscular wall.

Roughage

Some can take a large amount of bulky food; others find food containing much cellulose difficult of digestion. All, however, need a certain portion of cellulose or "roughage" to stimulate the bowel to its normal muscular activity. Much depends on the preparation of the food, the time spent in eating it, and the thoroughness with which it is masticated. With thorough mastication many of the bulkier foods ordinarily considered indigestible may be well taken and properly handled by the digestive tract.

The form of carbohydrate which as food places the least tax upon the digestive organs is dextrose, this, as we have seen, requiring no digestion. This is found in fruit as fruit sugar.* So in fruit we have a naturally predigested food together with cellulose which by reason of its bulk is a natural laxative. The exquisitely flavored acid of fruit which adds so much to its desirability is not only an appetizer and a delight to the palate, but has a definite disinfectant action in the digestive canal. It lessens bacterial activity in the mouth, sweetens the stomach, helps to check intestinal fermentation and putrefaction and thus markedly lessens the formation of poisons resulting from germ activity in the alimentary tract. It is well known that the acid fruits such as the lemon, orange, and grape fruit help to clear up a coated tongue, sweeten the breath and are good for a "torpid liver" and "biliousness." The bitter principle in grape fruit is said to act particularly on the liver.

Fruit Sugar

Fruit Acid

The fruit acid is a direct stimulant to the gastric and intestinal glands, increasing the flow of digestive juices. It also stimulates the muscular wall of the stomach and bowel,

*Fruit sugar is made up principally of glucose or dextrose and a closely related sugar of practically the same chemical composition called laevulose.

thus in every way increasing digestive activity. For those who can not take much cellulose the fruit juices are a great help by reason of their natural laxative action.

The good influence of this delightful food does not, however, stop here but is felt in an effective way after it is taken into the blood. The food value of the fruit fills a definite place as fuel in the body oxidation processes, but it is in the effect of the acid upon the blood that the most beneficial action is obtained.

A Cure for Rheumatism

The acid of the fruit is in the form of acid salts. These in the normal chemical processes of digestion are changed into the alkaline carbonates which render the blood more alkaline. This is a very desirable and necessary result, for, in counteracting the acidity resulting from protein wastes, it helps to maintain the normal alkaline reaction of the blood and thus tends to neutralize the conditions associated with lessened alkalinity as found in rheumatism, gout, etc. (See chapter IV, page 27.)

Nature's Medicine

It was thought for years that fruit increased a tendency toward rheumatism, but we know now that this is not the case but that most fruits lessen this tendency and so are among the best rheumatic cures.* Fresh fruits are also full of vitamines which adds greatly to their healthfulness, and for all these reasons fruit might well be considered nature's medicine.

Some with catarrhal stomachs find that they do not take fruit well because of an irritated condition of the mucous membrane brought on by some other cause. In this condition the stomach lining cannot bear even the normal stimulation of the fruit acid and its cellulose. The trouble is not with the fruit but with the primary state of gastric irritation.

*The exceptions to this are the grape, the prune, the plum and the cranberry. They do not affect the alkalinity of the blood as do the other fruits, e. g. the apple, the orange, the lemon, grapefruit, etc.

In some others, due to abnormal nervous excitation or naturally irritable mucous lining, an excessive amount of the normal acid of the stomach is secreted, and the already irritated mucous membrane does not seem to bear well the addition of any more acid even though it be the normal acid prepared by nature for us as food. However, even in these abnormal states, there is usually some way by which fruits or fruit juices can be taken and many of these persons do well if they eat fruits alone, not trying to combine them with other foods.

Fresh fruits are more easily digested when eaten without cane sugar. When sugar is added to stewed fruits it should be cooked with the fruit. In this way the heat and fruit acid tend to change the cane sugar into the simple predigested dextrose which results in a more natural and more easily digested combination.

In spite of the abundance of the natural predigested sugar it is in the form of cane sugar extracted from its various sources and served often in its concentrated form that a large part of sugar is ingested. Cane sugar requires digestion. This does not take place until late in the digestive process when the food has traversed a large part of the digestive canal. This delay often results in fermentation, especially when the sugar is combined with food requiring some length of time in stomach digestion.

An Artificial Food

In its concentrated form cane sugar is very irritating to mucous membranes, very marked inflammatory effects being produced when solutions stronger than from 6 to 10% are taken. Yet it is in this form that millions of pounds per year are consumed by the American people, and to this excess may be ascribed another cause for various digestive troubles, to say nothing of an excessive fuel supply in its effect on metabolism. In nature cane sugar is given us in a diluted form, even honey consisting largely of fruit sugar. This should sug-

gest to us that concentrated cane sugar is an artificial rather than a natural food.

The Sweet Tooth

Children are educated from babyhood to like sugar and the "sweet tooth" so universal among them is more often a result of wrong training than a natural instinct. The susceptibility of the child to colds, catarrh, adenoids, enlarged tonsils, croup, bronchitis is often greatly increased by this error in diet together with an excess of fat and greasy foods (See chapter VII); and wise is the mother who, knowing this, feeds her child in such a way that the foundation for chronic catarrh and digestive troubles is not laid.

A Highly Energized Food

We quote from Dr. Kerley in *Archives of Pediatrics, Oct. 1914:* "Cane sugar was not cultivated until 300 years ago and as late as the 16th century it was used largely as a condiment as honey is used at the present time. Countless millions existed and lived their span without it. Now we require 40 pounds a year per capita. It requires no great strain on the imagination to believe that the introduction of so large an amount of highly energized food in excess of demands might produce ailments of a very definite character. It is noteworthy that, as the refined product came into common use, it was first employed only in medicine 'to render unpleasant and nauseating drugs grateful to the sick.' Gradually sugar was found of value in preserving fruits and then added to tea, wine and various beverages until its acceptability as a food for the sick and its value as a source of energy in sustaining artificially fed infants came to be appreciated. Then only (about 1600) was the substance commonly recognized as a food. What the result has been can not be better summarized than in the words of Mosely, written in 1800.

" 'Two centuries have elapsed since it can properly be said that sugar has become an ingredient in the popular diet of

Europe. Such is the influence of sugar that once touching the nerves of taste no person was ever known to have the power of relinquishing desire for it.' "

Sugar in Infant's Milk

Sugar is present in mother's milk in just the right proportion for the babe and the only reason that sugar of any kind is added to the formula used in artificial feeding of infants is to adjust the cow's milk so that it will contain the food elements in the same proportion as in mother's milk. As the children grow older much harm is done them by adding sugar to their cereals, by feeding them cakes and desserts in which sugar is served in a concentrated form. (See Chapter XIX.)

The Banana

The banana is a food of great value. Too often it is eaten unripe and in this form is indigestible because of its high content of raw starch. In the process of ripening this starch is changed to sugar and the ripe banana with its yellow brown-speckled peel is a food of exquisite flavor and easy of digestion It should, however, be properly masticated. Too often it is gulped down without sufficient mastication. The food value of the banana is similar to that of the potato. Its percentage of protein is somewhat lower, but its proportion of alkaline mineral salts is about the same. Baked in the skins or prepared as croquettes, bananas may be served as vegetables and may often be substituted for foods higher in price, but perhaps lower in actual food value. (See recipes 89 and 90.)

"Singing apple, peach and grape
Into roundest, plumpest shape."

CHAPTER IX.

Vitamines.

"It has thus far been shown that nutrition means fuel for the machinery, new parts with which to repair the machine, and minute quantities of 'vitamines' which produce a harmonious interaction between the materials in the food and their host."—*Lusk.*

"Vitamines are ferments of life, substances without which a food does not keep one healthy even though on a balanced ration."—*Evans.*

Ferments Of Life

Funk says: "Vitamines are mother substances of digestive ferments and of body hormones as thyroid secretion and other internal secretions. Food may be ever so nourishing, but if without vitamines, the body can not construct its own ferments and carry on its own vital activities."

Years were spent in investigation before it was found that beri-beri, a disease of the Orient, could be cured and prevented by the addition to the diet of the nutritive elements ordinarily thrown away in the polishings. Just what these nutritive elements were was not understood, but the fact remained that a diet of polished rice resulted in symptoms of beri-beri, while a diet of the unpolished grain was sufficient to prevent any manifestation of the disease. In Java where the people lived largely on whole rice, beri-beri was unknown.

Beri beri

For years it has been a recognized fact that sailors living on canned and preserved foods sooner or later contract scurvy, but that this disease is speedily cured by the addition to their diet of fresh vegetables or the juices of fruits, especially the orange and the lemon. In 1535, when all but three of Cartier's 110 sailors had scurvy, he cured them all by giving them a decoction of fresh pine needles.

Scurvy

Babies fed on pasteurized milk often contract infantile scurvy but may be cured in a remarkably short time by the addition of orange juice to their diet. Potato water and other vegetable broths may be given these babies with the same beneficial effect, the symptoms of scurvy rapidly disappearing. When fed on oats or barley only, guinea pigs die from scurvy, but if the grain is moistened and allowed to sprout, i. e. in a way converted into fresh vegetables, the disease is prevented.

Pellagra

Pellagra, a disease of the Southern States, manifests itself largely among a class of people living on a monotonous diet of corn bread, bacon, biscuit and syrup. Goldberger's experiments in the State penitentiary in Mississippi, showed that many cases of pellagra resulted when the inmates were kept upon a diet of white flour, grits, cornmeal, fried mush, brown gravy, sweet potatoes, coffee with sugar and syrup. The introduction of oatmeal and fresh vegetables practically eliminated the pellagra.

A Restricted Diet

"The regular diet of thousands of the poor people of the Southern States during the winter contains little besides corn bread, molasses and a small amount of salt pork. After three or four months of such a diet large numbers of them develop pellagra. That the cornmeal which is eaten has in itself nothing to do with the production of pellagra is evident from the fact that the disease occurs with those who have not eaten corn products in the period preceding the attack. Corn rightly used is a wholesome foodstuff, and there is no warrant for the belief sometimes expressed that it is the cause of pellagra. It is the restricted character of the diet which is undoubtedly rendered unsatisfactory by several factors operating simultaneously, and not corn or any other single food which caused the disease. When the character of the diet is improved by doing away with an excess of alkali (baking soda) in cookery and by the introduction of a wider range of foods . . . many of

the milder cases of the disease recover."—*Ten Lessons of Food Conservation, U. S. Food Administration, p 50.*

No matter how plentiful in "calories" the diet, it became apparent that there might be a deficiency elsewhere with disastrous results to the body and thus the term "deficiency disease" originated. Unmistakably beri-beri and scurvy come under this head and the above observations strongly suggest that pellagra is also a deficiency disease. There are some investigators who believe that a predisposition at least, to rickets in children, to eczema, and even to such infections as tuberculosis and pyorrhea may result from a diet deficient in certain vital elements. Dr. A. S. Gray says that pyorrhea is the "result of lowered vitality from lack of those organic compounds other than the proteins which Casimir Funk and other investigators prove to be present in fresh vegetables and in lime and other fruit juices, small quantities of which are absolutely essential to growth and health." Gray also says: "A diet largely composed of sterilized milk, corn flours, starch and sugar, or of any foods subjected for a long period to a temperature above 250° may be considered vitamineless and will predispose to tuberculosis, beri-beri, pellagra, rickets, scurvy, osteomalacia, etc."

Deficiency Diseases

Pyorrhea

Casimir Funk, a Russian, working along this line, perfected some experiments that resulted in added light being thrown upon this most interesting subject. He was able to produce experimental beri-beri in pigeons by feeding them for three weeks on polished rice. Then if they were fed the polishings from this same rice they were cured of their symptoms in a remarkably short time, showing that in the rice polishings were certain elements absolutely essential to life. What could this vital substance be?

A Vital Substance

By a series of experiments he finally isolated from the rice polishings a minute crystalline substance, of which, two pounds of rice polishings yielded about one-half a grain.

A Rapid Cure

Injecting under the skin or into the crop of a dying pigeon three-tenths of a grain of this crystalline material was sufficient not only to make it well in a few hours, but also to keep it so for two weeks while on a diet of polished rice.

This precious crystalline substance, which contained nitrogen, Funk called vitamine from "vita" meaning life and from "amine," a nitrogenous chemical compound closely related to the proteins.

Vitamine

Much has yet to be learned in regard to this wonderful life giving substance and whether or not it is really an "amine" is still a debated question, but experiments by Funk and by other investigators as well have given evidence quite sufficient to help us materially in planning a diet that will completely supply the body needs. In addition to a sufficient diet as regards the caloric value of our food, it is quite as important that daily we obtain in some way an adequate amount of this wonderful vitamine; the battery, as it were, which keeps in operation the vital body processes and makes possible a utilization by the body of food materials.

A Battery

Just what may be the relation of vitamines to the proteins is as yet not fully determined, but it has been demonstrated that on a diet composed largely of carbohydrate more vitamine is needed by the body than when a larger amount of protein is taken. In other words that there is a direct relation between the quantity of carbohydrate to be metabolized and the amount of vitamine needed, carbohydrate metabolism seemingly influenced to a great extent by the presence of this vital element. At any rate, though all need an ample supply

Vitamine as Related To Protein

of vitamine foods, yet the vegetarian and the one living on the low protein ration need even more an abundant supply of these ferments of life. Perhaps the protein with its nitrogen content can to an extent take the place of the vitamine when this is for any reason deficient.

Again we are reminded of the importance of supplying to the body a sufficient amount of nitrogenous food. Babies fed largely on sugar as found in many proprietary foods with their deficiency of protein may get fat and seem to do well for a time, but often manifest symptoms of rickets which are relieved when the child is put upon a diet containing less carbohydrate, more protein and a goodly supply of vitamines.

Rickets

Reference has been made in a previous chapter to the conclusion drawn from laboratory experiments that young animals will not thrive and develop on a monotonous cereal diet because the proteins are incomplete. It has been shown that the supplying of the missing protein links is not sufficient for normal development unless with these are furnished these vital elements called vitamines. That vital element which has to do with proper growth is said by some investigators to be a fat soluble chemical substance and supplied in foods containing fats as fat meat, egg yolks, and milk. (See Chap. VII, footnote, page 66.) It is not present in refined oils as olive and cotton seed oil, it is not present in lard, but is found in butter fats and cod liver oil. It is also found in the germ of grain and in green and leaf vegetables, as even these contain enough fat to hold in solution the minute quantities of this important substance. The germ of grain may be at times difficult to obtain, but green and leaf vegetables are always on hand, and these not only supplement incomplete proteins, but also furnish vitamines and the fat soluble sub-

A Vitamine That Induces Growth

In Green Vegetables

stance necessary for the proper growth.* (See page 120.) Might not the disadvantage of a cereal diet lie largely in the fact that much of the cereal is taken in its devitalized form having been robbed of its aleuron layer containing the germ of the grain?

Funk's scurvy and beri-beri vitamine is water soluble (water-soluble B) and rather more widely distributed than the fat-soluble A.† For practical purposes we may class them all as vitamines and by acquainting ourselves with vitamine foods avoid any of the results of a devitalized diet.

Foods That Are Alive

What foods then contain vitamines? This is the practical question. All raw foods contain them as raw fruit, raw vegetables, raw milk, raw meat; all fresh vegetables properly prepared and not over-cooked; all whole cereals raw or cooked at not too high a temperature, as in a double boiler or, better still, in a fireless cooker.

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*The following is quoted from Dr. Graham Lusk as given in an address at the Auditorium, National Museum, Washington, D. C., August 30, 1917: "Two Italian scientists describe how this class of people (Italian peasants) live mainly on corn meal, olive oil and green stuffs and have done so for generations. There is no milk, cheese or eggs in their dietary. Meat in the form of fat pork is taken three or four times a year. . . . Little wonder that such people have migrated to America, but it may strike some as astonishing that a race so nourished should have become the man power in the construction of our railways, our subways and our great buildings.

"Dr. McCollum will tell you that the secret of it all lies in the green leaves. The quality of the protein in corn is poor but the protein in the leaves supplements that of corn, so that good result is obtained. Olive oil when taken alone is a poor fat in a nutritive sense, but when taken with green leaves these furnish one of the peculiar accessory substances, commonly known as vitamines, which is present most abundantly in butter fat, and gives to butter fat and to the fat in the whole milk its dominant nutritive value. The green leaves also furnish another accessory substance which is soluble in water and which is necessary for normal life. Furthermore, the green leaves contain mineral matter in considerable quantity and in about the same proportions as they exist in milk."

Recent investigation has also shown that carrots contain a considerable amount of both the water soluble and the fat soluble vitamine.

†The two vitamines (so-called) that have been definitely isolated have been designated as fat-soluble A and water-soluble B. Fat-soluble A is necessary for growth; water-soluble B for normal body maintenance.

Vitamines are abundant in the outer layer and in the germ of grain, and they are found just under the skin of vegetables and fruits. They are also present in brewer's yeast.

They may be destroyed by overheating or drying, or may be removed from the food in the process of preparation. Dried, preserved and commercially canned foods are vitamineless; also all processed grains as white flour and polished rice in which the aleuron layer has been removed. The vitamines remain in the outer coarser portion and are often fed to stock which thrive on "shorts" the part of the grain discarded by the human animal. It is said that pellagra, which is on the increase in America, is more acute and fatal here than elsewhere because of the superior machinery used in processing of food. "Food is too much polished, too much cooked, too much dried."

Foods That Are Dead

In the paring of vegetables many vitamines are lost; in the boiling most of those remaining pass into the water which is usually thrown away. Vitamines are destroyed by baking powder and soda, a strong argument against the use of these powders in the cooking of vegetables and baking of breads. Vitamines are more stable in some foods than others; e. g. raspberry juice can be boiled one hour without losing its vitality, while lemon or lime juice can be boiled and kept indefinitely without becoming devitalized.

Individuals with weak digestive organs, unable to digest bulky food, are often in danger of living on a vitamineless diet because their vegetables are pureed, their cereals are processed often in the form of gruels with the coarser particles removed, or much of their food is dextrinized, superheated, their bread twice baked and fruits perhaps eliminated entirely from their diet. But plans should be laid for these persons as well as for all others that in their daily ration may be supplied these vital substances upon which the body is so dependent. For these persons it

A Danger

should be remembered that broths prepared from vegetables without removing the skins are very rich in vitamines. (See pages 121 and 122.)

A Safe Course

Our safety then lies in keeping close to nature, in eating freely of fresh fruits and leaf vegetables,* raw vegetables plain and in salads, in saving and using vegetable broths, in replacing fine, white flour bread with whole-wheat and graham bread, in the eating of grains still retaining their hulls as unpolished rice, oatmeal, whole-wheat and unbolted cornmeal, and withal to vary the diet, avoiding a motonomy in the food supply.

For the Children

Especially should these things be borne in mind in the feeding of children. The importance of this cannot be overestimated. Children must have a varied diet of whole cereals, fruits and a liberal supply of green vegetables and vegetable broths. These with milk will in most cases supply their dietetic needs. (See Chapter XIX.)

Many things contain vitamines, and while some of the foods in our daily ration may necessarily be devoid of them, with a

*The dietetic value of the leaves of plants (leaf vegetables) as compared with the seeds (grains and legumes) has been conclusively shown by the experiments of McCollum, Simmonds and Pitz. The seed of the plant is its storehouse and aside from the germ, contains no living matter. The seed, while rich in caloric food value, has a protein of relatively poor quality; it is low in inorganic salts and is deficient in the fat soluble vitamine. The leaf of the plant is made up largely of living cells. It is the active respiring portion; the laboratory of the plant where starches, fats, and proteins are built up. This part of the plant supplements the nutritive shortcomings of the seed. We quote from McCollum: "From the results of experiments just described it was necessary to conclude that the leaf differs from the seed in that it contains in satisfactory amounts the dietary factors which are founds in seeds in too small amounts. These include the three inorganic elements, calcium, sodium, and chlorine, the fat-soluble A, and a protein supply which supplements, at least in some degree, the proteins of the seed. These, it will be remembered, are the three and only purified food factors which need to be added to each of the seeds singly in order to make it dietetically correct. It is therefore possible to devise a diet which is derived entirely from vegetable materials which will produce normal growth and the optimum physiological well-being."—**The Newer Knowledge of Nutrition.** Page 64. "The potato is to be classed with the seeds in its dietary properties, because it consists largely of reserve food materials and relatively little of cellular elements. The results available indicate that if the potato is steamed and the thin

little careful planning it will be found a very easy matter to add a sufficient quantity of foods rich in vitamines that the supply may be a liberal one. We need food for calories and for vitamines as well, and it is important that we remember the danger of "starving while feasting." Obedience to all other laws of hygiene and dietetics will avail one but little if one lives continually on a devitalized diet.

Do Not Starve While Feasting

We quote again from Dr. A. S. Gray, "The wise man takes no chances and simply sticks close to nature. This means eating simple, properly prepared, unprocessed foods."

"Oh! they's nothin', at morn, that's as grand unto me
As the glories of Nachur so fare,—
With the Spring in the breeze, and the bloom in the trees,
And the hum of the bees ev'rywhere!
The green in the woods, and the birds in the boughs,
And the dew spangled over the fields;
And the bah of the sheep and the bawl of the cows
And the call from the house to your meals!"

—James Whitcomb Riley.

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paperlike skin removed without the loss of the cellular layer which lies just underneath, it will contain relatively more of the fat-soluble A, a lack of which leads to conditions previously described, than do the cereal grains.. . . It would seem that a potato which is pared in the ordinary way and the paring discarded, is changed in its dietary properties in much the same way as is the rice kernel during the polishing process." Id. p. 47.

CHAPTER X.

Flesh Food.

Is flesh food necessary for the maintenance of health? This is today a much discussed question. Can health, strength and vigor be maintained without the use of meat?

An Important Question

The weight of evidence falls on the side of a vegetarian diet and seems to show that under present day conditions civilized man may reach a more nearly ideal state both physically and intellectually if he wisely and carefully selects his foods direct from nature's table rather than second hand through the flesh of the animal. Unquestionably the American people eat far too much meat, and much good might be accomplished could the ideas of the people in regard to the need for and the desirability of this class or foods be decidedly modified and the amount of flesh food consumed be materially lessened.

The high cost of living, the need for economy, the growing scarcity of meat have called the attention of many to the extravagance in the use of a food obtained from the animal flesh, when it might be derived much more economically and in a purer state from other sources.

An Extravagance

We will give briefly six reasons why flesh food is undesirable, also evidence to show that physical strength and efficiency need not be impaired by a diet in which meat is not included.

Six Reasons

1. Excess of protein, resulting in auto-intoxication and suboxidation.

2. Uneliminated tissue wastes: uric acid, purins, xanthins, creatin, etc.

3. Poisons resulting from putrefactive processes taking place in the animal as soon as life is extinct, as ptomains, etc.

4. The disease of animals.

5. Æsthetic reasons. Suffering of animals, filth of slaughter houses, influence of meat eating upon character and disposition.

6. Economy.

1. *Excess of proteins:* 200 to 250 calories of protein in twenty-four hours is ordinarily sufficient. Except in children only enough is needed to replace tissue waste, that is to keep the body in nitrogenous equilibrium. (See footnote page 56.) More than this is a burden and a handicap. One pound of lean meat contains 700 or more calories; most of this is protein.

In the Digestive Tract

(See page 38.) It has been estimated by competent observers that of the flesh food eaten, one-tenth to one-seventh putrifies or rots in the intestines. The poisons thus produced are absorbed and auto-intoxication, with its train of ills, as torpid liver, bilious attacks, sallow skin, despondency, neurasthenia, etc., results. (See Chapter III.)

When, as the result of active digestive processes an excess of protein is absorbed, the human stove becomes over-supplied and clogged with fuel. This interferes with proper

In the Tissues

oxidation and produces a condition which we may call suboxidation. (See Chapter IV.) This results in the formation of clinkers. The grates (the kidneys) become clogged, this interfering with complete elimination of the nitrogenous ash which backs up in the blood producing, as it accumulates in the joints and other tissues, rheumatism (so called), gout, lumbago, sciatica, etc. The arteries gradually lose their supple, elastic nature, and arterio sclerosis results with its accompanying rise of blood pressure and perhaps final apoplexy.

The overworked kidneys often become diseased. Prof. Quine, dean of the medical department of the University of Illinois, said: "Where one man dies of Bright's disease due to

chronic alcoholism, fifty men die of Bright's disease due to an excess of protein food, especially meat."

As a result of the accompanying suboxidation of the carbohydrates and fats, the individual also becomes obese, often with fatty heart resulting in shortness of breath and swelling of the ankles; all of these conditions producing the stout, rheumatic, apoplectic type of individual we so often see.

Meat as A Fuel

The fires of the system must burn more vigorously in order to oxidize protein just as it would require a much hotter fire were we to use iron as fuel in our stoves instead of wood or coal. Dr. Hindhede, the great Danish dietetic authority, says: "Meat is a fierce burning fuel, but it seems to burn out the oven itself in the long run."

A Physiological Economy

"Body weight, health, strength, mental and physical vigor, and endurance, can be maintained with at least one-half the protein food ordinarily consumed. A kind of physiological economy which, however, if once entered upon intelligently entails no hardship, but brings with it an actual betterment in health."—*Dr. Winfield Hall, Professor of Physiology, Northwestern University.*

Surcharged With Wastes

2. *Uneliminated tissue wastes:* The tissue and body fluids of the animal, at the time of death, have in them the protein ash on its way to be eliminated. Cellular activity continues for some time after death, but elimination ceases, therefore the flesh and blood of the animal are surcharged with protein wastes, and the one who eats this food introduces into his system this ash which must be eliminated in addition to the ash formed in his own body. So we have another factor in the causation of the conditions mentioned under reason No. 1.

These protein wastes have much the same chemical composition as the caffeine of tea and coffee and the same stimulating effect, so that the individual leaving off flesh food misses this stimulation and thinks he must have meat to give him strength. But that these extractives are actually poison is shown by the fact that animals die more quickly from starvation when fed exclusively upon meat extract than when entirely deprived of food.

Poisonous Extractives

We also give the following as quoted from Dr. A. L. Benedict in the Journal of the American Medical Association of September 10, 1910: "A meat broth prepared at a temperature above 160 degrees Fah., the coagulation point of albumen, contains salts, extractives wihch are mainly excrementitious, and a little gelatin, as well as some melted fat, although the last is often skimmed off to make the broth more pleasant and palatable. In so far as protein is concerned, a meat tea made by boiling, cannot be more nourishing than egg tea, that is to say, the water in which eggs are poached, or in plain words, it contains no protein nourishment at all, and is, barring certain qualitative and quantitative differences, of the same dietetic value as urine."

Egg Tea

The more freely the flesh is drained of the blood, the freer is the meat from these excrementitious products, so we can see the wisdom of the Lord's instruction to the children of Israel, when He said: "Only ye shall not eat the blood; ye shall pour it out upon the earth as water."—Deut. 12:16

A Wise Provision

We quote from Harrington and Richardson's Practical Hygiene, page 91: "The Jewish method of slaughtering is regarded by many as far superior to any other. According to Dembo, it is the most rational from a hygienic standpoint, since the animal is bled rapidly and completely."

So meat, if eaten at all, should be thoroughly cleansed of all its juices which, in the minds of many, would detract greatly from its desirability.

3. *Poisons resulting from putrefactive processes:* The ever present germ begins its work upon the flesh of the animal as soon as life is extinct, and decomposition begins immediately. The products of putrefaction are not all poisonous, but very often deadly poisons are formed and poisoning produced by decayed meat and fish is not an uncommon occurrence. This form of poisoning is known as ptomain poisoning, ptomains being organic bases resulting from the activity of bacteria on nitrogenous matter. These ptomains may be formed after the meat has been eaten, through changes occurring in the intestines as the result of the excess of protein and the stagnation in the bowel. However, decomposition has, in most cases, progressed to a great extent before the meat is digested. Often meat is not considered ready to eat until it has reached a certain stage of putrefaction and perhaps is ready to fall to pieces.

Ptomain Poisoning

Food Inspector Dodge, of the District of Columbia, testified that families of social prominence in Washington preferred "ripe" meat because it was more tender. "Many savage people prefer putrid fish and meat, and the more rotten it is the greater their enjoyment in its consumption. In less degree the same is true of many of the most enlightened people who prefer game when decomposition is fairly well advanced."—*Harrington and Richardson's Practical Hygiene, page 66.*

Ripe Meat

4. *The diseases of animals:* Some of the diseases which may affect animals are anthrax, black leg, pyemia, septicemia, rabies, tetanus, malignant epizootic, catarrh, hog cholera, actinomycosis, lymphadenitis, tuberculosis, pleurisy, pneu-

monia, Texas fever, parasitic icterohematurea, mange, scab, tape-worm, trichina, peritonitis, pericarditis, meningitis, enteritis, gastritis, metritis, mammitis, polyarthritis, phlebitis, foot and mouth disease, abscess, tumors, nephritis. Even fowl are often contaminated with disease.

It has been estimated that with tuberculosis alone the following percentage of cows are affected: Great Britain, 30%; Belgium, 49%; Denmark, 33%; Mexico, 33%; United States, 14%

Post mortem condemnations for one year in U. S. were:

	Rejected entire	Rejected in part
Cattle	35,103	99,739
Swine	86,912	799,300
Sheep	10,714	170
Goats	82	1

A Tainted Food

Note the fact that so large a number of carcasses are rejected only in part, the remaining portion being used as fit for food. Of some five hundred livers in one lot only forty were, according to the testimony of one inspector, considered good enough for export. The rest were *reserved for home consumption.* Meat inspection is often very superficial, and many diseased conditions may escape the notice of even the ordinarily careful inspector.

Many Frankforters and Bolognas are said to consist largely of horse-meat, immature veal, and decrepit and sick cows, tuberculous and otherwise. Prepared sausage casings contain about five grams (about a teaspoonful) of excrement per metre.

Thirty per cent of oysters five miles from sewer outlets contain the colon bacillus, a germ whose habitat is the human intestinal tract.

"Not long ago the Metropolitan Sewage Commission of New York and the Merchants' Association made an exhaustive investigation of waters and oyster beds surrounding New York and reported the harbor to be one vast cesspool foul with disease germs and undissolved sewage matter. Two million oysters are taken annually from these waters."—*National Food Magazine.*

"The pernicious practice of fattening oysters on sewage has been the cause of untold deaths from typhoid fever in the past."—*Roberts.*

It is a very common occurrence to find fish fresh from the market or fish wagon with worms crawling in great numbers out of their flesh.

5. Æsthetic reasons: On the question of suffering of animals we need not dwell. No comment is needed. On the filth of slaughter houses one quotation will suffice.

Slaughter Houses

"At nearly all slaughter houses inspected, foul, nauseating odors filled the air for yards around. Swarms of flies filled the air and the buildings and covered the carcasses which were hung up to cool. Beneath the houses was to be found a thin mud, or a mixture of blood and earth, churned by hogs which are kept to feed upon the offal. Maggots frequently existed in numbers so great as to cause a visible movement in the mud. Water for washing the meat was frequently drawn from dug wells which received seepage of the slaughter house yards or the water was taken from the adjoining streams to which the hogs had access. Dilapidated buildings were the usual thing, and always the most repulsive surroundings and odors existed."—*Slaughter House Inspector of Indiana. Gov. Bulletin.*

Regarding influence on character and disposition we will quote the following:

"More or less exclusive carnivorous alimentation is, to a greater extent even than race, one of the factors of the gentle or violent character of an individual. It is known that the white rats of our laboratories, as long as they are fed on bread and grain, are very manageable and easy to tame, whilst they become snappy and given to biting from the time they are fed on flesh. The same observations have been made in the case of a horse and even of a dog, although the latter is omnivorous. Liebig relates that a bear kept at the museum at Giessen was gentle and quiet when it was fed exclusively on bread and vegetables, but a few days of animal diet caused it to become fierce and dangerous to its keeper. They used to amuse themselves by periodically altering the animal's character. It is known, adds Liebig, 'that the irascibility of pigs may be increased by a meat diet to such an extent as to cause them to attack men.' "—*Gautier's "Diet and Dietetics," page 376.*

Character Gentle or Violent

"It (the fleshless diet) is practical and rational. It should be accepted and commended by those who pursue the ideal of the formation and education of gentle, intelligent, artistic and nevertheless prolific, vigorous and active races."—*Id., p. 413.*

The Ideal

6. Economy: Meat furnishes protein and fat, practically no carbohydrate. Protein and fat can be obtained at a much less expense than is necessary in obtaining them from flesh. A dearth of grain and milk would be a much greater disaster than a shortage of meat. The grain fed to animals which are in turn slaughtered to furnish flesh food, would accomplish much more if given directly to the people for food.

Much of the food value of the grain fed to animals is used

up by the animal in heat and energy production. It requires five or six pounds of grain to produce one pound of beef. Six pounds of grain represents about 10,000 calories in food value. One pound of beef averages 1000 food units. Hence the extravagance of feeding so much of food grains to animals, especially at a time when there is actual shortage of grain for human sustenance. Some one has aptly put it that "for every pound of steak we refrain from eating we release grain enough to furnish bread for a week for a soldier 'somewhere in France.'"

An Expensive Diet

Dairy products are more vitally necessary for food than meat. A well nourished cow during a year will give in the form of milk as much protein, and two and a half times as many calories as are contained in her own body. Let us seek then to save more of our cattle that we may have a necessary supply of milk even though the amount of flesh food be diminished. The question at the present time becomes one not only of keeping the cost of living within the limits of the financial possibilities of the average home, but also that of a patriotic duty in conserving the food supply of the nation and of the world.

Meat or Milk — Which?

In conclusion the following quotations will leave no doubt in the minds of any as to the need for flesh food in the diet of man under present day conditions:—

"Comparative experiments on seventeen vegetarians and twenty-five meat eaters in the laboratory of the University of Brussels, have shown little difference in strength between the two classes, but a marked superiority of the vegetarians in point of endurance. The average superiority was 53%. The vegetarians recuperated from fatigue more quickly than the meat eaters." —*Irving Fisher.*

Physical Superiority

"Fourteen meat eaters and eight vegetarians started out on a seventy-mile walking match. All the vegetarians reached the goal in splendid condition, the first covering the distance in fourteen and a quarter hours. An hour after the last vegetarian came in the first meat eater came in, and he was completely exhausted. He was also the last meat eater, for all the rest had dropped off after thirty miles of endeavor."—*Id.*

Says Dr. Graham Lusk: "The popular idea of the necessity of meat for a laboring man may be epitomized in the statement: 'A strong man can eat more meat than a weak one, hence meat makes a man strong.' The proposition is evidently absurd."

Thus does scientific investigation, together with the question of home and national economics, vindicate the principles of vegeterianism. While the majority may not want to take a radical stand on the side of strict vegetarianism, yet we believe that many when they look at the question squarely, will be led to put much less dependence upon flesh food as an article of diet. They will appreciate the fact that a fleshless diet may be more healthful and strength producing than the one on which mankind has for so long a time subsisted.

To be a vegetarian one should be intelligent as to foods and their values, and should make a wise daily selection. This, however, is very possible, and with careful planning the housewife may arrange her daily menus in such a way as to greatly raise the physical plane of the members of her household without the use of an article of food tainted with impurity.

"Give me health and a day, and I will make the pomp of Emperors ridiculous."—Emerson.

CHAPTER XI.

Condiments.

A two-fold purpose is accomplished in eating: First—the supplying of a physiologic need; second—the enjoyment resulting from the partaking of pleasant food.

Physiologic need being supplied, hunger disappears and appetite wanes, but humanity, so keen to surfeit itself with pleasure, has tended to tempt the fleeing appetite with foods so prepared that they may appeal to the palate even after the needs of the body are supplied.

This having been for so long the tendency of mankind, we find ourselves caring most for those things artificially and excessively seasoned, and so, often depend upon the seasoning rather than upon the natural flavor. In fact, few have tastebuds* so sensitive that they are able fully to appreciate the exquisite flavors of the foods so wonderfully supplied by nature.

Tastebuds

It has been said that given any article capable of disintegration by the teeth, plus the various condiments and seasonings known to the modern chef, a dish fit for a king may be evolved. So with peppers and sauces, with frying and basting, our food is set before us in such a form that it is often impossible for us to tell of what we are eating.

As "overflavoring leads to overeating," the custom of serving richly and highly seasoned food undoubtedly has much to do with the too prevalent dietetic sin of eating for drunkenness rather than strength. To reeducate our sense of taste that it might be normally sensitive to nature's exquisite flavors would, if we could but realize it, give us the keener enjoyment and prevent the suffering of penalties for the breaking of natural law.

Eating for Drunkenness

*Sensory nerve endings on the tongue and palate that provide the sense of taste.

The mucous lining of the digestive tract has two very important functions. First—to secrete the digestive fluids; second — to produce mucous which is a natural lubricant and protects the delicate membrane from the mechanical friction of food itself or from any other irritation which might enter it from the outside world.

A Protection

Condiments such as mustard, pepper, vinegar, etc., by reason of their irritating effect, produce a congestion of the mucous membranes with which they come in contact. This temporarily increases the flow of digestive juice, but analysis has shown that the character of this fluid is quite different from that produced as the result of the presence of food unassociated with condiments. An analysis of the salivary secretions following the introduction into the mouth of peppered food shows an increase in the quantity but a lowering of the quality. Though there is more saliva, it contains less ptyalin (the active digestive principle) and more mucous. Consequently it is weak in digestive power.

Quantity Rather Than Quality

Just so in the stomach and intestine; and as the result of repeated irritations of this kind, the little cells whose duty it is to secrete mucous, in their effort to protect against an ever increasing irritation, secrete more and more mucous and to a greater or less degree crowd out the cells that normally secrete digestive juices. The mucous glands increase in number and size, the digestive glands grow fewer, the mucous membrane thickens, becomes calloused as it were, until, as the months and years go by, catarrh of the stomach (or bowel) often results with a "corn" in the stomach instead of on the foot. The cause is the same: a long continued abnormal irritation and an effort on the part of the epithelial wall to protect itself—one is analogous to the other, but the first far more disastrous and as difficult to cure.

A Callous

But the deleterious effect of condiments does not stop here: The irritants are absorbed, enter the portal system, produce chronic congestion of the liver and, in their elimination through the kidneys, cause the same irritation in those organs with consequent thickening and scar tissue formation. Especially objectionable are those articles hardened and preserved in brine and vinegar as pickles. As the vinegar preserves the cucumber so do these irritants toughen and pickle the tissues and in addition to the irritation of the condiment is added the indigestibility of the toughened article of food.

Vinegar versus Lemon Juice

Vinegar differs from lemon juice in that it is a free acid, being a solution of acetic acid. It is a decomposition product of alcohol, the result of two fermentative processes, and because of its irritating properties produces disease; while lemon juice is not a free acid but an acid salt, not a decomposition product but is built up in nature's laboratory, is full of vitamines and is a cure for scurvy and many cases of malnutrition.

Some one has well said that "mustard produces the same effect on the *inside* as it does on the *outside* of the stomach."

Says Gautier: "Pepper irritates the digestive tract and the urinary tract."

An Inflammatory Thirst

Condiments create an inflammatory thirst which water cannot quench; alcohol is able to quench that thirst, and many a man having "signed the pledge" has been sent back to the saloon impelled by a thirst stimulated by highly seasoned foods served to him by the very ones, perhaps, who would, if they but knew how, save him from his overwhelming temptation.

"Many mothers who deplore the intemperance which they see everywhere do not look deep enough to see the cause. They are daily preparing a variety of dishes which tempt the

appetite and encourage overeating. The tables of our American people are generally prepared in a way to produce drunkards." —*Ellen G. White.*

And a still greater "cloud of witnesses" might be raised up against these much used articles. But enough has been presented to cause the thoughtful mother and housewife to hesitate before serving to her family foods so seasoned that, even though the immediate effect may seem pleasing and satisfactory, a foundation for disease rather than for health is being laid, and, in some cases at least, a thirst created that may lead to a more grievous form of intemperance with its train of misery and woe.

Disease or Health

While catarrh of the stomach and bowels, hardening of the liver and Bright's disease, are not in every case caused by the use of condiments, nevertheless these things are factors in the production of these ever increasing diseases and shorten the working life of these organs. Again we would lay emphasis upon the fact that the reserve strength of a healthy organ cannot be estimated. Just how much wear and tear and overstrain it may be able to endure we can never know until it has been tried out, and then it is often too late; the damage is already done. It is not one error that brings disease; Nature may resist and override the few occasional mistakes, but a combination of factors, a continued irritation from various sources, is bound even in those most vigorous to bring all too soon the time of reckoning and the day when the strength of the organs no longer enables them to cope with the adverse conditions. And their ability to do even a normal amount of work is often so greatly impaired that the individual must walk, with a crutch as it were, permanently maimed, his vitality lessened and his life shortened.

How Much Reserve?

With a Crutch

An important part of the treatment of the diseases mentioned in this connection is the elimination from the diet of all irritating and highly seasoned foods. How much better to avoid those things which tend to produce disease and to let our regular dietary consist of the foods so bountifully supplied by Nature that will place upon our bodies no handicap in the processes of assimilation and elimination.

There are many delicious flavors in natural foods; the delightful nectar of fruits, the rich flavor of nuts, the wholesomeness of grains, the savor of vegetables and vegetable broths; all of these were given us that we might derive the keenest enjoyment in the partaking of them. Careful and intelligent preparation will bring out delicacy of flavor that will prove delightful and more than satisfactory to all who will give the healthful way an unprejudiced trial.

Keen Enjoyment

"Wherefore do ye spend money for that which is not bread? And your labor for that which satisfieth not? Hearken diligently unto me, and eat ye that which is good and let your soul delight itself in fatness."

CHAPTER XII.

Unnatural Stimulants.

These are any substances which excite cell or tissue to undue activity by reason of their irritating presence. Condiments then would be included under this head (see previous chapter), but as they have already been discussed, we will devote the contents of this chapter to those stimulants which affect the nervous system. These are substances which excite the brain and nerves to abnormal activity by reason of their irritating presence in the blood. This undue stimulation is always followed by a compensatory period of depression. This is more than a mere physiological sedation, for after repeated stimulation of this sort it takes more of the stimulant to produce the same amount of activity until the nerves tend toward a wornout state or a condition of exhaustion.

Abnormal Excitation

Compensatory Depression

Exhausted nerves are always irritable, and as the end result of a continued abnormal stimulation the nerves become weak, unsteady and unable to do with poise and control the work of governing the muscular mechanism of the body. Under the head of such stimulants may be classed: Alcohol, tobacco, various drugs, many patent medicines, tea, coffee, cocoa, and meat juices.

Alcohol, the great destroyer of the race, we need not discuss here. Tobacco, a menace to the physical and intellectual integrity of mankind, is not included in the realm of dietetics. The promiscuous use of drugs and patent medicines the people are being, to an extent, saved from by educational campaigns and the law. But coming more strictly in the province of our discussion, and often apparently innocent in their effects,

are those in the remainder of the list—tea, coffee, cocoa, and meat juices.

Tea: "That social cup which sharpens wit, brightens repartee, accelerates the flow of ideas, quickens the pulse, relieves one of headache and fatigue and drives away dull care is not the innocent benefactor of the race that it may seem to be. Instead it is a deceiver which, commending itself for the present as a thing 'to be desired to make one wise' and well, in the end robs us of a hundredfold more of the very things it seems to give."—*Dr. D. D. Comstock in Signs of the Times, July, 1917.*

Theine

Tea contains two injurious extractives—a somewhat bitter alkaloidal poison called theine, and an astringent acid called tannin. A small cup of tea—four ounces—will contain from ½ to one grain of theine and a variable amount of tannic acid. The physiological effects of theine are principally those of stimulation. It is an excitant to the brain, quickens the pulse and raises blood pressure, apparently relieving fatigue.

"Used in excess it (tea) exerts a harmful influence upon the nervous system, and in too strong a form injures the digestive tract and function."—*Harrington and Richardson's Practical Hygiene, page 212.*

According to Bullard, "the abuse of tea as a beverage leads to ringing in the ears, tremor, nervousness, headache, neuralgia and constipation."

A Habit-Forming Drug

Practically all medical authorities classify theine with the habit forming drugs, such as morphine, cocaine and alcohol. Who shall say then just what is excess or abuse? Experiments of the Pasteur Institute have shown that the long continued use of even very small doses of poison ultimately produces decided injury to the organism, and some observers say that a given amount of poison taken in small

doses over a long period of time does more harm than if taken in large doses at infrequent intervals. Just as there is greater damage inflicted by alcohol on the "tippler" than on the man who goes on a "spree" occasionally, but abstains at other times.

The astringent action of the tannic acid of tea in its effect on the bowel is no small factor in the causation of the prevalent disease, constipation, and many a girl and young woman has laid the foundation for future ill health in her daily indulgence in a cup of tea.

A Tragedy

"With nerves all a-quiver with theine, and the bowels all puckered with tannin, what an amazing preparation for the battles of life! It is but little short of a tragedy that a girl of a nervous and artistic temperament, with a natural tendency toward functional disease of the nervous system, should be encouraged or even allowed by her parents to begin so young to cultivate a disorder toward which she has a natural bent—nervous prostration and chronic constipation—through the free use of tea and other nerve stimulants and sedatives."—*D. D. Comstock.*

Caffeine

Coffee: The stimulating principle of coffee is caffeine, which is practically the same as the theine of tea, and identical in its effects, and much that has been said of tea might also be said of coffee. Caffeine is a drug that is commonly used in headache powders or is prescribed by physicians when an emergency stimulant is needed. Coffee contains about 2-grs. of caffeine to the cup and thus its effect upon the nervous system is even more marked than that of tea; and while tea, because of its astringent action, interferes with the normal peristalsis of the intestine, coffee interferes to a greater extent with stomach digestion.

American people yearly consume about 15,000,000 pounds of caffeine, which if given at one time would kill the whole world at one dose. This if divided into doses would equal more than 100,000,000,000 doses annually or a little more than 3 grains daily for every man, woman and child in the nation. Surely this can not tend toward the physical uplift of the race, but must have its effect in the gradual increase of chronic disease.

15,000,000 Pounds

Quoting from Gautier: "Coffee, as everybody knows, produces a nervous excitement, which if abused may lead to insomnia, halluciantions, troubles of the circulation, and muscular enervation, to pericordial distress and to dyspnoea. One can become caffeic, just as one can become alcoholic or a morphia maniac."

And again from Harrington and Richardson's Practical Hygiene, page 214: "Coffee taken in extreme quantities causes palpitation and intermission, besides general nervousness and derangement of digestion. It has a marked inhibitory influence on gastric digestion and is more oppressive to the stomach than tea, and hence should be used with caution by dyspeptics."

The headache that one has when deprived of his morning coffee or his daily portion of tea is one of the greatest evidences that the nervous system has learned to depend upon the artificial stimulation and that, sooner or later, if the habit is continued nature will reach the place where she can no longer cope with the situation and the collapse will come.

For That Headache

"There can be no doubt but that the human race would be better off if these beverages had never been discovered, and many cases of nervousness, dyspepsia, and constipation would be either greatly helped or entirely relieved if these beverages were banished from our tables."—*Sadler in Science of Living, p.* 162.

Cocoa: Many giving up tea and coffee feel that they can indulge themselves freely in cocoa, but here again a mistake is made; for even in the use of this delightful beverage, care and moderation should be exercised. It contains the active principle theobromin which is related to caffeine, though not so deleterious in its effects, it not having the untoward effect on the cerebral centers and the heart that does the active principal of either coffee or tea. However, it is a drug, its drug action affecting principally the kidneys and urinary tract. A cup of cocoa contains about one-half as much of its active principle as does tea or coffee and the theobromin may be considered one-half as injurious in its effects as caffeine.

Theobromin

Cocoa has an advantage over tea and coffee. Being rich in fat and protein, it has rather a high food value. Chocolate and cocoa are the same except that in cocoa the fat has been largely removed. This fat is placed on the market as cocoa butter.

So while the same things cannot be said against cocoa as can be said against tea and coffee, and it may at times serve a useful purpose as food, yet it should be used only with care and moderation. Especially should children be kept from the use of cocoa, it being particularly deleterious to them because of its action on the urinary tract.

Truly it is "the little foxes that spoil the vines" and our safety and greatest efficiency lie in a selection of food which will yield the highest results healthwise, and in the avoiding of those things which are questionable in their effects.

Little Foxes

Meat Extractives: The end products of protein metabolism already described are closely related to caffeine. For this reason the stimulating effect of meat or meat broths, which when taken add these extractives in excess to those already formed normally in the tissues, and the sensation of

weakness when they are omitted from the dietary by one accustomed to having them.

The feeling of strength obtained from meat broths is thus not a true tonic but an unnatural stimulant, which if freely indulged in cannot but have in the end a devitalizing effect upon the general nervous system.

A Devitalizing Effect

Eating for health means eliminating from one's diet those things which tend to make for disease and race decadence and in subsisting on those foods so abundant that are full of life and health properties. The more we are able to reach this ideal the nearer does the body approach the normal state which means not only fulness of physical but of intellectual strength.

"Blessed art thou, O land, when . . . thy princes eat in due season, for strength and not for drunkenness."

CHAPTER XIII.

Meat Substitutes

Upon meat and the savors derived from it has dependence always been placed to make food palatable and appetizing.

With meats taken from us, free fats in disfavor, condiments disallowed, what can we do in the way of preparing dishes that will not only supply the body needs, but also meet the demands of often wrongly educated palates? Surely we would feel quite helpless and find the problem too great. However, a practical study may enable us to "find a way."

A Problem

In preparing meat substitutes we must think of (1) broths, (2) entrees, and (3) gravies. These foods must be appetizing, the broths with something of the same savory appeal to the palate as have the meat juices; the entrees must supply the necessary amount of tissue building element, and the gravies, while palatable, must be free from excess of grease especially superheated fats.

Three-fold

(1) *Broths and Soups:* Vegetables properly prepared yield the most delicious and appetizing flavors. In fact, vegetable bouillon may be so like the ordinary meat broth in its savor that many could scarcely be persuaded of the absence of all meat extract in its preparation. Moreover, such vegetable broths are rich in the mineral salts and vitamines so essential. For the invalid they will have all the advantages of an appetizer and tonic without the contamination of animal wastes and purin stimulation.

A Natural Tonic

The vegetables cut up without paring should be put to cook in cold water and allowed to simmer two or three hours. In this way the mineral matter, vitamines, and much of the protein pass into the broth, the temperature not being high enough to destroy the vitamines. In boiling vigorously for more than

thirty minutes a greater risk is run of destroying the vital elements.

Soup Stock

The most important part of the nourishment being near the skin, a most delicious vegetable broth can be made by using simply the parings of potatoes and other vegetables. These having been thoroughly cleansed, may be used to excellent advantage in the preparation of broths and soup stock. No fat should be added but, after straining or pressing through a colander, seasoning in the way of salt, celery salt, a bay leaf, or a pinch of thyme may be added. Any combination of vegetables may be used with good results. (See recipes for soups, Chap. XXII.) Vegex is a factory prepared vegetable extract which makes, when added to boiling water, a very nice bouillon comparable to that prepared from bouillon cubes. (See recipe 34, Chap. XXII.)

The Essential

(2) *Entrees:* The essential for these dishes as meat substitutes is first, and most important, that they contain a relatively high proportion of protein. In this way only can they replace flesh food, which usually contains 30% or more of the nitrogenous element. Often dishes are served as meat substitutes which contain a very small percentage of protein, and are in reality starchy rather than nitrogenous foods. Something more than the taste must be considered if we are rightly to supply the body demand. However, the flavor cannot be ignored and the dish to be a success must satisfy the palate as well. For foods that, because of their large protein content, are good meat substitutes, see table, Chapter VI.

Breakfast

For at least two of the daily meals, a protein dish should be planned. For breakfast it may be an egg, cottage cheese, cottage cheese omelet, milk toast, gluten mush or gruel, or any of the whole grains, as oatmeal, whole or cracked wheat, whole rice, pearled barley. These grains contain in themselves 15% or more protein.

When eaten with milk the percentage of protein may reach 18%. The addition of sugar is a mistake for two reasons: first because sugar and milk is not a good combination (see Chapter XVII) and second, because the extra food units of sugar greatly disturb the protein balance. Cream may be used if other fats in the meal are limited, but as a protein dish the cereal has its greatest advantage when eaten with whole milk.

Fruit juices may be combined with the grain if desired, but care must be taken that sufficient protein in some form be supplied. Nuts are a good addition to a breakfast menu, but supply fat rather than an excess of protein. The peanut and almond are higher in protein than other nuts.

*Sample Breakfast Menus**

No. 1—	Protein Calories.	Total Calories.
Fruit (large apple or orange)	6	100
Cracked Wheat with Milk	25	164
Whole Wheat Gems (2)	30	190
Butter (thin pat)	—	50
Cereal Coffee (tsp. sugar, 1 oz. evaporated milk)	8	65
Almonds (6)	8	60
Per cent of protein for the meal 12.	77	629

No. 2—	Protein Calories.	Total Calories.
Cantaloupe	5	75
Omelet	27	90
Nut Cream Toast	34	209
Corn Bread	18	150
Butter (thin pat)	—	50
Milk (6 oz.)	23	120
Per cent of protein for the meal 15.	107	694

*Unless otherwise specified, food values are taken from tables in Chapter V and are for average servings. See Chapter XXII for recipes.

No. 3—	Protein Calories.	Total Calories.
Grapefruit (1) with tsp. sugar	7	125
Whole Rice or other whole cereal with cream	15	161
Fruit Toast	15	158
Protose Steak	45	100
Whole Wheat Sticks (3)	10	100
	92	644

Per cent of protein for the meal 14.5.

No. 4—	Protein Calories.	Total Calories.
Corn Flakes with Milk	16	100
Baked Apple	2	125
Cottage Cheese Omelet	33	82
Graham Oven Toast (2 pieces)	26	200
Butter (thin pat)	—	50
Cereal Coffee with Evaporated Milk and Sugar	8	65
	85	622

Per cent of protein for the meal 14.

No. 5—	Protein Calories.	Total Calories.
Fruit (large apple or orange)	6	100
Oat Gruel	23	125
Puree of Peas on Toast	38	200
Graham Puffs (2)	29	170
Butter (thin pat)	—	50
	96	645

Per cent of protein for the meal 14.5.

The above are not necessarily ideal menus for everyone, but are given to show how the balance of protein may be adjusted.

In some cases where the no breakfast plan is followed, or where the morning meal is made up largely of fruit or other low protein foods, the other two meals of the day must be planned so as to furnish ample tissue building material.

Dinner

When possible it is better for dinner to be served in the middle of the day. In planning the menu it is well to decide first upon the form in which the protein is to be supplied, then to select the other foods accordingly.

If legumes, such as peas, beans, or lentils are to be served, or cottage cheese either as a salad or a meat dish, it may not be necessary to plan a special meat substitute. However, it is often very pleasing to serve a dish which will seem more nearly to take the place of meat, such as recipes 36 to 47, Chapter XXII. These may be served with sauces or gravies which may add greatly to the meaty flavor.

*Sample Dinner Menus**

No. 1—	Protein Calories.	Total Calories.
Cream of Celery Soup	16	105
Bean Croquettes with Brown Sauce	37	145
Baked Potato, Egg Gravy	24	144
Sliced Tomatoes (1 tomato)	5	33
Bread (2 slices)	26	200
Butter (thin pat)	—	50
Fruit Mold	—	59
Per cent of protein for the meal 14.	108	736

No. 2—	Protein Calories.	Total Calories.
Vegetable Bouillon	24	93
Green Peas (3 oz.)	21	85
Browned Potato	19	129

*Unless otherwise specified, food values are taken from tables in Chapter V and are for average servings. See Chapter XXII for recipes.

	Protein Calories.	Total Calories.
Lettuce and Cottage Cheese Salad (2 oz.)	40	75
Graham Bread (1 slice)	13	100
Butter (thin pat)	—	50
Cereal Pudding	14	257
	131	789

Per cent of protein for the meal 16.

No. 3—	Protein Calories.	Total Calories.
Cream of Corn Soup	14	114
Spinach with Egg	33	100
Apple and Celery Salad with Golden Dressing	9	91
Bread (1 slice)	13	100
Butter (thin pat	—	50
Buttermilk (6 oz.)	23	66
Olives (6)	6	120
Strawberry Fluff	11	136
	109	777

Percent of protein for the meal 14.

No. 4—	Protein Calories.	Total Calories.
Cream of Tomato Soup	19	112
String Beans (4 oz.)	8	20
Carrot and Cottage Cheese Salad	27	146
Oven Toast (2 slices)	26	200
Milk (7 oz.)	27	140
Baked Banana	7	100
Walnuts (3) or Olives (5)	10	100
	124	818

Per cent of protein for the meal 15.

Daily Ration Showing Greatly Distorted Food Balance

Breakfast:	Prot.	Fat.	Carbo.	Total.
Cream of wheat, cream and sugar	11	78	96	186
Buttered Toast (2 pieces)	26	112	162	300
Potatoes fried in fat	10	26	99	135
Apple Sauce	1	4	95	100
Jelly	1	—	99	100
	49	220	551	821
Dinner:	Prot.	Fat.	Carbo.	Total.
Cream of Vegetable Soup	12	104	23	139
Sweet Potatoes with Brown Gravy (flour browned in oil)	14	64	195	273
Olives (5)	2	83	15	100
Asparagus with Butter Sauce	7	51	15	73
Macaroni with Tomatoes	19	16	70	105
Apple and Celery Salad with Cream Dressing	2	73	41	116
Raisin Pie	16	177	207	400
White Bread (2 slices)	25	12	163	200
Butter	—	150	—	150
	97	730	729	1556
Lunch:	Prot.	Fat.	Carbo.	Total.
Peanut Butter Sandwich	30	68	91	189
Baked Apple	2	5	118	125
Coffee with Cream (2 tablespoons and heaping tablespoon sugar)	3	51	46	100
Chocolate Layer Cake	17	52	181	250
	52	176	436	664

Total calories in daily ration:

Prot.	Fat.	Carbo.	Total.
196	1126	1716	3041

Percent Prot.	Percent Fat.	Percent Carbo.
6	37	56

Note the high total; the fat nearly two times the normal amount (See Chap. VII); the protein less than the lower normal limit.

The only person handling well the total amount of food would be a man in active labor, as a farmer. For him the protein would be 50 to 100 calories too low. Having a total of 3041 calories, his protein might be sufficient at 9% or 10%, but in this ration he has only 6% protein.

Two other meals having been served, it is often better for the evening meal to consist largely of fruit with a dextrinized cereal or some other easily digested food. This, of course, depends entirely upon the needs of the individual and what portion of the necessary daily ration has already been taken. If the protein ration is still low, there must be added to the evening meal some food which will supply the lack. This may well be in the form of buttermilk, cottage cheese, a cereal gruel or an egg. Brain workers and those fatigued from the work of the day would find it a great advantage to take their food at this time in as digestible a form as possible.

Evening Meal

Often, however, the evening meal must be the heavy meal of the day. In these cases the lunch at mid-day should be light but nourishing and the evening dinner, while supplying the necessary food elements, should be served in not too great a variety, properly prepared and eaten with care as to mastication. The fact that more time can be taken for the meal in the evening is an advantage over the haste with which a noonday meal is often eaten, this offsetting to a great extent the disadvantage of eating heartily in the evening. Dinner menus numbers 3 and 4 are simple in variety and may well be taken in the evening. In many cases it is better not to serve potatoes regularly for evening dinner. They may be served for breakfast instead, and as baked potatoes make a most satisfactory addition to the morning meal.

No. 3. *Gravies:* Many would be quite willing to eliminate flesh food from their diet were it still possible to have the rich, savory gravies usually served with meat. These much to be desired sauces may readily be made from vegetable broths and extracts and eaten with the added satisfaction of the thought that they are not only appetizing but health giving.

Many gravies made by vegetarians are anything but hygienic because of their excess of grease and superheated fat. These may make a meal more unhealthful than one in which meat is served.

Unhygienic Gravies

A very enjoyable and healthful dressing for vegetables and entrees may be prepared by using a vegetable broth as a basis. Instead of browning flour in butter or oil, it can be browned in the oven or in a dry pan over the flame and this used to thicken the gravy. The addition of caramel cereal coffee, or carmelized sugar, will serve to give an added richness in color. (See recipe 56, Chap. XXII.)

"Experiments have shown that physical endurance can be doubled by dietetic causes alone."

"Observation shows that many, possibly most, of the world's most vital men and women have virtually made over their constitutions from weakness to strength."—Irving Fisher.

CHAPTER XIV.

Vegetables

No other food is so universally used by all classes as the vegetable. No daily ration seems complete without it, no matter how elaborate the other foods may be. None live so largely on a meat diet that they do not feel the need of the accompanying vegetable to make their meal satisfactory. And to those who have adopted a fleshless diet it becomes, more than ever, an important part of their dietary and greater dependence is placed upon it in the making up of the daily ration. Greater thought and care must then be accorded its preparation and more attention paid to the part it plays in each meal.

A Universal Food

Vegetables are valuable because of their cellulose which, as before stated, serves as necessary bulk; because of their richness in the mineral salts so essential to the blood and tissues; because of the great amount of vitamines they supply, without which the organic processes could not be carried on; and because of actual caloric food value, this last much more abundant in some vegetables than others. The leaf vegetables are of special value because of their complete proteins and growth producing vitamines. See chapters VI and IX.

Their Value

Botanically vegetables may be classified as follows:

1. Roots—as carrots, turnips, beets, parsnips.
2. Tubers—potatoes, onions, etc.
3. Leaves—lettuce, cabbage, cauliflower, asparagus, spinach, greens.

*4. Seeds or Legumes—peas, beans, lentils, peanuts, soy beans.

*In this class may also be placed the grains.

The bulk of most vegetables is cellulose; exceptions being the potato, sweet potato, the winter squash and the legumes. The cellulose of some vegetables is tougher and more indigestible than that of others; for instance, that of the cabbage, the parsnip, corn, and vegetable oyster. The cellulose of vegetables is often more digestible raw than cooked, as for example cabbage which can be eaten raw by many who find it impossible to take it cooked.

The Value Of Potato

The potato, though poor in cellulose, is especially rich in alkaline salts and for this reason is useful in conditions where it is desirable to render the blood alkaline. This, no doubt, is the reason why the combination of "meat and potatoes" has always been so satisfactory; the acid ash of meat metabolism being neutralized to an extent by the alkalinity of the potato.

An Iron Tonic

All vegetables are rich in salts; green vegetables are particularly valuable for the iron salts they contain, thus being very helpful in cases of anemia. The iron obtained in this way is appropriated by the body to a much greater degree than that taken as "iron tonic" out of a bottle. The green coloring matter of plants is known as chlorophyll. Chlorophyll is the respiratory and starch making portion of the plant and is essential not only to plant life but to animal life as well.

Haemoglobin, the red coloring matter of the blood, is analogous to the chlorophyll of the plant, and just as chlorophyll is necessary for plant life so is haemoglobin necessary for animal life. Green vegetables contain substances closely related to the red of the blood and the quality of the haemoglobin of the blood with its iron content may be altered materially by a deficiency or an abundance of these important and vitalizing foods.

Vitamines are present in these green vegetables in large amounts, thus making them invaluable as an article of diet both for the invalid and for the person in normal health, for the child as well as for the adult. For the child they are especially valuable because of the "fat-soluble" vitamine contained in them, which has to do with normal growth and development. (See chapters VII and IX.)

Fat-Soluble Vitamine

Green vegetables contain much water, as high as from 80% to 92%. For this reason an animal feeding largely upon leaves and green vegetables drinks much less water than one subsisting upon a diet of grain. For this same reason green vegetables are especially good as "hot weather food." However, they should be obtained as freely as possible at all times of the year.

Hot Weather Food

In cities and countries where green vegetables can not be obtained during the winter months people often suffer the results of a vitamineless diet. Dr. Evans, a noted health writer, says that one-half of the people in the cities have a touch of scurvy every winter. This may account for the epidemics of spring fever so prevalent as winter ends, and the use of liver pills and blood purifiers at this time of the year. All vegetables, however, contain vitamines and when green vegetables can not be obtained and fruits are expensive, the proper preparation of winter vegetables may supply necessary vitamines.

Spring Fever

The question of the preparation of vegetables is a most important one. Uncooked vegetables contain the highest percentage of vitamines and such vegetables as carrots, turnips, cabbage, as well as lettuce, water cress, tomatoes and celery, etc., may be eaten raw with great advantage, care being taken to insure thorough mastication. These prepared in the form of salads may be served in a most attractive way. (See recipes,

Chapter XXII.) In this way they may to a great extent take the place of fruit.

The process of cooking unfortunately often greatly lessens the nutritive value of vegetables. It is possible, however, to so prepare and cook them that they will not lose their nutritive and vital elements, and it is very important that this be accomplished.

The ordinary method of vegetable preparation includes the removing of the skins and those parts containing the tough, more fibrous portions of cellulose such as celery tops, asparagus butts, peapods, etc. These parts, however, contain many of the valuable salts and vitamines and often a comparatively large amount of protein. For example, the greater part of the protein nourishment lies with the salts and vitamines just underneath the skins of such vegetables as the potato, the carrot, etc., and so is lost when these are thrown away. Carrot tops are said to be particularly rich in calcium or lime salts.

A Waste

When vegetables are boiled a considerable portion of the remaining nitrogenous elements and vitamines passes into the broth and not infrequently is thrown down the sink, instead of being used where it is so often sorely needed in the supplying of body needs. When potatoes are peeled, allowed to stand in cold water and then boiled, they lose about 50% of their protein and 40% of the mineral matter and vitamines. As usually prepared and cooked, carrots lose 40% of their protein food value and 25% of their sugar. The cooking of other vegetables results in about the same loss. In this way much of the delightful flavor is lost, and the vegetables lose to a great extent their satisfying palatability.

These losses may be prevented in a number of ways. Vegetables may be cooked without paring. They may be baked, boiled or steamed, the skins being removed just before serving, or eaten, as in the case of baked potatoes. In boiling, the water

should never be thrown away, but should be saved as a basis for soups and gravies. As a variation, and for those members of the family not able to handle cellulose well, the vitamines may be secured and served in the form of these delicious vegetable broths and purees.

An Economy

The vegetables having been thoroughly cleansed with a brush may be cut up and cooked without paring, or the parings may be cooked by themselves (see recipe 23, Chapter XXII), and in this way the nutritive elements extracted. This being a process of extraction instead of retention the cooking should be more prolonged than otherwise and at a lower temperature, as e. g. simmer, which takes place at about 190° F instead of 212° F, the ordinary boiling point. At this lower temperature a somewhat prolonged cooking of one to one and a half or even two hours does not destroy the vitamines but quite thoroughly extracts the food elements from the vegetable. Pressing through a colander or sieve will separate the skins and cellulose and leave practically all nutritional elements in the broth or puree. The elements thus extracted contain the meaty savor which is an appetizer and tonic.

Delicious soups may be made in this way, and from the standpoint of economy they are well worth while, as parts are used that ordinarily find their way to the garbage can. Outside lettuce leaves, celery tops, the tougher portions of asparagus, and even peapods may be boiled and from these portions will thus be obtained food elements that will greatly increase the total value of the vegetable. (See recipes, Chapter XXII.) Prepared in this economical way the vegetables no longer remain simply carbohydrate food, but may be made to supply to the body a comparatively large portion of nitrogenous material. It is interesting to note that, while the total food content of vegetable is often low, that of this low total, a

Vegetables as Protein Food

high proportion may be protein, in the case of the leaf vegetable ranging from 25 to 50%. How important that none of this be lost!

Do Not Overcook

In cooking vegetables care should be taken that they are cooked until tender, but that they are not over-cooked or allowed to become water soaked. Unless a broth is desired, only enough water should be added to properly moisten the vegetable so that when cooking is complete there will be no excess to throw away. Cooking is often prolonged much beyond the necessary time and this at a high temperature which devitalizes the food and in no way increases its tenderness or desirability. The prolonged subjection to heat may even toughen it, as in the case of peas. Vigorous boiling longer than thirty minutes is said to destroy vitamines. Spinach is often cooked one to one and a half hours, when cooking from 20 to 30 minutes is usually quite sufficient leaving the vegetable much more desirable as a food, rich in vitamines and iron salts. (See recipe 51, Chapter XXII.)

The actual energy value of vegetables varies within rather wide limits from the cabbage containing 2 to 5 calories to the ounce to the bean furnishing a food supply of 65 calories to the ounce.* Vegetables should be considered real food rather than merely a relish, and they may assume a place in the role of nutrition that they have never had when housewives learn to prepare them in such a way as to retain all their food elements.

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*"We may safely compare the cost of the cereal grains or the legumes with each other, or with the tubers such as the potato, or the sweet potato, or with the root foods. It is not possible to compare the cost of any of these with milk or the leafy vegetables such as cabbage, cauliflower, Swiss chard, collards, Brussels sprouts, onions, lettuce, celery tops, spinach, turnip tops and other vegetables employed as greens. Milk and the leafy vegetables are to be regarded as **protective foods.** . . . The leaves should not be regarded as foods of low value because their content of protein, fat and carbohydrate is low, and the content of water high. . . . But they have a peculiar value . . . which makes them stand in a class by themselves among the vegetable foodstuffs."—McCollum.

CHAPTER XV.

Breads and Cereals.

Bread is the staff of life and without the homely loaf we would often feel unsatisfied even though surrounded by the most tasty viands. Someone has well said that "there is true religion in a loaf of good bread." Today when the cost of living is high, the quality of our bread becomes a question of the greatest importance, and when we are confronted with the fact that the refined flour of today has been robbed of life giving properties by the removal of the outer layer of the grain, it behooves us to cultivate a taste for real graham bread and demand whole flour instead of that which has been devitalized. (See Chapter IX.)

The Staff Of Life

Whether bread is made from wheat, rye, or corn, flour containing the whole grain should be obtained whenever possible. In this way not only are the valuable vitamines and mineral salts saved to the body, but the extra bulk is a great help in the prevention and treatment of constipation. One of the most generally recognized foods indicated in constipation is bread containing an excess of bran. However, the addition of sterilized bran to bread made from devitalized flour, while of some benefit, can not take the place of bread containing both the coarse outer covering and the vitamines which would be found in graham bread made from real graham flour.

The Whole Grain

Genuine whole wheat or graham flour is difficult to obtain, but its value as a food is worthy of a determined effort to obtain it and to eat it every day as bread, raisin bread, nut bread, or gems. The flour sold as whole wheat is usually a combination of a few of the several low grades of flour, middlings, and bran produced by the roller processes, and so does not contain vitamines.

After being ground the outer layer containing the germ will not keep more than a few weeks and so can not be stored indefinitely. For this reason the manufacturers will not keep it on hand until the demand for it is greater than it has been. But the occasional small miller can often be found who will grind the whole wheat berry, as it is called for, or the wheat can be ground at home in a small mill or even in a coffee mill.

Several families may club together and buy a mill in which a supply of whole wheat flour may be ground for them all. This has been done by many with satisfactory results. We are too often prone to do the easy thing, but a sense of the importance of having the best, most wholesome bread will result in a determined effort to obtain it, and "where there is a will there is a way."

Home Ground Wheat

A mill can be bought at a small cost that will turn out 15 lbs. of whole wheat flour per hour. Larger and more expensive mills may be purchased that will grind as high as 50 lbs. per hour. With wheat at $2.25 a bushel it is worth 3⅔c per lb. Labor time not counted, home grinding then saves per pound the difference between 3⅔c and the 6c or 7c at which graham or whole wheat flour is marketed. At the same time the family is supplied with a fresh, whole grain containing its food elements entire. One who has suitable storage room may buy grain by the bushel and grind it as it is needed. It should, of coarse, be protected from dampness and mice. This home ground wheat may be coarsely ground and used as breakfast cereal, or in a more finely divided state it may be used in bread making. The wheat should first be washed until the water is clear and spread on a cloth to be dried before grinding. (See recipe 10, Chapter XXII.) This mill may be used in grinding other grains as corn, rye, buckwheat, rice, or in making peanut butter, and grinding dried fruits, etc.

Given bread made from flour which is of the right quality, it should be prepared in a way that will permit of easy digestion. Bread raised with yeast, most commonly used and undoubtedly the best, should, of course, be light and sweet, but aside from these qualities there is another qualification to which we pay little attention, and that is the process through which bread passes after it is baked. Fresh bread is difficult of digestion, and this difficulty is enhanced by the common addition to it of large amounts of butter. Being soft it is not thoroughly masticated and it is often swallowed in masses which become soggy in the stomach. The gastric juice is unable to mix thoroughly with it, digestion is delayed and fermentation results. On the other hand, if bread is allowed to stand for twenty-four hours or more, important changes take place which eliminate its indigestible qualities. It becomes drier, separates into small particles more readily, and certain chemical changes actually occur in the protein as the bread becomes stale that greatly increase its digestibility.

Fresh Bread

These conditions are enhanced when bread is twice baked, as in oven toast, and for one with a weak digestion there is no bread so well received by the stomach. The starch is partly digested by the extreme heat and we speak of it as being "dextrinized." Its brittleness allows of easy solution by the digestive fiuids.

Oven Toast Or Zweiback

Toast, as often made, is not better than fresh bread. A slice of bread is taken and browned superficially leaving the center soft and often more like fresh bread than if it had not been toasted. This is then covered with butter and reheated, making a combination in the "hot buttered toast" as ordinarily served that can hardly be called hygienic, even though commonly considered under the head of invalid dietary. The

The Wrong Way

thorough mastication of hard breads would tend to prevent much of the premature decay of teeth so prevalent among the American people. Here as elsewhere are often seen the results of lack of exercise, and the teeth tend, because of disuse, to fall into degeneration and premature decay.

Baking powder and soda breads are not the best for several reasons:

Devitalized Bread

1. They are made usually of refined, devitalized flour.

2. They are served hot, and eaten with an excess of butter.

3. Soda and baking powder destroy the vitamines, so even though whole grain were used, the addition of these powders would tend to devitalize the grain, with a resulting vitamineless bread.

4. Baking powders, even though the best, leave in the bread a chemical residue, the continuous ingestion of which is not conducive to health.

In a baking powder two substances are combined, one alkaline the other acid in character. The alkaline substance is soda, the acid may be cream of tartar, acid phosphate or an acid salt of alum. The chemical reaction between the acid and the alkali results in the formation of carbonic acid gas (CO_2) and a salt. The gas passes off and makes the bread light, the salt is left behind as a residue in the bread. In the alum baking powders the residue is particularly unhealthful.

Analysis has shown that a cream of tartar baking powder leaves about 70% of its own weight in Rochelle salts as a residue and that the acid phosphate leaves about 35% of its own weight in sodium phosphate. These salts are all saline cathartics. Rochelle salts is the basic element of a Seidlitz powder. From the U. S. Department of Agriculture in Bulletin No. 13 we receive the information that "a loaf of bread made from

a quart of flour leavened with cream of tartar baking powder contains forty-five grains more of Rochelle salts than is contained in one Seidlitz powder." Also in a report on baking powders by the Referee Board of Consulting Scientific Experts, appointed by the United States Department of Agriculture, that "it is wise to be moderate in the use of foods that are leavened with baking powders." Dr. A. Warner Shepard, formerly Health Officer in Brooklyn, said: "I have not the slightest doubt that the mental and physical health of thousands is permanently injured by the excessive use of Rochelle salts in bread and other forms of food and drink. It irritates the kidneys, bowels and stomach and may therefore produce most unfortunate results.

5. Soda, if used at all, should be used with an acid in *exact* proportions, so that there may be no excess of alkali. The most accurate way to use it is with hydrochloric acid in the proportion of one exactly level teaspoon of soda to 80 minims of hydrochloric acid. In this way the following chemical reaction takes place: HCL (hydrochloric acid) + $NaHCO_3$ (soda) = NaCL (salt) + H_2O (water) + CO_2 (carbonic acid gas). The end products are simply common salt, water and carbonic gas or carbon dioxid. This measurement, however, must be exact. Only the *careful* housewife should use this combination.

How to Use Soda

We quote from "The New Cookery" by Lenna Frances Cooper: "It is advisable when using hydrochloric acid to have a minim glass, which can be purchased for a small sum at any drug store. One perfectly level teaspoonful of soda is neutralized by 80 minims of hydrochloric acid. The hydrochloric acid must be chemically pure (marked C. P.) and in the concentrated form. One teaspoon of soda and 80 minims of hydrochloric acid are equivalent to four level teaspoons of baking powder . . . for most recipes ½ teaspoon of soda and 40 minims of hydrochloric acid are sufficient to use with

one cup of flour." (For warm breads without baking powder see recipes, Chapter XXII.)

Very satisfactory breakfast gems may be made without the use of baking powder or soda. These are best made with whole wheat or graham flour and are light and easy of digestion (See recipes 1 and 2).

Cereals as Protein Foods

Cereals are very useful foods, and it is most important that their comparative values be understood by the housewife. The greater part of the protein of all cereals is found in the pericarp and just beneath it, so any whole cereal is comparatively rich in protein. Even rice ceases to be merely a starchy food when not deprived of its outer covering. The tables in Chapter VI give the approximate protein value of these foods. Whole or cracked wheat, oat meal, and whole rice contain 13 to 18% of protein and so are of great help in the making up of the necessary daily ration of nitrogenous food. The proteins of cereals often being incomplete need to be supplemented by those of other foods, as milk, eggs and vegetables. This is due in part to the fact that much of the cereal eaten has been deprived of important proteins in the outer covering. However, a monotonous diet largely of cereals or of a single cereal should be avoided. (See Chapter VI.)

To Cook Cereals

Cereals should be thoroughly cooked; the cooking preferably prolonged at a low temperature as in a double boiler or fireless cooker. The length of time required varies, but is usually two and one-half to six hours. This softens the outer covering and prepares the grain for easy and complete digestion. Cooked at the simmering point, the temperature is not high enough to destroy the vitamines. For invalids or for small children it may be necessary to serve cereals without the rough elements, but the prolonged cooking has put into solution most of the

salts and vitamines of the outer layer and they are not lost to a great extent when only the harsh exterior is strained away. Gruels, while usually considered invalid dishes, make a nice variation from the ordinary breakfast mush and may be served for a change to the entire family for breakfast or as an evening lunch. (See recipes 19 to 21, Chapter XXII.)

"Oh for festal dainties spread,
Like my bowl of milk and bread;
Pewter spoon and bowl of wood,
On the door stone, gray and rude!"

—Whittier.

CHAPTER XVI.

Desserts.

This most pleasing part of our meal comes to us, usually, when hunger is satisfied and the needs of the body have been supplied by that part which has gone before. Thus the digestive powers are overtaxed, the body is burdened by an excess of food, and actual harm is often done, even though the dish might of itself be wholesome. However, desserts are frequently not wholesome and then the food which is imposed upon an already more than satisfied stomach is of such a quality that insult is added to injury.

Insult Added To Injury

The so-called best chef is the one who can make a dessert so tempting that it will appeal to the palate of one who is already surfeited with food, and again we are reminded of the frequency with which the question of supplying physiological need is lost sight of in the desire to cater to the sense appeal. When one is truly hungry it is not the dessert that satisfies, but the homelier part of the meal, and the tendency is to wait until the appetite wanes before partaking of that which is often of the most concentrated food value.

The best desserts are light, easily digested, and of a minimum caloric value. They must not be of such concentration that they interfere with the proper food balance. If the first part of the meal is low in calories and it is planned that the dessert supply a large part of the food value, making with the remainder of the food served a proper balance, a more concentrated dessert may be served, e. g. the following:

	Protein Calories.	Total Calories.
Cottage Cheese 2 oz	40	75
Spinach 2 heaping tbsp	8	25
Apple Pie 1-6 of a pie	16	325
Walnuts (6)	20	200
Glass Milk	28	150
Per cent of protein for the meal 14.	112	800

Note the ample total food units, and the protein—half the daily needs, in spite of the fact that the pie contains only 4½% protein. The low protein of the pie is made up by the high protein content of the other food. While the pie may not be considered the most wholesome of desserts and better to be served only occasionally, yet much of its unhealthfulness is avoided when it is given its rightful place in the meal. The pie and nuts, making a dessert of 550 calories, would undoubtedly be a great imposition upon a digestive tract after the ordinary dinner of three or four courses. This would in reality be serving a second full meal when the digestive organs already have all they can do.

The Proper Food-Balance Maintained

Usually the dessert of 150 food units or less is the best, and many very delightful dishes of this kind can be prepared. (See recipes, Chapter XXII.)

One great disadvantage in desserts is the large amount of fat and sugar of which they are usually made. If care is not taken this will result in a meal overbalanced as regards its carbohydrate and fat content, at the same time irritating because of its concentrated sweet and overheated fat, and more or less indigestible especially if added to an already overloaded stomach.

A Disadvantage

Desserts should be made of food substances in proper combination. For instance, combinations of milk and sugar are not the most wholesome and greatly increase a tendency to gastric fermentation. (See recipes, Chapter XXII, for desserts without the milk and sugar combination.) The combination of fruits and vegetables is not considered ideal, and if a fruit dessert is served after a hearty vegetable meal, is should preferably be one in which the cellulose of the fruit has been largely removed.

How to Combine

The time for candy is at the end of the meal at which time it may be served with the dessert. Taking its proper place as a part of the meal, its food value being reckoned with the daily ration, one great objection to its use is removed. The appetite already satisfied, the tendency to overeat of it is greatly lessened and it does not prove so irritating to the mucous membrane when not taken on an empty stomach. However, candy eaten in excess even at this time often results in marked irritation of the throat and increased catarrhal conditions.

Candy

Nuts are some times served with the dessert, and much blame is often attached to this most valuable article of food because it so often plays a part in the overeating frequently indulged in during this last most delightful course. The high caloric value of nuts must be kept in mind and they should be eaten accordingly. Nuts served with a simple fruit dessert make a most satisfactory combination in which the food concentration need not be too great. Nuts often cause distress because they are improperly masticated. If thoroughly chewed and eaten moderately, as all concentrated foods should be; if eaten at the proper time and place and considered a food with actual food value instead of something merely to please the palate, this pleasing as well as nourishing food may be eaten by nearly everyone with no unsatisfactory results.

Nuts

Ice cream, so often served, should be mentioned, and the same rules apply to this as to all others. It must be eaten with due regard for what has preceded it. Because of its combination of milk and sugar it can not be considered as wholly without objection, but if eaten in moderation and slowly so that large ice cold masses are not thrown upon the stomach at once, thus too quickly lowering the temperature below that at which digestion can be carried on, it need not be condemned. As a dessert it is much to be preferred to the rich puddings and pastries so

Ice Cream

often served. A good time for ice cream is at lunch when little else is taken. A plain cracker eaten with ice cream makes a more rational combination than the conventional cake. Sometimes an invalid can take ice cream better than anything else. At these times it is usually served by itself and supplies needed nourishment. Melted before it reaches the stomach, it is little more than a liquid and is usually well taken care of.

Cakes

Rich cakes and pastries are better omitted. Simple cakes made preferably without baking powder (see recipe 87) may be served occasionally, but the fewer of these sweets supplied the family table as a usual thing, the better. And when for economy's sake, or lack of time, the dessert is forgotten or omitted, none need feel that the body will suffer because of the omission.

"Many things sweet to taste, prove in digestion sour."
—Shakespeare.

CHAPTER XVII.

Combinations.

The question of proper and hygienic combinations of food is one which greatly exercises the mind of many who find it necessary to consider their diet from a health standpoint. Yet we believe that those who have carefully followed us in our discussion of the previous chapters can readily see that when the daily ration is properly balanced, and one is careful not to overeat, the problem of food combination is to a great extent solved. And again we are reminded of the beauty and freedom of eating, as well as living, by principle rather than merely by rule. However, there are a few points in this connection which perhaps should be spoken of in addition to those already discussed.

The Solution

First, and perhaps most important of all, is this: the menu having been properly balanced it is much better to serve a small variety at one meal. A large variety often complicates the digestive processes and tends to overeating. Different kinds of digestive juices are called forth by different foods. If the variety is too great the stomach may find it difficult or impossible to manufacture so many kinds of gastric juice at the same time and thus the digestive process be hindered.

Small Variety

Often when some particular food disagrees, it can be eaten and properly digested if taken unmixed with other foods. This is sometimes true in cases where fruit is not well taken. Although fruit should form a part of the dietary of everyone, yet there are those who seem unable to take it in any form, particularly if raw, or very acid. In nearly every case if these persons would devote one meal to the eating of fruit and nothing else, they would find themselves able to eat it without trouble, and they would often soon find it possible to

add one other simple food to the fruit meal, such as oven toast or cereal in some form.

Fruit and Vegetable

The combination of fruit and vegetable is not an ideal one. Fruit being a predigested food, should pass from the stomach very soon after entering it. Vegetables often require rather a prolonged stomach digestion because of the protein which they contain. The fruit cellulose in addition to that contained in the vegetable may greatly retard and even prevent the digestion of the vegetable protein. This objection is to a great extent removed if the fruit is served in the form of a puree, the cellulose removed as in prune or apple whip, fruit mold, etc., or if the vegetables are tender, free from fibrous cellulose and easy of digestion. There is ordinarily no objection to fruit juices taken at meals where vegetables are served.

Starch And Acids

Much has been said in regard to the combination of starches and acids, the reason being given that the ptyalin of the saliva which acts upon starch does its work only in an alkaline medium, the saliva normally being slightly alkaline. However, as all of our food except meat and nuts contains starch, this would interdict the eating of fruits with any food ordinarily served. Even cottage cheese and buttermilk with their lactic acid content would have to be eaten by themselves. With a properly balanced ration and careful mastication the question of this combination may be disregarded.

Milk and Sugar

The milk and sugar combination has already been spoken of and, while it is perhaps not necessary to avoid it entirely, it should be remembered that milk and sugar combined in excessive quantities may prove very injurious, and for one with a weak digestion should be avoided.

Whether or not milk and fruit should be taken at the same meal depends largely on *how* they are taken. We quote as follows:

"There is a deep-rooted impression that sweet milk and fruit should not be taken at the same meal. This idea is evidently largely based upon the fact that milk curdles in the presence of a fruit acid; but the curdling of the milk by the fruit acid aids rather than retards its digestion. The first thing that happens to milk when it reaches the stomach is that it is curdled. There is a special milk-curdling ferment in the stomach. A fruit juice more acid than the normal gastric juice of the stomach cannot be found. Lemon juice, one of the most acid of fruit juices, added to milk, renders the milk easier of digestion. We should guard against the sudden pouring of a large quantity of milk into the stomach, as this may form large, tough curds, difficult of digestion. If the milk is taken slowly, or mixed with the food as it enters the stomach, it will be converted into small curds."—Dr. George Thomason.

Fruit and Milk

It is well to remember that fruit is practically predigested and quickly passes from the stomach unless combined with a food requiring prolonged stomach digestion. For this reason some may find it an advantage to eat the fruit part of their meal first, thus allowing it time to pass from the stomach before a great deal in the way of other food follows. Still others, as suggested above, find it better to eat their fruit alone, uncombined with other foods. Ordinarily, however, milk eaten on cereal, or taken in sips thus allowing it to enter the stomach slowly need interfere in no way with the taking of fruit at the same meal. It should be remembered that *thorough mastication will prevent the unpleasant results which sometimes seem to follow the introduction of these unlike foods into the stom-*

ach. More often incomplete mastication rather than the non-ideal combination leads to fermentation.

Two Starches

Another rule in regard to combinations that has been given is the one that two starches should not be eaten at the same meal, or that bread must not be eaten with a starchy food. However, as so many of our foods contain starch, the following of this rule would be quite impractical. The principle underlying it obviously involves the question of the proper food balance. This having been looked after by the intelligent housewife in the planning of the meal, the question of whether or not two or more foods containing starch should be combined can be forgotten. It can readily be seen that a meal composed of rice and potatoes with white bread would be far from correct healthwise, but this mistake no one who understands the fundamentals of dietetics will make.

Two Kinds Of Fruit

Someone else raises the question, "Should two kinds of fruit be eaten at one meal, or is it healthful to eat stewed fruit and fresh fruit at the same time?" We know of no reason why these combinations are objectionable, and again we would emphasize the importance of getting away from petty rules and of intelligently planning the daily dietary, combining common sense and good judgment with a knowledge of scientific principles. Eat a few well selected foods at one meal. Do not overeat or undereat, but see that the foods are so prepared and combined in the daily ration that the necessary food elements in proper proportion and amount are supplied to the body.

CHAPTER XVIII.

Fads.

An Engrossing Question

What to eat has always been the big and engrossing question with mankind ever since Eve in the garden made her first great mistake and Adam as the result was sentenced to a lifelong earning of his bread in the "sweat of his face." The question has been an absorbing one from the standpoint of the epicurean whose desire was to find some new thing with which to please the palate to the man or woman who in the face of poverty has had the problem to solve with the wolf at the door.

What Shall We Eat?

The primary thought in regard to eating having ever been to please the senses, man has long since reached the place where because of certain discomforts and ailments obviously due to error somewhere in the amount or kind of food taken he asks the question, "What shall I eat?" from the standpoint of one who has come to realize that he must eat to live rather than live to eat.

We hear the question from the man or woman who regards it sanely, sensibly and with a real desire to understand the principles underlying nutrition; and from the fanatic and the hypochondriac, who look upon all food as an enemy and seem to think that the less of it and in the most unpalatable form the better, expecting that everything eaten will cause distress unless it be taken according to the most rigid rules and with the utmost self-denial.

This question has been carefully investigated from the standpoint of science, more and greater light has gradually been thrown on it until today those interested in this all important subject have only to study the proper literature to learn much

in regard to the scientific principles underlying the question of how to supply the body with proper food.

Together with a fund of scientific facts accessible to the investigative mind are various fancies and fads brought forth by those who in their searching have often gotten but a single truth instead of the whole fundamental outline involving body nutrition. Fads in regard to diet are many and varied. The question of eating having become so problematical, men both scientific and otherwise, have advanced many theories as to the practical solution of these dietetic problems.

Fads Many And Varied

The partaking of food leading to so many ills it has been only a matter of course that some one should come forward with the assertion that, if eating causes such a large proportion of sickness, abstinence from food would undoubtedly prove a cure-all, and so the "fasting" fad has had its day.

Fasting

So much trouble having resulted from faulty and incomplete nutrition it has seemed the natural thing that an effort be made to overcome this condition by forcing an excess of food upon the body. The thought has been that at least a part of the excess must be assimilated and that the body, gaining strength from added nourishment, would be better able to cope with problems due to a weak digestive tract. And so "forced feeding" has played a great part in the treatment of anemic conditions, malnutrition and wasting disease, as tuberculosis, etc.

Forced Feeding

Abnormal conditions resulting from errors in protein digestion and metabolism being so apparent, the "low protein" idea has been advanced, and many have been led to the extreme of omitting as nearly as possible all protein from the diet—subsisting on a meatless, eggless, milkless diet, with nothing to take the place of these protein foods.

Low Protein

Protein, however, being such a necessity and the harm resulting from a deficient protein diet so apparent to secure this food in as digestible and assimilable a form as possible has seemed most important, and so the "milk diet" has had, and still holds a great place as a "cure all" for all conditions of disturbed nutrition and chronic disease.

Milk Diet

Others seeing conditions so often resulting from an overworked digestive tract and an excessive body fuel supply have sought to solve the problem and to obtain results by the "no breakfast plan" which has worked admirably in many cases.

No Breakfast

Again the prevalence of eating processed, over-cooked, overseasoned foods having been so evidently a factor in the causation of disease the advantages of the other extreme have been widely heralded and the "raw food" fad has had a great following with much benefit, no doubt, to some.

Raw Food

So much of digestive disturbance seemingly due to improper combination of various sorts, many have thought that all dietetic errors might be corrected if a few rules in regard to what foods may be combined, were obeyed, and so many "diet specialists" have confined their dietetic teaching to the questions of "combinations." So we hear that a starch and an acid must not be eaten at the same meal; bread must not be eaten with starchy foods, two starches must not be combined; two kinds of fruits, fruit and vegetables, fruit and milk, are all wrong combinations, until one finds himself so surrounded by a maze of rules that bewilderment results and fear lest some rule be disobeyed takes such a hold that eating becomes a burden and the digestive organs, affected by anxious mental impulse, are unable to care for the simple food that may be taken. These bewildered friends, still suffering ills apparently

Combinations

due to dietetic mistakes, are at loss to know how to solve a problem which becomes more and more a vital one, and in desperation ask the question, "What can we eat?"

Along with all this comes the theory that it does not make any difference what you eat; "forget it and eat what you want."

"Eat What You Want"

Build up the general health by exercise, and proper and regular living; maintain the correct mental attitude and eat what your appetite calls for. For those who have long been introspective and have feared to eat, this advice may be very timely.

We would wish no one to think that we have not the fullest respect for each one of these various rules in regard to eating. Each one has done much good and in selected cases under proper supervision there is no doubt but that each one of these may apply and perhaps in a more or less modified way be used with great success in the treatment of various and sundry abnormal conditions. Every one of these hobbies has had its basis in truth. It is in the application that mistakes have been made. The rule has been advanced, the reason why has been vague and indefinite, and the people, untaught in regard to body processes and food composition, have been tossed about by many winds of dietetic doctrine.

Many Winds Of Doctrine

The reason for these rules in regard to eating becomes very apparent when one has been properly educated in food fundamentals. The application, based upon principle, then becomes plain and the modern housewife, as the home dietitian, may wisely plan the food program for her family in such a way as to apply sensibly the principles upon which all of these fads are founded. She can thus avoid the necessity of having members of her family submit to any one of the above lines of dietetic treatment for the correction of conditions brought on by overeating, undereating, or improper eating of any sort.

A Better Way

Briefly we will consider the principles underlying the application of the eight methods given above of overcoming nutritional ills.

1. *Fasting:* In conditions of auto-intoxication and overloaded digestive tract, excessive putrefaction in the large intestine and a body often supersaturated with nourishment, a fast for a more or less limited time undoubtedly would be indicated. It must be remembered, however, that except perhaps for a short time, the advantage of a complete fast, without the disadvantage, may be obtained by a modified fast such as a food supply limited to those things that will tend to decrease auto-intoxication, e. g. fruits and fruit juices. These may be taken alone or with a certain amount of green vegetables and perhaps lactic acid foods, as cottage cheese, buttermilk or yogurt.* An occasional meal missed; a day without food or with nothing but fruit will often be found a great advantage. "Abstemiousness in diet is rewarded by mental and moral vigor."—*White.*

An Antitoxic Diet

2. *Forced Feeding:* Less can be said in favor of this plan. However, there are cases where the food supply has long been deficient when it may be found a decided advantage to insist upon the ingestion of food in amounts necessary to supply the excess of nourishment needed to build up a body long weakened and wasted from lack of food. This is to be done gradually and carefully with due regard for existing conditions and dietetic principles. This plan should always be carried out under competent supervision.

3. *Low Protein:* Those, who have long overeaten of protein food and are suffering the results of protein putrefaction

*In the dietetic treatment of diabetes, an initial period of fasting is often carried on under the careful supervision of the attending physician.

in the intestine and incomplete protein metabolism, often do well for a time on much less than a normal supply of this nitrogenous food until the excess has been eliminated and the body calls for more to keep up actual repair. However, this must be done carefully as an exceedingly low protein diet continued for too long a time will result in weakness, lowered nerve tone, malnutrition and even, because of lowered resistance, in an increased susceptibility to such diseases as tuberculosis. In these cases the ingestion of protein is less than the outgo; the body is out of nitrogenous equilibrium (see footnote page 56), and the results will be serious unless the condition is soon corrected.

Serious Results

4. *The Milk Diet:* This diet is valuable in many cases. It permits of an excess of nourishment in an easily digested and assimilated form. Many will take the amount of food units that their body needs and the excess that, because of depleted conditions, they should have for a time in the form of milk better than in any other way. However, we believe that these cases should be carefully selected and that often the same, or even better, results may be obtained by a modified milk diet, or by a diet in which the same advantages may be derived without the absolute restriction. We know of no serious objection to the milk diet as a trial even though the same results might be obtained in another way. The plan is simple and needs not the thorough knowledge of foods necessary in planning a varied diet with the same results in view.

In Selected Cases

Often little permanent good results from this plan of feeding because the patient, upon going back to his usual dietetic program, returns to the same errors that led to trouble in the first place, so he has gained little in the way of lasting benefit if in addition to the milk diet he has not obtained a knowledge of the normal rational eating that makes for health.

5. *The No-Breakfast Plan:* This plan we consider a very good one because, *First,* many have eaten a hearty dinner the evening before, their digestive organs have had to work while they slept and are in no condition in the early morning to take up the work of digesting even a light breakfast. *Second,* the plan lessens the daily food intake and discourages overeating. *Third,* the digestive organs should have more rest between meals than they usually get; six to eight hours intervening, being the ideal. With no breakfast and an early lunch this would be accomplished.

It can readily be seen, however, that understanding the principle one may get the same advantageous results by leaving out supper or by eating carefully three times a day.

6. *Raw Food Diet:* The advantages of this are many:

(1) It ensures an ample supply of vitamines which lessens the amount of protein needed. (See Chapter IX.)

(2) It necessitates thorough mastication.

(3) It prevents rapid eating.

(4) It hinders excessive seasoning and the use of superheated fats.

(5) Many vegetables are more digestible raw than cooked.

These principles borne in mind will enable one to avail himself of all the advantages of the raw food diet without the restrictions. However, too much cannot be said in favor of the eating of vegetables and fruits raw; a certain amount of these taken daily being a decided advantage.

7. *Combinations:* This is by no means an unimportant subject, and the housewife wishing to feed her family for the best results in health and vigor should be informed as to the principles underlying this phase of dietetics. But here, as elsewhere, those who have only a few rules by which to be guided, without a knowledge of the reasons why, will often fail to accomplish the important results they seek. (See Chap. XVII).

8. *"Eat What You Want."* For the poor neurasthenic, who has forgotten everything in life but the question of what he dare put into his stomach, this is perhaps the best of all. And it explains the often apparently marvelous results of various faith cures, so called. Too much attention to the digestive tract may be worse than none at all and some may well, for a time at least, "forget it."

Principles Not Rules

Again the importance of intelligent application of principle cannot be too emphatically urged. Let us know our bodies and their needs; supply them wisely and in a masterly way and thus rise above the petty handicaps that hinder us in our endeavor to reach our ideals and to find success.

"There are more things in Heaven and earth, Horatio, than are dream't of in your philosophy."—Shakespeare.

CHAPTER XIX.

The Feeding of Children.

It is in childhood that the foundation for the health or ills of life are laid, and more can be accomplished by proper feeding of the boys and girls while yet in the developmental stage than in after years when the seeds of ill health have long been sown and nature has begun to take her toll. Careful feeding can do much to prevent the digestive upsets and respiratory troubles so common among children and will lay a foundation for health and strength in after life that means more than any heritage of lands or gold.

A Foundation

We cannot in our limited space present an exhaustive treatise on this important phase of dietetics, but we can lay down a few principles that may serve as a helpful guide in the important work of supplying to the child the food which will yield happy results in the way of a normal physical growth. The body is made up of the food supplied to it. This food should be complete, untainted by impurities introduced from without or manufactured from within.

Normal Physical Growth

Perhaps one of the most important things to be made emphatic is the necessity for regularity in feeding with ample length of time between meals for the stomach to entirely empty itself. We find that even infants do much better when fed every three or four hours, than when fed every two hours as has so commonly been done. They gain in weight more rapidly, have less colic, and are happier in every way.

Regularity

When it is necessary to feed babies artificially, it is safer to use only sterilized milk. It has been found too that the boiling

of milk greatly increases its digestibility*. However, if the milk is boiled or even pasteurized, it is of the greatest importance that these babies receive in addition to their milk, at least an ounce of orange juice daily; a neglect of this precaution often being a factor in nutritional disturbances, such as scurvy, eczema, rickets, etc. (See Chapter IX.) Orange juice may be introduced carefully into their diet at any time after the age of one month, and it is often a valuable addition to the diet of even a nursing infant.

A Precaution

If the baby does not take orange juice well, or if this fruit is difficult to obtain, the necessary vitamines may be supplied in potato water or in other vegetable broths. Other fruit juices may be used as lemon juice or grape fruit juice.

It is well after the age of seven months to gradually introduce into the diet additional foods as vegetable broths and purees, potato gruel and cereal gruels. To make the cereal gruels, the cereals should, after thorough cooking, be put through a colander or strainer, and to the jelly-like mass left should be added milk (not cream) to make it the consistency of gruel. Add no sugar.

After Seven Months

A little later or by the age of nine months, vegetable purees, oven toast, hard crackers and scraped apple or apple sauce should be given; also other fruit purees and fruit juices. Early in the second year the child should begin to have green vegetables as spinach, green peas, string beans, etc. These should be pureed at first, but soon the child may be taught to

The Second Year

*According to Dennett the milk or milk mixture, the proportion depending upon the baby's age, should be boiled vigorously for three minutes, stirring well to prevent the formation of a scum. The curds formed from this milk are fine and much like those of mother's milk, and when properly supplemented with orange juice and vegetable broths are not constipating.

masticate thoroughly the more tender cellulose, so that tender, carefully cooked vegetables may be given without being strained or pureed. These vegetables should be cooked with due care to preserve the vitamines. (See Chapter XIV.)

The sooner after the age of twelve months that children are put on three meals a day the better. If anything is given between meals it should be fruit or a drink of milk. Even this extra, if allowed, should be given at the same hour every day with unvarying regularity. One mistake that is often made is in keeping children too long on milk alone, some babies being nursed into the second year or kept upon the bottle long after they should be having a greater variety of food.

The cereals will during the second year have an important place in the diet of the child along with milk toast, and stale bread and milk. In the beginning of the second year well cooked cereals may be given the child without the preparatory process of straining. These cereals should be *thoroughly cooked.*

A Mistake

The mistake is often made of adding sugar to the cereal, but the child should learn from the first to take cereal and milk without sugar. Great harm is done by educating children to like sugar in this way. Never at any time should the combination of milk and sugar be allowed on cereal, whether gruel or mush.

Bread should be whole wheat and graham, or made from other whole grains, and should be at least thirty-six hours old. All toast given the child, whether dry or as milk toast, should be in the form of oven toast, hard clear through, with more than merely a superficial browning.

Artificial sweets should be limited. (See Chapter IX, p. 91. Quot. from Dr. Kerley.) It were better for any child if he need never know of the existence of cake, pie, ice cream and ordinary desserts. It is only as a result of education that children acquire the sweet tooth so common among them. But it can hardly be hoped that the

Sweets

ideal will be reached—there are too many loving friends to teach our children to like these things for us to expect to be able to keep sweets entirely away from them. If the sweets could be limited to their proper place and to that alone, no harm perhaps might be done, but with the knowledge of the delight to the palate comes the difficulty of teaching proper control and moderation. However, this must be done and our aim as parents must be, if not to restrict entirely, to limit candy and other sweets to the proper time, place and amount. Much can be done in this direction, and it is surprising how much co-operation can be elicited from the little folks if they are taught in the interesting way that it is possible for them to be taught, the importance of caring for the body machine as carefully as father looks after his watch or his automobile.

The Body Machine

The element of education and discipline entering into this phase of child culture gives the parents the great opportunity of obtaining results not only in a physical way, but also in the way of character building and self-control, so closely is the physical allied to the intellectual and moral.

Self-control

But it is only as the mother has mastered for herself the problem of eating for health and the necessary self-control to reach this high ideal, that she can be master of the important work of feeding and teaching her child.

The dainty morsel of candy can be eaten as dessert and when the little one has, with a hearty appetite, eaten well of the dinner served, a very small amount of candy will suffice. Then too, as a matter of politeness, the supply of sweets must be passed and divided with the members of the family, and in this way the amount may be quite easily limited to the one or two pieces the child may be allowed to have. With great care should the mother prepare the simple dessert allowed her tiny man, that there

Generosity

may be nothing served him that would in any way detract from the benefit his little body should derive from this food.

Simple Desserts

Cereal desserts made with cereal, egg and a moderate amount of sugar are often good (See recipes Chapter XXII) and, served at the midday meal, simply add more calories that the growing child may thrive. Desserts such as prune whip, banana whip, junket, fruit mold (see recipes Chapter XXII), are all good and supply the necessary sweet. The little one will delight in these simple things if they are made attractive and he will derive only benefit from them. Dried fruits as figs, dates, raisins, etc., may help to supply the needed sweet in a very wholesome form.

Fresh Fruits

The fresh fruit served the boy or girl will be delighted in for its own flavor without added sugar, if a little tact is used by the thoughtful mother. The sliced peaches, berries and other fresh fruit served may be enjoyed without the sugar usually added. Special care should be taken that this fruit be naturally sweet and palatable. The older members of the family may in their interest in watching the beautiful development of this normal boy or girl become enthusiastic in eating as carefully as the little folks are taught to eat and thus become examples, incidentally deriving immense advantage to themselves.

Ice Cream

Ice cream should be withheld as long as possible, but as the child grows older it may seem almost impossible to withhold it entirely, but it must be insisted upon that it be eaten only at meal time, that it take the place of real food and that it be eaten slowly and in moderation. Too much cannot be said against the pernicious custom of permitting the child to obtain ice cream sodas and ice cream cones promiscuously from any and every ice cream stand. This tempting sweet should be obtained from a source

that guarantees its freshness and purity, served with care and best in the home at the regular meal.

A simple sponge cake or plain cookie may be allowed in place of, or in connection with, the dessert.

Cake

At bread making time a crusty sweet cake can be made from the bread dough that will be as much a delight to the normally educated child as a French pastry to the one who has been trained to like excessive and rich sweets. When pie is served the older members, how the little one will rejoice in a tiny pie made especially for his or her benefit, and the crust may be as hygienic as bread, for it may be made from the same dough, and its palatability will never be questioned by the small recipient.

Concentrated Food

Another common mistake in feeding children is in the thought that they must have an abundance of fat—cream on their cereal, butter freely on bread, richly seasoned vegetables and even fried and greasy foods. This plan for them does untold harm and their appetites are so educated that they can never perhaps get away from the bondage of acquired and perverted tastes. Dr. Kerley says that "the average child after the sixth year receives two or three times as much energy food as he requires." (This probably does not include the poorer classes.) Energy food we know to be fat and carbohydrate.

Undesirable Results

In almost every case whole milk is better than cream. The child needs ample protein, but not an excess of fat. The catarrhal conditions, frequent colds, enlarged tonsils, adenoids and recurrent bronchitis so common among children undoubtedly are favored, if not caused by, the excess of fat given them together with the large amount of sweets allowed in their diet. The result of these mistakes are never entirely overcome

and thus the individual goes through life handicapped because of the ignorance of his parents.

A Corrective Diet

For a child subject to colds, no plan is better than a diet limited, for a time at least, to boiled skimmed milk, whole cereals, green vegetables, fruits, cottage cheese, buttermilk, vegetable broths and vegetable soups (See recipes 23 to 31, Chapter XXII), and perhaps an occasional egg. Butter used very moderately if at all.

Above all things do not serve your children hot fresh bread, griddle cakes, fried potatoes, richly seasoned foods of any kind.

To Encourage Mastication

Give them plenty of food requiring thorough mastication as hardtack, oven toast, etc. Teach them to masticate thoroughly. Impress upon their minds that if they are to have beautiful, sound teeth, these teeth must be exercised as well as kept clean. Tell them how the starch is changed to sugar in the mouth. Let them become interested in seeing how much sugar they can manufacture out of a crust of bread and how sweet the sugar will taste. The social element at meal time may be one of the best safeguards against too rapid eating and improper mastication.

We quote the following:

"After the teeth begin to come children should be given all their starchy food in as hard a form as possible and the per cent of starch limited.

"The preponderance of the carbohydrates in the diet is one of the causes of so many children entering the kindergarten with their teeth broken down to the gums and small undersized jaws. One of our responsibilities is spreading the knowledge that no demineralized white bread or crackers should ever be given to a child under five. We not only need all the lime salts contained in the dark breads to build the teeth and bones, but we need exercise to develop the jaws.

"Children who eat tough bran bread made into toast instead of mush and who do not drink while eating usually get the proper development of the jaws."—*M. Evangeline Jordan, D. D. S., in California State Health Bulletin.*

Tea and coffee must never be allowed, even cocoa should be kept away from them. Children are much better off without meat and meat broths with their protein wastes. It is well for the child up to the age of four or five years to eat by himself and not at the family table unless the other members of the household can themselves co-operate with the small boy or girl in eating for the body strength and health. Usually the evening dinner is later than the child should take his evening meal and it becomes a simple matter to serve his simple meal at 5:30 and his appetite is entirely satisfied when an hour later his elders partake of theirs.

Avoid

Co-operation

Never should food be allowed between meals. If the hungry boy waits until meal time he will eat at the right time the food he needs, and care much less about the sweet after-part. Plain food will taste good and be quite satisfactory, and the supply taken will be sufficient to last until the next regular meal. If the boy after school must have something to "stay his stomach" until supper time, let it be an apple or other fruit and this the regular daily plan, instead of a spasmodic one.

Between Meals

During the period of growth and development much more food is needed per pound of body weight than after maturity is reached. It is impossible to say how much food a growing child may need. It all depends upon the activity of the child and the rapidity with which new tissues are formed. The child who cares little for vigorous play but enjoys his books, should eat less food than the one who plays hard all day. Other things being equal, the child of phlegmatic

Amount of Food Needed by Child

temperament will need less food than the one who is of a more nervous, impulsive type. The amount of food needed depends upon tissue activity and this varies with individual temperament. Boys, because of greater muscular activity, need more food than do girls.

Every mother should see that her child gets active physical exercise daily. Then if the boy or girl is fed regularly, does not eat between meals, eats wholesome food, prepared with due regard for hygienic principles as outlined above, the appetite will be one of the best guides as to the amount of food required.

A careful estimate for a few weeks of the calories taken by the child will be of advantage to the mother from an educational standpoint, and will permit her to study and to determine the results when the daily amount in food units is decreased or increased for a time.

It should be remembered that it is not bulk so much as concentration of food that determines its caloric value. And also that the candy or knick-knack taken between meals may increase the total food value above actual body requirement, even though the child eats a comparatively small amount of food at mealtime.

Do not underfeed your children. They must be properly and sufficiently nourished. Their body demands are great and must be supplied, but they can have enough food without that which will handicap rather than help the body in its work. Of protein they must have an ample amount, of carbohydrate and fat a normal supply, but they may get this without excess and with every advantage to their growing needs. Great danger lies in a diet for them top-heavy in fats and carbohydrates with often not enough protein. The results of such as unbalanced diet are serious and parents should know how to avoid a mistake which is far too common. Some sweets

Body Demands Great

they should have, but the intelligent mother having mastered the important principles of nutrition, will supply these in a simple, not too concentrated a form and combined in a healthful way. She will be teacher as well as mother, and will teach her boys and girls that the most wonderful, the most manly, womanly thing they can do is to develop strong, healthy, normal body machines that will make of them strong, noble men and women, able always to do well their part and to make a success of life.

"The mother who holds herself responsible for what her child shall wear and yet does not feel that she is answerable for what he shall eat, shows that she regards his outer appearance more than his health of body or moral strength."

—Elizabeth Harrison.

"In these years of infancy and childhood, food and nourishment are of special moment; not alone for the time, but also for the child's future life. Through its diet, a child may grow up to be—in the business of life—idle or industrious, dull or lively, weak or strong."—Froebel.

CHAPTER XX.

Food Economy.

(Written at the time of the Food Conservation Campaign, 1918. Hoover Food Dictator.)

We have come to the time when "economy" is the watchword: conservation of men, money, food. Well had it been could such an impulse have been given prosperous civilized man without the appearance upon the stage of action of dire necessity in the shape of a gigantic war! Conservation of the health, of the resources of the race should always have been the ideal, but in the mad rush of a strenuous life we have thought that we could spare no time for petty economies, not even for those of body conservation and the things that would mean the most in the longevity and efficiency of the human race. After all it is in the time of stress that we come the nearest to reaching our ideals and, in suffering, has mankind ever reached the highest state of perfection. Sterling qualities, physical and mental, gain strength only through exercise and exercise comes in the face of resistance and trial.

Conservation Always The Ideal

So today in the face of a great need, many will acquire depth and breadth of character and attain to ideals of living far out of the reach of the throng in times of prosperity and peace.

Eating for pleasure's sake has for so long been the only thought in supplying the body with food; for so long the sole ambition of the overworked housewife has been to supply her family with food that would "taste good" that often all else has been lost sight of. Life in so far as the housewife has been concerned has become sordid and ideals have been cheapened. Neither has her energy been conserved, the food supply, or the body strength and resources of those who day by day sat down to an

The Old Standard

overstocked board loaded with eatables far in excess of physical needs.

Today in the light of scientific advance and national need the mother in the home is blessed with a new vision. The needs of the hour, the demand for conservation both of food and of physical resources, lends a new interest to her plans. Her work is no longer a mere drudgery to please the varied tastes of a family demanding that their appetites be pampered three times a day, but she becomes master of a new situation: that of furnishing the table with a food supply adequate for body needs, balanced with such correctness that there is the least possible waste in the raw material, in its preparation, or in its ultimate utilization by the body; at the same time yielding the highest and most satisfactory results in physical health and strength.

A New Vision

She is no longer merely cook; she becomes a dietitian whether she prepares the food with her own hands or directs its preparation by those under her. She is no longer content to leave the question of feeding her family with the ordinary cook, however experienced and competent, but personally supervises the important work of supplying those at her table with the food yielding the best results with the least possible waste. Thus she serves her country, is a blessing to her family and to the race.

The Home Dietitian

Her immediate reward she will receive in seeing those in her care thrive and develop in a normal physical way, and in knowing that by her thoughtfulness and careful planning more has been left to maintain the great supply necessary to feed the world.

"The heart of her husband will safely trust in her, and her children will rise up and call her blessed" and, no matter how narrow her sphere may seem to be, she will be doing her bit and this perhaps the most important service that can be appor-

tioned to any in this time of need for every possible conservation of national resources. The need no longer so urgent, she will still appreciate the advantage of wise economy and will continue to direct her family in the way that will lead to the results most needed by the home and nation in time of peace, as well as in time of war.

Economy And Health

True food economy in so far as the body is concerned is the partaking of the minimum amount of food necessary to fully supply the body needs and to keep one in health, with some reserve in the form of stored food as fat. Overeating, as we have learned, interferes with proper oxidation, and complete elimination. The blood thus becomes surcharged with wastes, the tissues overloaded and the circulation sluggish; the mind becomes clouded and many are the evil results. But with a proper food balance all of the body processes are carried on with freedom and alacrity, strength and poise, and resulting health, vigor and efficiency. "Economy in food does not signify ill health, but rather the reverse, as undoubtedly in times of peace and prosperity a very large number of people eat unsuitable food and more than is good for them."—*Editorial Medical Record June* 16, 1917.

How America May Feed The World

Because the suggestions of the present food campaign are so in harmony with the laws of scientific dietetics and so ever applicable and helpful for any time in combating the "high cost of living," we will consider against the background of the Food Question as we have followed it in our previous chapters, the practical points in Food Conservation as emphasized in the setting forth of the needs of the present hour. The vital question is that of having enough food to go around. The problem would be solved were no one to eat more than necessary to adequately supply his physical needs. This alone would mean a

saving in the total amount of food entirely sufficient to feed the world, even though America were the only source of supply. And what would it not mean in the added physical strength and efficiency of the nation, in the lessening of disease, in the increase of mental and moral power, in the advance of national enlightenment and onward stride of civilization.

Dr. H. Edwin Lewis in *American Medicine* of May, 1917, says, "Not the least of the duties of this department (Department of Food Conservation) will be the systematic dissemination of information in regard to the amounts and kinds of food required to maintain perfect health."

But not only must there be a reduction in the total amount but certain kinds of food must be used more sparingly and with greater care, and again we see mankind thrust back as it were by an irresistible force to the normal food balance proportionate with natural supply. The sure result of this to be a more normal, natural method of living compatible with the highest degree of health and enlightenment.

Normal Food Balance Proportionate to Natural Supply

How strange that the foods we must get along without are those foods that we have been using in excess of physical need, and that we could not have had, had not the total food supply been so abundant; far in advance of that actually needed by the world population. And so we have been led to profligacy in eating and living. Can it be possible that the disasters of the most terrible war of history may be compensated for to a degree in the resultant necessity for obedience to natural law as regards the feeding of our bodies? In the raising of the physical plane of the people, who have long been looked upon as the teachers and leaders of the world?

A Compensation

Because of the need for food conservation we find that as a

nation we must readjust our dietetic habits in the following ways:

First—We Must Eat Less Meat: We come face to face with the fact of our extravagance in feeding so much of our food grains to stock, and then killing and eating the animal which might have been saved for the production of milk by far the most economic method of converting vegetable into animal food. We are reminded that each pound of meat not eaten will save ten pounds of grain and the economic value of a vegetarian diet becomes apparent. But in the light of modern hygienic dietetic principle this self-denial becomes a source of satisfaction and pleasure. The meatless days are no hardship and are many instead of one or two a week. (See Chapter X.)

Save Grain And Milk

Second—We Must Use Less Fat: In Ten Lessons on Food Conservation by the U. S. Food Administration, we are advised to "avoid cooking by means of frying," and again to "preach the gospel of reducing the total amount of fat ⅓ of an ounce a day for each adult." We are told that the waste of ¼ oz. of butter daily in every one of our 20,000,000 households would mean 312,500 lbs. a day, 114,062,500 lbs. a year. How easy to save this amount and much more by eating less. Without a doubt each individual in the ordinary family could eat ¼ oz. less butter daily and be the gainer healthwise; and how much more in the way of valuable fat could be saved if the hygienic method of cooking with the use of the minimum amount of free fat be adopted by the housewives of the land.

Save Butter

Among other suggestions are these: "Choose recipes calling for less fat;" "use cream desserts sparingly;" "buy whole milk instead of cream; use the top milk on cereals, etc., and the remainder for drinking and cooking." We are told that the value of skimmed milk has not been appreciated; that

as a meat substitute it is quite as valuable as whole milk, as it contains just as much protein.

What a source of satisfaction our economy in this direction becomes when we learn that a reduction in the use of free fat and fried foods will greatly lessen the prevalence of certain diseases among us, and thus increase our strength as a nation. (See Chapter VII.)

Third—We Must Greatly Reduce Our Sugar Supply: It is suggested that more honey be used; that fresh fruits be eaten more plentifully instead of the cooked fruits requiring sugar; that dried fruits be used to take the place of sugar. That dried fruits be added to desserts, in this way lessening the amount of sugar needed.

Use Natural Sweets

How enthusiastically we can co-operate as we learn the great advantage to be derived healthwise, from a reduction in the use of this concentrated food. How easy this restriction becomes when we realize the added benefit derived from the use of fresh fruits, with their vitamine content and predigested sugar; when we appreciate the nutritive value of honey and dried fruits with their content of fruit sugar. (See Chapter VIII.)

Fourth—We Must Learn to Do Without White Flour: We are finding it necessary to use flours made from a variety of cereals, as oatmeal, cornmeal, buckwheat and rice. Those most addicted to the use of fine flour bread are learning because of wartime necessity to cultivate a taste for breads made from the coarser unrefined whole grains. We are accustoming ourselves to breakfast cereals made from other grains than wheat.

Coarse Breads

There is no hardship in this in the light of our knowledge that upon a "monotonous diet of a single cereal," even though it be our faithful standby wheat, we may be unnecessarily lim-

iting our tissue supply of complete proteins; when we know that the use of refined flours robs our bodies of elements essential to life and health. (See Chapter XV.)

Fifth—Use More Vegetables in Season and Prepare Them Without Waste: This suggestion can be followed only with the greatest satisfaction when we become aware of the valuable nutritive elements in these natural foods, and of the great nutritional value of those parts so often thrown away. (See Chapter XIV.)

Natural Foods

Sixth—We Are Urged to Prepare Our Food With Due Regard for Fuel Conservation: Again we can see in this a great advantage when we think of the vital elements in fruits and vegetables, so often destroyed in the cooking, and the benefit derived when these foods are eaten raw. To the saving of fuel in the use of the fireless cooker is added the enjoyment of added delicacy of flavor, and of a knowledge that there are in this way retained valuable food elements, often lost in the ordinary methods of cooking. (See Chapter IX.)

The Less Cooking The More Life-Giving the Food

Seven—Waste Not, Want Not: Our attention is called to the enormous waste in this country. A recent Government Bulletin tells us that the estimated food waste of the U. S. equals in value $700,000,000.00 annually. We quote again from Dr. Lewis: "It is a well established fact that the waste of food each year is enormous. The amazing prosperity throughout the country during the past few years has made the people careless, and in the kitchens of our homes, our large hotels and public institutions, the waste, according to a very conservative estimate, is said to exceed 10%. Indeed there are those who, as the result of careful thought and

Food Waste of $700,000,000

investigation, do not hesitate to say that 20% is more nearly correct."

There is the waste due to thoughtless extravagance in supplying our tables, a common fault of which the majority of American people are guilty. Thus at every meal in the home, or public eating place, the average individual invariably insists on having a great deal more than he needs, often more that he can possibly eat—the remainder is thrown away.

From the *Independent* we take the following:

"What is needed is the individual cultivation of the custom of taking no more food on the plate than one expects to eat, and then eating it all unless it proves unpalatable or excessive. If this practice were universal, we should have enough to put up a palatial postoffice in every hamlet, pension all descendants of all the soldiers, build the biggest navy in the world, and carry out any of the schemes of social improvement urged upon us."

Even in times of peace the world's needs are great enough to demand conservation of resources in every way possible and the "Gospel of the Clean Plate," so impressed upon our minds in times of stress, should never be forgotten in times of prosperity, and the admonition to "gather up the fragments that nothing be lost," should be a rule of daily living, however abundant our supply.

A Rule of Daily Living

So we find that Food Conservation means body conservation and health; that the need for food economy can have only a most beneficial effect upon the American home, and that the educational value of the present Food Campaign will prove to be far beyond estimation.

The problem of feeding the family with the least expense, the least food waste, and the best results in a sufficient and balanced food supply thus becomes one of fascinating interest;

one that makes of the housewife a scientist as well as an artist; raises home keeping to the dignity of a profession, and will in time of the greatest prosperity do more for the nation in conservation of resources and in race betterment than can in any other way be accomplished.

The woman of the land, the housewife, the mother in the home thus becomes in this way, as well as in many others, the power that rules the world, builds the nation and shapes the future destiny of the race.

"Much food is in the tillage of the poor; but there is that is destroyed for want of judgment."

CHAPTER XXI.

Summary and Conclusion.

1. Our bodies are made up of the food we eat. "As a man eateth so is he." Quality of tissue depends on quality of food.

2. Food may be of poor quality when eaten or it may become contaminated during a process of retarded digestion, and so be impure as it enters the blood.

3. Excessive quantity is sure to impair quality of food and of the food laden blood.

4. Chronic disease is largely due to defective food analysis in the body. These conditions are all preventable. Knowledge is power.

5. Know food values, the composition of foods and the relation of food elements to body needs.

6. See to it that your daily ration is a balanced one. Do not consider the question of calories an arbitrary one. Remember that individual needs and conditions must be considered and rules modified. Estimate your calories for two weeks. How much are you eating, and is it the right amount? Could you do just as well on less or do you need more? Sit in judgment on your own case.

7. Remember that excessive calories can not make up for deficient vitamines. That the body can not utilize food unless the necessary ferments of life processes are backed up by an ample vitamine supply. Know the vitamine foods and avoid a devitalized diet. Eat freely of raw foods and do not forget the value of green vegetables.

8. Avoid a monotonous diet and thus the danger of deficiency in quality as well as in quantity of proteins.

9. Do not consider it a hardship if you find it necessary from the standpoint of economy to limit your meat supply. Remember that an adequate, properly balanced diet is very

possible without the use of flesh food, and that the fleshless diet offers many advantages healthwise.

10. Keep out of your food those things that make it "hot when it is cold" and that tend to produce irritated catarrhal conditions of the digestive mucous membrane. Remember that the mucous membrane may be irritated not only by condiments, but also by excessive and superheated fats, improperly masticated and indigestible food, and by cane sugar in concentration.

11. Do you long for a good complexion? Eat less free fat, more raw carrots and green vegetables.

12. Remember that your health and efficiency are impaired, your possibilities for length of life lessened by the use of beverages and foods which continually, even though slightly, stimulate because of drug principles that they contain.

13. Remember that bread is the "staff of life" only when it contains its nutritive elements entire, and that the use of the whole grains is economy from every standpoint.

14. Regard desserts with suspicion, use them with caution and when used, let them supply a need rather than serve as an excess.

15. A simple variety at a meal is a great advantage and the best combination is a well-balanced ration.

16. No one dietetic plan is a "cure all." All rules have their exceptions. The only safe plan is to have a thorough understanding of dietetics and of the principles of nutrition with the use of common sense and good judgment in their application.

17. The physical foundation for mental and spiritual growth is most important. The greatest work that can be accomplished is that of feeding the child in such a way as to insure the highest type of physical, mental and spiritual development. The self-discipline and control that this will foster is not the least of the good results.

18. Conserve your food intelligently and thus your health. Economy is spending not less, but more wisely. Much that is expended for food could be used with better and far more lasting advantage, in some other way.

19. Remember that good food may be wasted, or spoiled in the preparation, and that cooking should be a science as well as an art.

20. Remember that *how* you eat is quite as important if not more so that *what* you eat. Food eaten properly is much less liable to be taken in excess. Proper and thorough mastication will cover a multitude of dietetic sins. If you must hurry, eat less.

21. Allow ample time for stomach digestion by sufficient rest between periods of work so that this your faithful friend, upon the integrity of which so much depends, may not give out before its time.

22. System and regularity are as important in the work of the digestive tract as in all other business. Therefore, plan for regular habits of eating. Never eat between meals.

23. If fluid taken at meals hinders the proper mastication of your food, go on a dry diet.

24. Do not forget that adherence to principle in eating is an evidence of strength of character and that he who eats to live will longer live to eat.

25. Above all do not be a fanatic.

"The object of physical health is not health as an end, but as a means to the end of efficiency."—Dickenson.

INTRODUCTION TO CHAPTER XXII.

This book is *not* a cook book. But in order to help the housewife make practical application of the principles laid down in the preceding chapters, and to acquaint her in a measure with simple hygienic methods of cookery, we append a few representative recipes that we trust may serve to introduce her into the art and science of healthful food preparation.

To lend variety many of these recipes may be modified. The housewife already versed in the art of cookery may often be able to improve upon the recipe given, but we trust that she may do so with intelligent regard for food values. The size of the serving may often vary, but the calories given for the entire recipe will enable anyone easily to estimate the value of any sized helping. A few of the recipes have been received directly from the Bulletins sent out by the United States Department of Agriculture. For many we are indebted to our friends: Miss Lenna Frances Cooper, director of the Battle Creek Sanitarium School of Economics, and author of *The New Cookery;* Mr. H. S. Anderson, dietitian of the Loma Linda Sanitarium and author of *Food and Cookery;* and to Mr. E. G. Fulton, for many years proprietor of the Vegetarian Cafeteria, Los Angeles, and author of the *Vegetarian Cookbook.* A number of recipes have also been taken from the *Manual of Recipes* of the Washington Sanitarium, Washington, D. C.

To these most excellent and reliable authorities on hygienic and scientific cookery, we would recommend those who desire to inquire further into the detail of Modern Culinary Art.

CHAPTER XXII.

Recipes—Simple, Economical, Hygienic.

(A) Breads and Breakfast Dishes

1. *Wholewheat Gems.* (Manual of Recipes—Washington Sanitarium) 1 egg, 1 cup of milk, 1 cup of white flour, ¾ cup wholewheat flour, salt to taste.

Break egg into batter bowl, add milk and salt.

Sift flour before measuring and add it a handful at a time, beating briskly. *Do not stir.* Beat thoroughly for a few minutes, then pour into gem irons, heated, but not too hot and slightly oiled. Bake 30 to 40 minutes.

To make the mathematical calculation plain, we will work out entire the simple problem of estimating the food value for the above recipe. Referring to table No. 2, in Chapter VI, page 48:

	Protein.	Fat.	Carbo.	Total.	
1 egg	25	50	—	75	see p. 50
1 cup of milk	30	83	47	160	see p. 51
1 cup white flour	63	15	438	516	see p. 51
¼ cup wholewheat flour	60	19	314	393	see p. 51
Salt	—	—	—	—	
Total calories in recipe	178	167	799	1144	

This will make about 12 gems.

Dividing by 12, we find that each gem contains 15 calories protein, 14 fat, 67 carbohydrate, and a total of 96, making 16% protein, 15% fat and 69% carbohydrate.

2. *Graham Puffs.* (One Hundred Recipes—Lenna Frances Cooper.)

1 egg, 1 cup milk, 1½ cups graham flour, ¼ teaspoon salt.

Beat egg, add milk, salt and lastly the graham flour. Beat about five minutes or until batter is smooth. Fill hot gem irons full to the brim, and bake in a moderate oven 20 to 30 minutes. Number of puffs, about 12.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
172	181	668	1021	17	18	65
In One Puff:						
14	15	56	85	17	18	65

3. *Corn Bread Without Baking Powder.* (Food and Cookery—Anderson.)

1 cup cornmeal, 2 tablespoons flour, 1 tablespoon sugar, 2 eggs (separated), 1¼ cups boiling water, 1½ teaspoons salt.

Sift dry ingredients together, stir smooth with one cup of boiling water. With the remaining ¼ cup of water make a batter that will barely drop from the spoon. Beat eggs separately. Fold yolks into whites and turn them into the batter, folding them in with a wire batter whip; mix lightly, yet thoroughly. Pour into oiled granite pan and bake in a moderately hot oven 20 to 30 minutes. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
110	125	545	780	14	16	70
In One Serving:						
18	21	91	130	14	16	70

4. *Cream Rolls.* (Food and Cookery—Anderson.)

1½ cups pastry flour, ½ cup thin cream, ½ teaspoon salt.

Sift the flour and salt into the mixing bowl, pour the cream on all at once, and draw the flour in from the sides of the bowl so as to mix evenly and not stir any into batter. Work it into a stiff dough in the bowl, then turn out on a slightly floured board and work together for a few minutes; roll out to about one-third inch in thickness, cut into long strips with a dull knife about one-third inch wide, roll on board and cut into two-inch lengths. Lay in baking pan, leaving a little space between, and bake in a medium oven until crisp and a light brown. Number of rolls, 24.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
106	226	681	1013	12	22	66
In One Serving:						
5	9	28	42	12	22	66

5. *Wholewheat Sticks.* (Food and Cookery—Anderson.)

1 cup flour, ⅓ cup wholewheat flour, 1⅓ tablespoons oil, ¼ teaspoon salt, ⅓ cup cold water. Emulsify the oil by beating thoroughly while adding water a drop at a time. This will take only a portion of the ⅓ cup of water. To the sifted flour and salt add the oil, which has previously been emulsified, and rub evenly through the flour. Add the remainder of the water all at once and mix evenly. Knead on a board and roll out into ⅓ inch thickness.

Cut with a dull knife into strips ⅓ inch wide and three inches long. Bake in a medium oven. Number of sticks, 24.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
90	202	578	870	10	23	67
In One Stick:						
4	8	24	36	10	23	67

6. *Corn Dodgers.* (Food and Cookery—Anderson.)

1 cup corn meal (preferably toasted lightly in oven, 1½ tablespoons vegetable fat, 1 tablespoon brown sugar, ½ teaspoon salt, 1½ cups boiling water.

Mix all dry ingredients, add the fat and pour on the boiling water all at once and stir smooth. A few tablespoons of water may be added if needed to make the batter of a consistency barely to drop from spoon but not run. Drop from the side of a large spoon into an oiled baking pan in oblong shapes and bake in a quick oven. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
52	225	487	764	7	30	63
In One Serving:						
9	37	81	127	7	30	63

7. *Bran Bread.*

1 pint milk or water, 4 cups bran, 1 cup raisins, 4 cups sifted flour, ½ cup oil ½ cup brown sugar, 2 teaspoons salt, cake of yeast.

Make a sponge with the milk or water and the flour, let rise until light. Beat the oil into the sugar and add to the sponge, with the salt. Then add the bran and the raisins; beat well and put in tins. Let rise ½ inch. Bake. Number of servings, 30.

Calories in Recipe (if made with water):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
388	1092	3219	4699	8	23	69
In One Serving:						
13	36	107	156	8	23	69

Calories in Recipe (if made with milk):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
452	1104	3315	4871	9½	22½	68
In One Serving:						
15	37	110	162	9½	22½	68

8. **Oatmeal Bread.* (Mrs. Jessica Hazard—Official Demonstrator Food Conservation Campaign.)

1 cup milk and water or all water, 1 teaspoon salt, 1 tablespoon fat, 2 tablespoons sugar, 1 cup rolled oats, 2½ cups wheat flour (or substitute as rice flour), ½ cake yeast dissolved in ¼ cup warm water.

Put oats through mill or grinder. Scald the liquid and pour it over the rolled oats, then add the sugar, fat and salt. Let stand until about luke warm (about half an hour). Add yeast. Add flour and knead. Let rise until double its bulk. Knead again and place in pan. When light bake in a moderate oven 45 to 90 minutes.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
265	260	1412	1937	14	14	72
In Average Slice:						
15	15	78	108	14	14	72

9. *"Rye and Injun Bread."*

2 cups corn meal, 4 cups rye flour, 2 tablespoons oil, 2 tablespoons sugar, 1 teaspoon salt, cake compressed yeast, 4 cups water.

Dissolve yeast in cup warm water. Scald ⅔ cup corn meal with three cups water. Let stand ½ hour or until luke warm,

*U. S. Food Leaflet No. 6 gives the same recipe omitting the sugar and fat.

and add yeast. Then add 2 cups rye flour, ⅓ cup corn meal, oil, sugar and salt. Let this sponge rise. When light add 1 cup corn meal and 2 cups rye flour. Mold into loaves as soft as can be handled. Let rise until twice its bulk. Bake. This makes two loaves.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
260	364	2810	3434	8	10	82
In Average Slice:						
7	10	78	95	8	10	82

10. *Home Ground Wheat Bread.* (Food Thrift Series No. 2, U. S. Dept. Agriculture.)

3 cupfuls wheat meal (or 2 cupfuls wheat meal and 1 cupful of white flour), 1¼ cupfuls lukewarm water, ½ cake compressed yeast, 1 level teaspoon salt, 1 level tablespoon sugar, 1 level tablespoon shortening if desired.

Mix the yeast with a small amount of lukewarm water; dissolve the sugar and salt in the rest of the water; mix the two solutions and add all to the meal (or meal and flour). Mix thoroughly so that all the liquid is incorporated in the mass, cover and set in a moderately warm place to rise. After about 2 hours, or when well risen, add the shortening and knead well, adding a little meal if necessary, until a smooth elastic dough has been formed. Cover and set aside again to rise for an hour. Knead lightly, form into a loaf, place in a greased pan; allow to rise until just double in bulk (this is only ⅔ of the usual rise in the pan when white bread is made). Bake slowly for ¾ of an hour.

Calories per slice would vary slightly from bread as given in tables Chapter VI in that there would be a somewhat higher proportion of protein.

11. *Oven Toast.* (Zwieback.)

Cut bread in slices. Brown slowly in oven until crisp all way through. Bread may be dried out in the sunshine before putting in oven. (For calories see page 34.)

12. *Fruit Toast.*

Use any canned or stewed fruit, or fruit juice. Heat, thicken slightly with cornstarch, and pour over moistened oven toast. Calories in one serving:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
15	7	136	158	9½	4½	86

13. *Prune Fluff Toast.* (Manual of Recipes—Washington Sanitarium.)

½ cup prune puree or marmalade, 2 egg whites ¾ cup sugar, vanilla or other flavoring.

Add sugar and flavoring to stiffly beaten whites. Add prune puree and beat well. Serve hot or cold on moistened oven toast. Oven toast may be moistened with cream if desired. Number of servings, 6.

Calories in Recipe (not including oven toast):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
53	1	386	440	12	—	88

In One Serving (not including oven toast):

9	—	64	73	12	—	88

If cream is added to the oven toast the extra calories can easily be calculated.

14. *Cream Tomato Toast.*

1 cup strained tomatoes, 1 teaspoon sugar, ¾ cup milk, 1 teaspoon flour.

Heat tomatoes, add sugar and salt. Heat milk, thicken and add slowly to heated tomato. (See recipe 26.) Use no soda. Serve on oven toast. Number of servings, 6.

Calories in Recipe (not including oven toast):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
31	68	109	208	15	33	47

In One Serving (not including oven toast):

5	11	18	34	15	33	47

15. *Cream Puree of Peas on Toast.*

1 cup peas, 1 cup (or less) milk, flour, salt.

Press peas through a colander, add milk and salt, and thicken. Serve over moistened oven toast.

Calories in recipe (not including oven toast):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
92	96	230	418	22	23	55

In One Serving (not including oven toast):

15	16	38	69	22	23	55

16. *Cream Egg Toast.*

1 pint milk, 2 eggs, flour, salt.

Scramble the eggs, add milk, thicken and salt to taste. Pour over moistened oven toast. Minced parsley may be added.

Calories in Recipe (not including oven toast):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
118	274	146	538	22	51	27

In One Serving (not including oven toast):

19	46	24	89	22	51	27

17. *Nut Cream Toast.*

Make cream sauce by thickening 1 pint of milk with flour. Rub one tablespoon of peanut butter smooth with water and add. Salt. Reheat and serve over oven toast. Number of servings, 6.

Calories in Recipe (not including oven toast):

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
85	236	156	477	18	49	33
In One Serving (not including oven toast):						
14	39	26	79	18	49	33

18. *Hygienic Hot Cakes.* (Veg. Cook Book—E. G. Fulton.)

2 eggs, 2 cups bread crumbs, ½ cup flour, ½ teaspoon salt, 1 tablespoon sugar, about 1½ cups milk.

Mix thoroughly the bread crumbs, flour, salt, and sugar. Add sufficient milk heated to 140° or 150° to make a thick pour batter, and into this beat the yolks of the eggs. Add the stiffly beaten whites and bake on a soapstone griddle. Be careful not to have the milk *scalding* hot. Number of cakes, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
179	260	669	1108	16	23	61
In One Cake:						
22½	32½	83	138	16	23	61

19. *Oatmeal Gruel.*

3 tablespoons rolled oats or 2 tablespoons oatmeal, 1 pint water, salt to taste.

Add oats to the salted boiling water. Let boil 10 minutes, then cook 3 hours in a double boiler. Strain and add ½ cup evaporated milk or cream. Number of servings, 3.

Calories in Recipe, if milk is used:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
49	105	122	276	18	38	44

In One Serving:

16	35	41	92	18	38	44

Calories in Recipe if cream is used:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
31	223	102	356	9	63	28

In One Serving:

10	74	34	118	9	63	28

Note—While usually considered invalid dishes, gruels make a pleasant variation from the monotony of the ordinary mush for even the healthy members of the family. They may be prepared as above from any other cereal. Very nice gruels may be made from left-over cereals. Reheat the left-over cereal and thin; press through a colander or strainer, and add milk or cream.

20. *Gluten Gruel.*

1 pint boiling water, salt to taste, ½ cup 20% gluten meal.*

Add gluten to the boiling water, stirring constantly. Boil until thickened and add ½ cup cream or evaporated milk. Number of servings, 6.

Calories in Recipe if evaporated milk is added:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
89	91	294	470	18	19	63

In One Serving:

28	30	98	157	18	19	63

Calories in Recipe if cream is added:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
67	209	274	550	12	38	50

In One Serving:

22	70	91	183	12	38	50

*Gluten is a meal made from wheat and contains a higher proportion of gluten (wheat protein) than ordinary flour. This can be obtained from the Battle Creek Sanitarium, Battle Creek, Mich. Two grades may be obtained, containing 20% and 40% gluten, respectively.

21. *Browned Rice.*

Put rice in shallow pan and place in a moderate oven for about ¾ of an hour or until rice is a golden brown. Stir occasionally. Then cook in a double boiler until tender. Serve with milk or cream.

For calories in serving see page 35.

(B) Soups

22. *Vegetable Bouillon* (Manual of Recipes—Washington Sanitarium):

1 pint strained tomatoes, 1 pint potato water, 2 medium sized onions, ½ cup chopped celery, 1 pint split pea broth.

Cook tomato, chopped onion and celery together slowly 1½ to 2 hours; add one bay leaf, a pinch of thyme and sage, broth from peas and potato water. Strain through strainer, salt to taste, reheat and serve. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
143	95	317	255	26	17	57
In One Serving:						
24	16	53	93	26	17	57

23. *Economy Broth.*

Parings from 6 medium sized potatoes, parings from 3 or 4 carrots, 2 red onions, one tomato, two tablespoons oatmeal, ½ pint or more of bean broth. Salt to taste, celery salt, pinch of thyme or bay leaf.

Scrub thoroughly all vegetables before paring. Put to cook in cold water. Cook all the vegetables, except the beans, to-

gether with the oatmeal, slowly 2 or 3 hours, adding enough water so that there will be about 1 quart of broth when done. (Cook beans by themselves.) Strain, pressing as much of the vegetable pulp as possible through the strainer. Add the bean broth and seasoning. Reheat and serve. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
117	34	126	277	41	13	46
In One Serving						
19	6	21	46	41	13	46

The above recipe can be varied in many ways. More or less of the mentioned vegetables can be used, and to these may be added many others, as celery tops, lettuce leaves, cabbage leaves, turnip parings, etc.

The broth may be served without the bean broth. Water drained from potatoes or other vegetables may be used.

24. *Potato Soup Stock.*

4 or 5 large potatoes, 2 onions (preferably red onions).

Scrub thoroughly and cut up without paring potatoes or removing outer onion skins. Put to cook in 2 quarts of cold water. Let cook slowly 2 hours or more, adding more water if necessary. Press through a colander or strainer. The potato broth and puree, of which there will be about 2 quarts, may be used as a basis for the following soups, as well as for many others.

In the making of this soup stock there may be cooked with the potato and onion any other vegetables as carrots, tomato, cabbage or lettuce leaves, celery tops, etc. Or the soup stock may be made from potato parings alone, with or without the parings and outer leaves of other vegetables. If parings

alone are used it will be well to cook with them two tablespoons of oatmeal or other cereal, that the soup stock may have sufficient body to it.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
50	10	420	480	11	2	87

Note—As much of the protein is near the skin, the more of the skins used the higher the relative protein content, until a broth (without the pulp) made from vegetable skins and leaves alone, may have the following high protein value:

Calories in 2 qts. veg. broth:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
179	9	32	220	81	4	15

25. *Cream of Potato Soup.*

Thin potato soup stock as necessary to make proper consistency, add one cup of evaporated milk, ½ teaspoon thyme and salt to taste. Chopped parsley may be used as seasoning instead of the thyme. Use no butter or other fat. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
110	182	508	800	24	23	63
In One Serving:						
14	23	63	100	14	23	63

26. *Cream of Tomato Soup.*

To 1½ pints potato soup stock add 1½ pints strained tomato. Salt to taste, bring to boil. To the hot, but not boiling, tomato soup add one cup of hot condensed milk to which a little salt has been added. Serve at once. Another method to

prevent curdling is to put all ingredients together cold, then heat and serve. Never use soda. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
115	191	366	672	17	29	54
In One Serving:						
19	32	61	112	17	29	54

27. *Cream of Corn Soup.*

To 2 pints potato soup stock add 2 cups canned corn and 1 cup evaporated milk. Add water if necessary to make the soup the proper consistency. Salt to taste. The corn may or may not be put through a colander before adding to soup stock. Number of servings, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
145	237	699	1142	12	21	61
In One Serving:						
14	24	70	114	12	21	61

28. *Cream of Bean Soup.*

Cook ⅔ of a cup of beans. Press through a colander and add, with the bean broth, to 1 pint of potato soup stock. Thin as necessary and add 1 cup evaporated milk. Season with thyme and salt to taste. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
187	196	494	877	21	23	56
In One Serving:						
23	25	62	110	21	23	56

29. *Cream of Pea Soup.*

Make as recipe No. 28, using green peas instead of beans. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
169	187	465	821	21	23	56
In One Serving:						
21	23	58	102	21	23	56

30. *Cream of Celery Soup.*

Cook with the potato stock the tops of one bunch of celery. Strain and add milk as for cream of potato soup. Salt to taste. Cut up celery and cook it separately. Add cooked celery to soup; heat thoroughly and serve. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
125	184	529	830	15	22	63
In One Serving:						
16	23	66	105	15	22	63

31. *Cream of Spinach Soup.*

To 1½ pints of potato soup stock add 1 pint of spinach water. Add one cup of evaporated milk, salt to taste. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
124	178	254	556	23	32	45
In One Serving:						
21	30	42	93	23	32	45

Note—To any of the above soups may be added the water in which any vegetable has been cooked. Various combinations

may be made with many pleasing results in delicious and savory flavors. Beet juice, turnip water, asparagus broth, etc., may be added in varying amounts, depending upon individual preference, and there need be no monotony in the soups served. Cream may be used instead of milk; or, if preferred, the soups may be served without the addition of milk or cream. If served without milk or cream it may be an advantage to thicken them slightly with a cereal as gluten, cream of barley, oatmeal, etc. Left-over cereal may be added to the soups with satisfactory results. In addition to salt, other seasonings as parsley, thyme, bay leaf, sweet basil, etc., may be used. But no fat of any kind need ever be added.

32. *Tomato Bisque.*

2 cups strained tomato, 1 cup water, 1 cup bean broth or potato water, 2 teaspoons peanut butter, rubbed smooth in water, salt.

Put all together and cook well. Salt to taste. Number of servings, 4.

Calories in Recipe if made with bean broth:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
57	51	194	302	18	17	65
In One Serving:						
14	13	48	75	18	17	65

Calories in Recipe if made with potato water:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
45	25	106	176	25	13	62
In One Serving:						
11	6	26	44	25	13	62

33. *Corn Chowder.*

1 medium onion, ¼ teaspoon celery salt, 1 pint bean broth, 3 hard boiled eggs diced, three potatoes diced, 1 pint potato water, 1 cup canned corn, 1 cup strained tomato. Salt to taste, pinch of sage. Add diced potatoes and grated onion to the bean broth and tomato. Cook until potatoes are tender, add rest of ingredients and milk to make 2 quarts. Thicken the milk slightly before adding. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
210	207	497	914	23	23	54
In One Serving:						
26	26	62	114	23	23	54

34. *Vegex Broth.* (Vegex is a vegetable extract obtainable at large grocery houses.)

1 teaspoon Vegex, 1 cup boiling water, mix thoroughly. Serve. Vegex may be added in this proportion to other soups and to gravies and gives a very meaty flavor.

Calories in serving of 5 oz.:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
20	2	—	22	91	9	—

35. *Savora.* A vegetable extract put out by the Battle Creek Health Food Co., Battle Creek, Michigan, may be used as in recipe 34.

(C) Meat Substitutes and Entrees

36. *Bean Croquettes.*

2 cups mashed beans, 1 cup tomato pulp with juice, 1 egg (or more if desired), 1 minced onion, sage, salt, celery salt.

Mix, roll in corn flakes or oven toast crumbs and egg, shape

into patties and bake in oven. Serve with brown sauce or tomato sauce. (See recipes 56 and 57.) Number of croquettes, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
289	150	753	1192	24	13	63
In One Croquette:						
29	15	75	119	24	13	63

37. *Protose Steak*.*

1 onion grated, 2 tomatoes or their equivalent in canned tomatoes, pinch of thyme or sage, salt to taste, 1 egg, ¼ of a pound can of protose, 1 cup of zwieback crumbs.

Put all the ingredients in a dish except the egg and the crumbs. Moisten the crumbs with hot water or hot vegetable broth, beat egg and add to the crumbs, then mix all together well. The whole should be sufficiently moist to mold into patties. Cut the patties through the center and brown in a slightly oiled pan over the fire or bake in the oven. Serve with brown gravy. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
162	133	282	577	28	23	49
In One Serving:						
27	22	47	96	28	23	49

*Protose is a food preparation manufactured by the Battle Creek Health Food Co., Battle Creek, Mich. Its food value approximates that of meat. It may be obtained at any grocery store carrying Battle Creek Sanitarium Foods, or by sending direct to Battle Creek. A like preparation under the name Nut Cero is made by the St. Helena Sanitarium Food Co. Nuttolene is also a meat substitute, put out by the Battle Creek Health Food Co., Battle Creek, Mich.

38. *Protose with Onion.*

1 pound of protose, 1 cup strained tomato, ½ teaspoon salt, 2 large onions, pinch of sage.

Slice the protose and the onion and place in dish in alternate layers. Cover with the strained tomato, add the salt and sage. Bake in a slow oven for an hour or more. Watch carefully and if protose seems dry, add water. Brown sauce may be used instead of tomato, or even with plain water it makes a very savory dish. To obtain best results use plenty of liquid. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
390	267	264	921	43	29	28
In One Serving:						
49	33	33	115	43	29	28

39. *Nut Fillet.*

Nuttolene ½ pound, protose ½ pound, 1 onion, salt, celery salt, sage, brown sauce. (See recipe 56.) Cut in half slices ¼ inch thick. Arrange in an oiled pan a layer each of protose and nuttolene with a slice of onion between, placing nuttolene on the bottom. A toothpick through the center of each layer will hold protose and nuttolene in place. Sprinkle with salt, celery salt and sage. Cover well with brown sauce and bake about ¾ of an hour in a moderate oven. Strained tomatoes or tomato sauce may be used instead of brown sauce. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
353	363	276	992	36	37	27
In One Serving:						
45	46	35	126	36	37	27

40. *Home Made Protose.*

2 cups peanut butter, 2 cups mashed beans, 4 cups water, 3 tablespoons corn starch, 1 teaspoon chopped onion, pinch of sage, salt to taste. Mix thoroughly, steam in double boiler 3 hours, stirring occasionally. Let cool. Run knife around edge and turn out. Cut in slices; may be served cold with tomato sauce or used in any recipe calling for protose. This will make about 3 pounds of protose and 24 servings.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
715	1887	952	3554	20	53	27
In One Serving:						
30	79	40	149	20	53	27

Note—This protose is much higher in fat with less protein than Battle Creek Sanitarium protose. However, it is fairly high in protein and may be used with advantage. Care should be taken that it be served with gravies not too rich in fat.

41. *Cottage Cheese Omelet.*

2 eggs, ½ cup milk, ¼ teaspoon salt, ½ cup cottage cheese.

Add milk and salt to the egg, beat thoroughly. Add cottage cheese and beat again. Bake in a moderate oven 20 to 30 minutes. Number of servings, 2.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
125	182	37	341	36	53	11
In One Serving:						
62	91	18	170	36	53	11

42. *Cottage Cheese and Nut Roast.* (Food Thrift Series No. 2, U. S. Dept. Agriculture.)

1 cup cottage cheese, 1 cup chopped English walnuts, 1 cup bread crumbs, 2 tablespoons chopped onions, juice of ½ a lemon, salt to taste.

Cook the onion slowly in a little water until tender. Mix the other ingredients and moisten with the water in which the onion has been cooked. Pour into a shallow baking dish and brown in the oven. Number of servings, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
295	1044	334	1673	18	62	20
In One Serving:						
30	104	33	167	18	62	20

43. *Boston Roast.* (Food Thrift Series, U. S. Dept. Agriculture.)

2 cups mashed beans, 1 cup cottage cheese, bread crumbs as needed, 2 tablespoons chopped onion, salt, celery salt or sage.

Cook onions in a little water until tender. Add onions and cheese to the beans and bread crumbs to make mixture stiff enough to be formed into a roll. Bake in a moderate oven, basting occasionally with a little oil and water. Serve with tomato sauce. (See recipe 57.) Number of servings, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
380	134	677	1191	32	11	57
In One Serving:						
38	13	68	119	32	11	57

44. *Carrot and Nut Loaf.*

1 cup mashed carrots, 2 eggs, 1 minced onion, ½ cup chopped walnuts, bread crumbs as needed, salt.

Mix thoroughly, adding enough bread crumbs to make it the proper consistency. Bake in oiled pan, slice and serve with tomato sauce. Number of servings, 8.

Calories in Recipe without sauce:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
127	578	193	898	14	64	22
In One Serving:						
16	72	24	112	14	64	22

45. *Egg Plant Croquettes,*

One medium sized egg plant boiled, drained and mashed, 2 (or 3) eggs well beaten, salt to taste. Add bread or cracker crumbs until right consistency to handle. Shape into croquettes, roll in bread or cracker crumbs. Bake in oiled pan. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
141	184	555	880	16	21	63
In One Serving:						
18	23	69	110	16	21	63

46. *Celery and Nut Roast.*

2 eggs, 1½ cups milk, ¾ cup finely chopped nuts, 1 cup chopped celery, 1⅛ cups fine toasted crumbs, 1 teaspoon salt, 1 tablespoon grated onion.

Beat the eggs, add milk, nuts, salt and crumbs, onion and celery. Let stand 20 minutes. Bake in an oiled tin about 30

minutes or until well browned. To remove, turn upside down on a platter and cover with a cloth wrung out of cold water, allowing it to stand a few minutes or until loosened from the pan. Garnish with parsley and serve with parsley sauce or cream sauce. Number of servings, 8.

Calories in Recipe without sauce:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
212	943	356	1511	14	63	23
In One Serving:						
26	118	45	189	14	63	23

47. *Croquettes of Split Peas.* (Food and Cookery—Anderson.)

1 cup mashed peas, ½ cup oven toast crumbs, 2 teaspoons cream.

Put the cream and onion into a small saucepan on the stove and reduce to about one-third. Mix all ingredients well, roll into round balls about the size of an egg and form into oblong croquettes with a knife, having them about 1 inch thick, 1 inch wide, and 1½ inches long. Mark the top with a knife. Brush over lightly with milk or cream and bake on the top grate in a hot oven. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
76	92	277	445	18	21	61
In One Serving:						
13	15	46	74	18	21	61

Note—Croquettes may be made in this way from any legume or from corn.

(D) Vegetables

48. *Browned Potatoes.*

1 quart steamed potatoes (about 6), 1 pint brown sauce. (See recipe 56.) Place potatoes in a dripping pan and cover with brown sauce. Put in the oven and bake 20 to 30 minutes. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
117	17	639	773	15	2	83
In One Serving:						
19	3	107	129	15	2	83

Note—The same recipe may be used, using potatoes raw instead of steamed and baking them until tender. More brown sauce will be needed.

49. *Potato Puffs.* (Manual of Recipes—Washington Sanitarium.)

Add 2 eggs to 1 quart well beaten mashed potatoes, beat well. Drop on oiled tin and brown in hot oven. Number of servings, 8.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
123	295	500	918	13	32	55
In One Serving:						
15	37	62	114	13	32	55

50. *Spinach Souffle.*—(The New Cookery—Lenna Frances Cooper.)

1 cup minced spinach, 3 eggs beaten separately, ⅔ cup of milk, ¼ cup flour, ½ teaspoon salt. Rub flour and salt together, heat the milk and add slowly to the above, stirring to keep

smooth; then add the spinach, add the yolks beaten well, and lastly the stiffly beaten whites. Bake 20 to 30 minutes in a moderate oven. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
136	227	174	537	26	43	31
In One Serving:						
23	38	29	89	26	43	31

51. *Spinach.*

Wash thoroughly. Put to cook, adding very little, if any, water. Watch carefully so it does not scorch, or cook it in a double boiler. Cook 20 to 30 minutes. When done, drain, chop fine, and salt. Serve with lemon, and, if desired, sliced hard boiled eggs. Add no fat. For calories, see page 41.

Another very satisfactory way to cook spinach is to steam it. Do not put directly in steamer, but set in steamer the pan in which it is to be cooked. Cover well, so that steam will come in contact with spinach over sides of smaller pan. Other vegetables may be cooked in this way.

52. *Scalloped Egg Plant.*

1 egg plant, quarter, cook in boiling water until tender. Drain, salt, and beat up with a fork. Add 1 cup of milk, 1 egg and ⅔ cup of oven toast crumbs. Corn flakes or cracker crumbs may be used instead of the toast crumbs. Season with sage if desired. Bake 30 minutes in moderate oven. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
108	164	293	565	19	29	52
In One Serving:						
18	27	49	94	19	29	52

53. *Baked Carrots.*

4 large carrots sliced. Place in baking dish with alternate layers of corn flakes. Cover with milk. Season with salt. Bake in a slow oven about 45 minutes. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
54	99	162	315	16	30	54

In One Serving:

9	16	27	54	16	30	54

Note—For bananas served as a vegetable see recipes 90 and 91.

(E) Gravies

54. *Egg Gravy.*

1 egg, 1½ cups potato water, ½ cup milk or evaporated milk, flour, salt, celery salt. Scramble egg, chop well, add potato water, seasoning and milk. Number of servings, 6.

Calories in Recipe with milk:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
82	93	88	263	32	34	34

In One Serving:

14	15	15	44	32	34	34

Calories in Recipe with evaporated milk:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
97	134	112	343	28	39	33

In One Serving:

16	22	19	57	28	39	33

55. *Nut Gravy.* (Vegetarian Cook Book—E. G. Fulton.)

1 pint water, 1 cup strained tomato, 1 dessert spoon peanut butter, flour as necessary. Emulsify nut butter with tomato, add the water and the rest of the tomato. Thicken with flour. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
37	69	108	214	17	32	51
In One Serving:						
6	11	18	36	17	32	51

56. *Brown Sauce.*

4 potatoes or the parings of 6 potatoes, 2 red onions, 1 tomato, 3 tablespoons flour, salt, sage, juice of ½ lemon.

Scrub the vegetables thoroughly, do not peel, cut up and cook as for potato soup stock, recipe 24. Strain off 1 pint (or more) of the broth for the brown sauce. (Use the remainder, after straining through a colander, for soup.) Brown the flour in the oven or in a dry pan over the flame. Rub it smooth with water and thicken the vegetable broth. Add the juice of ½ lemon, a pinch of sage, salt to taste. Other vegetable broths or simply potato water may be used in the preparation of this gravy. The addition of a little cereal coffee will deepen the brown color. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
57	11	105	173	32	7	61
In One Serving:						
9	2	17	28	32	7	61

57. *Tomato Sauce.*

1 pint strained tomatoes, 1 tablespoon minced onion, flour browned as in recipe 56. Cook tomato and onion together 20

minutes, strain, thicken with the browned flour. Season with salt. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
33	59	142	234	14	25	61
In One Serving:						
5	10	24	39	14	25	61

58. *Olive Sauce.*

12 ripe olives, 2 cups brown sauce. Chop olives and stew slowly 2 or 3 hours. Add to brown sauce. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
52	214	135	401	13	54	33
In One Serving:						
9	36	22	67	13	54	33

59. *Vegex Gravy.* (See page 186.)

Add vegex to any gravy in the proportion of 1 teaspoonful of vegex to 1 pint of gravy.

(F) Salads

60. *Grape Salad.*

1 cup white grapes, ⅓ cup blue grapes, 1 cup sliced pineapple, 1 egg, marshmallows as desired, ½ cup fruit juice.

Seed grapes, remove skins from white grapes. Thicken ½ cup fruit juice and add to beaten egg and pour over grapes and pineapple. Section marshmallows and add to salad just before serving. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
31	65	220	325	9	20	71
In One Serving:						
5	11	38	54	9	20	71

61. *Fruit Salad.*

1 apple, 2 oranges, 2 bananas, 1 can pineapple, ½ cup of chopped nuts.

Cut up the fruit and mix, together with the chopped nuts. Add pineapple juice which will serve as a dressing, (or omit pineapple and add cream dressing). Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
69	397	471	937	7	42	51
In One Serving:						
11	66	79	156	7	42	51

62. *Apple and Celery Salad.* (Manual of Recipes, Washington Sanitarium.)

2 apples, ½ cup celery, cream dressing or golden dressing. Dice apples, chop celery, mix and add dressing. Number of servings, 6

Calories in Recipe without dressing:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
4	11	120	135	4	9	87
In One Serving:						
1	2	20	23	4	9	87

63. *Carrot and Cottage Cheese Salad.*

1 cup ground or grated carrots, ⅓ cup chopped nuts, ½ cup cottage cheese, juice 1 large lemon, salt to taste. Mix thoroughly. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
106	357	119	579	19	61	20
In One Serving:						
18	59	20	97	19	61	20

64. *Tomato and Lettuce Salad.*

3 tomatoes, 1 large head lettuce. Shred the lettuce and slice the tomatoes. Arrange in alternate layers in salad dish and cover with cream dressing. (See recipes 73 and 74), or with lemon dressing. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
40	487	174	701	6	69	25
In One Serving:						
7	81	29	117	6	69	25

65. *Cabbage Salad.*

1 medium cabbage shredded. Serve with cream dressing. (See recipes 73 and 74.) Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
62	224	109	395	15	58	27
In One Serving:						
10	37	18	65	15	58	27

66. *String Bean Salad.*

2 cups cooked string beans, let stand for one hour in lemon juice. Drain and serve with French salad dressing or Mayonnaise. Number of servings, 6.

Calories in Recipe without dressing:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
10	10	30	50	20	20	60
In One Serving:						
2	2	5	9	20	20	60

67. *Italian Salad.* (Food and Cookery—Anderson.)

1 cup cooked macaroni cut into small rings, ½ cup diced celery, ⅔ cup finely diced raw carrots, ½ cup cooked green peas, 2 teaspoons grated onion, mayonnaise. Mix all ingredients. Season with mayonnaise; serve on lettuce leaf. Number of servings, 6,

Calories in Recipe without mayonnaise:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
65	14	287	366	18	4	78
In One Serving:						
11	2	48	61	18	4	78

68. *Raw Vegetable Salad.*

Use any combination of raw vegetables, chopped or cut into small cubes. Mix with mayonnaise or cream salad dressing or lemon juice and salt. Any or all of the following may be used: Carrots, turnips, beets, radishes, cabbage, lettuce, potatoes, celery, onion, parsley, cucumber, tomato.

Calories in One Serving (approximately) without dressing:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
7	4	24	35	20	11	69

69. *Tomato Jelly.* (The New Cookery—Lenna Frances Cooper.)

1 can tomatoes, 3 bay leaves, 1 medium onion, 1 teaspoon salt, ½ cup lemon juice, ⅓ box vegetable gelatin (¼ oz.), 1 cup boiling water, 2 tablespoons sugar.

Put the tomatoes with the seasoning to cook until reduced ⅓. Then rub through colander. Prepare the vegetable gel-

atin by soaking in warm water about 20 minutes, draining and cooking 8 to 10 minutes in 1 cup of boiling water. When cooked and strained add to the tomatoes, turn into molds and set in a cool place. It may be cut into cubes or other shapes if desired and used as a garnish, or may be served as a salad with mayonnaise dressing. Number of servings, 12.

Calories in Recipe without mayonnaise:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
45	17	326	388	12	3	85
In One Serving:						
4	1	27	32	12	3	85

70. *Cucumber Jelly.* (The New Cookery—Lenna Frances Cooper.)

1¾ cups cucumber pulp, ⅓ package vegetable gelatin (¼ oz.), ¼ cup lemon juice, 1 cup water, ½ teaspoon salt, few drops of lemon juice.

To prepare the cucumber pulp, peel the cucumbers and grate them; strain through a colander, pressing through as much liquid as possible; add the lemon, onion juice, and salt. Prepare the vegetable gelatin as for tomato jelly and cook in 1 cup boiling water 5 to 10 minutes. Strain and add to the juices. Turn into molds wet with cold water and let stand until firm. Serve in a lettuce leaf, with or without mayonnaise. Number of servings, 6.

Calories in Recipe without mayonnaise:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
7	4	53	64	10	10	80
In One Serving:						
1	1	8	10	10	10	80

(G) Salad Dressings

71. *Mayonnaise Dressing.*

2 egg yolks, juice of 1½ lemons, a little grated onion, olive oil or salad oil as needed (about 1 cup). The ingredients should be cold, having been on ice if possible.

Pour oil into egg yolks very slowly at first, *drop by drop,* beating constantly. Keep adding oil until eggs are very stiff, then add 1 teaspoon salt, the lemon juice and grated onion or onion juice. If yolks and oil separate, add the beaten whites. Otherwise the whites need not be used unless desired. Calories in Serving of heaping teaspoon:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
—	50	—	50	—	100	—

72. *French Dressing.*

2 teaspoons lemon juice, 2 tablespoons olive oil, salt, grated onion or ¼ teaspoon onion juice. Number of servings, 8 or 1 teaspoon each.

Calories per Teaspoon:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
—	34	—	34	—	100	—

Note—This dressing is very nice omitting the oil.

73. *Cream Dressing.* No. 1.

½ cup cream, 1 teaspoon sugar, ¼ teaspoon salt, 2 lemons. Beat cream, add sugar, salt, then lemon juice. Beat well. Evaporated milk may be used instead of cream. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
12	204	79	295	4	69	27
In One Serving:						
2	34	13	49	4	69	27

74. *Cream Dressing.* No. 2.

½ cup thick cream, 1 egg yolk, juice of 2 lemons, 1 teaspoon sugar, ½ teaspoon salt.

Boil the yolk for 20 minutes, or until quite mealy. Break up with a fork and add to cream. Press through a fine sieve. Add sugar and salt; last of all add the lemon juice, a few drops at a time, beating the cream with a fork. If the cream is thin add two tablespoons evaporated milk; or all evaporated milk may be used instead of cream. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
7	477	70	554	1	86	13
In One Serving:						
1	79	12	92	1	86	13

75. *Golden Dressing.*

2 eggs, ¼ cup light colored fruit juice (orange, apple or pineapple), ¼ cup sugar, ¼ cup lemon juice. Beat the eggs slightly to blend, but not until foamy, and add fruit juice, lemon juice and sugar. Stir constantly in a double boiler until it begins to thicken. Cool and serve. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
50	100	260	410	12	24½	63½
In One Serving:						
8	16	43	68	12	24½	63½

(H) Desserts

76. *Cereal Pudding.*

1 cup cooked oatmeal or other leftover cereal, ½ cup Karo syrup, ½ cup nuts, 1 egg or more if desired.

Put all together in a double boiler; when smooth turn into

an oiled pan and bake ¾ of an hour. Serve with lemon sauce. Number of servings, 6.

Calories in Recipe without sauce:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
93	432	604	1131	8	38	54
In One Serving:						
15	72	101	188	8	38	54

77. *Lemon Sauce* (Vegetarian Cook Book—E. G. Fulton).

1 cup sugar, 1 egg, 1 lemon, ¾ cup boiling water.

Put grated rind and the juice of lemon with the sugar; add the beaten egg; add the boiling water just before serving. Cook slowly, do not boil. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
25	50	855	930	3	5	92
In One Serving:						
4	8	142	155	3	5	92

78. *Farina Mold.* (Manual of Recipes—Washington Sanitarium.)

4 cups water, 1 cup farina or cream of wheat, ½ cup sugar, pinch of salt, flavoring as desired.

Cook farina 1 hour in double boiler, add sugar, salt and flavoring. Pour into molds, chill, serve with fruit juice. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
57	17	820	894	6	2	92
In One Serving:						
9	3	137	149	6	2	92

79. *Fruit Sauce.*

1 cup red fruit juice, ⅓ cup sugar, ¼ cup lemon juice, corn starch. Heat fruit juice and lemon juice together, add sugar and thicken with corn starch. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
—	—	520	520	—	—	100
In One Serving:						
—	—	87	87	—	—	100

80. *Corn Starch Pudding* (without milk).

1 quart water, 3 tablespoons corn starch, salt, 1 cup sugar, 3 eggs. Flavoring as desired.

Put 1 quart of boiling water in double boiler, add the corn starch rubbed smooth. Salt to taste. Cook until clear. Add sugar, remove from fire, beat in quickly the well beaten yolk, add the whites beaten stiff. Beat well, add flavoring. Number of servings, 12.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
75	150	954	1179	6	12	82
In One Serving:						
6	12	80	98	6	12	82

81. *Prune Whip.*

2 cups prune puree, 2 eggs, 1 tablespoon sugar, or as desired, ½ cup nuts, flavoring as desired. Add the yolks and nuts to the prune puree, flavor and sweeten, stir well, then fold in the

beaten whites of the eggs, reserving enough of the latter with which to garnish. Number of servings, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
111	498	621	1230	11	49	40
In One Serving:						
11	50	62	123	11	49	40

Calories in Recipe if nuts are omitted:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
63	—	587	750	8	13	79
In One Serving:						
6	—	59	75	8	13	79

82. *Strawberry Fluff.* (Vegetarian Cook Book — E. G. Fulton.)

2 egg whites, 1 pint strawberries, ¾ cup sugar.

Mash strawberries with the sugar and add to the unbeaten whites. Beat until light and foamy. Number of servings, 6.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
64	20	134	818	8	2	90
In One Serving:						
11	3	22	136	8	2	90

83. *Banana Snow.* (Food and Cookery — Anderson.)

½ cup banana pulp, 1 tablespoon sugar, 2 teaspoons lemon juice, a few drops vanilla, 1 egg white.

Mix and beat with wire egg whip until very light. Put on a sauce dish. Garnish with red strawberries or jelly. Number of servings, 2.

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
30	5	148	183	16	3	81
In One Serving:						
15	2½	74	91	16	3	81

84. *Vegetable Gelatin.* (Agar Agar.)

How to prepare vegetable jelly: Soak 1 ounce vegetable gelatin in warm water for an hour. Drain and add to 1 quart of boiling water. Let boil about ten minutes, or until clear. Strain through a cheese cloth and it is ready to use. Much to be preferred to animal gelatin.

85. *Orange Jelly.* (Food and Cookery—Anderson.)

1¼ cups orange juice, ⅓ cup water, ½ cup sugar, 3 tablespoons lemon juice, 1 cup vegetable jelly (see above). Mix all cold ingredients, add the vegetable jelly. Mix well and pour into molds. Add a few thin slices of orange. When cold serve with a little red fruit juice around each mold. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
—	—	585	585	—	—	100
In One Serving:						
—	—	97	97	—	—	100

86. *Fruit Mold.*

1¾ cups of berry or other fruit juice, sweetened to taste, 3 tablespoons lemon juice, 1 cup vegetable jelly. Mix and pour into molds immediately. Number of servings, 6.

Calories in Recipe:				Percent	Percent	Percent
Prot.	Fat.	Carbo.	Total.	Prot.	Fat.	Carbo.
—	—	355	355	—	—	100
In One Serving:						
—	—	59	59	—	—	100

Note—Nuts, sliced fruit, raisins, etc., may be added to this recipe, making a very delightful variation.

87. *Cake Without Baking Powder.*

4 eggs, 1 cup sugar, 1 cup sifted flour, 1 teaspoon lemon juice, pinch of salt. Separate eggs, add ½ of the sugar to the yolks, lemon juice and salt. Beat until foamy and the sugar is dissolved. Then beat whites until stiff and add the other half of the sugar to the whites. Beat, add the yolk mixture to the white mixture, folding them into each other. Then fold in the flour very carefully. Bake 20 minutes in a slow oven. Number of servings, 16.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
163	215	1280	1658	10	13	77
In One Serving:						
10	13	80	103	10	13	77

Note—The above may be used as a basis for nut or layer cake.

88. *Cocoanut Dropcakes.*

Whites 2 eggs, ½ cup sugar, ½ cup shredded cocoanut, 2½ cups cornflakes. Add salt to egg whites and beat stiff. Add sugar gradually, beating well. Then carefully fold in the cornflakes and the cocoanut. Drop from a spoon onto oiled pan and bake ½ hour in a slow oven. Number of dropcakes, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
142	290	1144	1576	9	18	73
In one dropcake:						
14	129	114	158	9	18	73

89. *Caramel Pudding.* (Mrs. W. D. Gibson of Pasadena Study Club.)

2 cups brown sugar, 2 cups water, 2 tablespoons cornstarch, ½ cup nuts, pinch salt, teaspoon vanilla. Add sugar to water, boil 5 minutes and thicken with cornstarch. When thick add nuts and pour into molds to cool. Serve with whipped cream or any other pudding sauce desired. Number of servings, 10.

Calories in Recipe:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
53	465	966	1484	4	31	65
In One Serving:						
5	46	97	148	4	31	65

90. *Baked Bananas.*

Select ripe, firm bananas. Bake in the skins in a slow oven until tender. May be used as a vegetable.

Calories:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
6	7	123	136	4	5	91

91. *Banana Croquettes.*

Peel and scrape the banana; roll in an egg, beaten and mixed with four tablespoons of milk. Then roll in sifted bread crumbs. Brown in skillet or bake in oven. May be served as a vegetable.

Calories:

Prot.	Fat.	Carbo.	Total.	Percent Prot.	Percent Fat.	Percent Carbo.
12	18	120	150	8	12	80

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