Notes on Dietetics

Edward H. Risley M.D.
College of Medical Evangelists

Harold M. Walton
College of Medical Evangelists
NOTES
ON DIETETICS

Edward H. Risley, M. D.
and
Harold M. Walton, Dietitian

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Food

"Any substance that being taken into the body of animal or plant serves through organic action to build up normal structure or supply waste of tissue."

There are three general classes of foods as follows:

2. Energy-producing, for fuel.

Purpose of Eating

Food, as stated in the above definition is designed to supply power by which the body can accomplish its work. Many people little realize the importance of carefulness in eating; many eat to please the taste rather than to keep up health and strength. We should "eat to live," and not live to eat." "It is wrong to eat merely to gratify the appetite."

In this country a greater number of people overeat rather than eat too little, and the old statement that "we Americans dig our graves with our teeth" is not far from the truth in a good many cases. Dr Osler has made clear his idea about the relation of eating to health when he says, "Ninety per cent. of all conditions, outside of acute infections, contagious diseases and traumatisms are directly traceable to diet."

Nutrition

The whole process of taking and utilizing food is included in this term. For convenience of study, the subject may be subdivided into several sub-heads as follows:

1. Digestion.
2. Absorption.
3. Assimilation.
4. Excretion.

Source of Foods

There are two great sources of food in nature:

1. Animal, represented by such foods as milk, eggs, meats, and butter.
2. Vegetable, such as fruits, grains, nuts and vegetables.
How the World is Fed

The problems involved in supplying the world with food are of the very greatest interest and of practical value for the consideration of the student of dietetics. The factors which have made possible the feeding of so many people with such a variety of food at all seasons are largely the following:

1. Transportation.
2. Variation in plant products.
3. Factory production of foods.
4. Storage methods.

Variation in Kind of Food

Certain factors modify to a marked extent the need for variation in the food supply. The chief points worthy of consideration are as follows:

1. Climatic conditions.
2. Work.
3. Habits of life.
5. Age.
7. Individual characteristics.
8. Kind of food.

Original Diet

It seems of the greatest importance for one who takes up the study of dietetics to consider carefully the diet that was originally best suited for the maintenance of human beings. No text is able to give accurate data upon this subject except the Bible. This book gives well defined information in Genesis 1:29. "And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in which is the fruit of a tree yielding seed; to you it shall be for meat."

After the curse had rested upon the earth the program was modified to include the green herb. (Genesis 3:16). Still later, after the flood, man was given permission to use flesh foods.

"In choosing man's diet in Eden, the Lord showed what was the best diet; in the choice made for Israel He taught the same lesson." M. of H. p. 311

In this connection it is of interest to calculate the age of man during these various periods. The average age as given in Genesis 5, is 912 years. In Genesis 11, after the above change had been brought about and was beginning to take effect, the average had decreased to 332 years. Today, after centuries of decadence and decline the average is at most between 40 and 50 years.
Again, in the time of Israel, God had another opportunity to demonstrate the best diet. They were given manna which is spoken of in the Bible as "Angel's food." In Israel's experience we also see the evils of flesh as food. They longed for the flesh pots of Egypt and when they were finally given a chance to try it out it was with great disaster to their health. Daniel's experience illustrates the great blessing that comes from following God's plan in regard to diet.

The following quotations from Ministry of Healing are useful here:

1. "Grains, fruits, nuts and vegetables constitute the diet chosen for us by our Creator. (p.296)

2. "Flesh was never the best food; but its use is now doubly objectionable, since disease in animals is so rapidly increasing." (p. 313)

3. "The diet appointed for man in the beginning did not include animal food. Not until after the flood, when every green thing on the earth had been destroyed, did man receive permission to eat flesh. (p. 311)

Simplicity in living is being recognized more and more as the best plan and particularly is this true in connection with diet. There are able advocates of both the vegetarian and lacto-vegetarian diets at the present time. Dr. McCollum says, "Lacto-vegetarianism should not be confused with strict vegetarianism. The former is, when the diet is properly planned, the most highly satisfactory plan which can be adopted in the nutrition of man."

Dr. Hindhede, the famous Danish Dietitian says, "The ideal regimen is milk, bread, potatoes, and fruit."

Dr. Elmer Lee says, "The truth is man's fit, proper and natural diet is plant and vegetable foods. Oysters, fish, poultry, meat, eggs, milk, cream, butter, cheese, game, are unfavorable foods. If used at all they should be used sparingly."

Dr. Wiley says that his diet as a boy was composed largely of corn meal, whole wheat bread, milk and sorghum molasses. He states further that this diet was a good one.
1. **Relation of Diet to Disease:**— Examples as Follows—

- Chronic diseases such as Nephritis and Arteriosclerosis.
- Impoverished diet. Pellagra & Rickets. (osis.
- Deficiency diseases as Scurvy and Beriberi.
- Diseases of Metabolism, Gastrointestinal diseases.

2. Diet is one of our fundamental methods in the treatment of disease.

3. Dietetics is an economic problem of the world.

4. Research work is pointing strongly toward the importance of diet problems.

5. Proper diet builds for efficiency in work.

6. Poor diet lowers resistance, giving better chance for contracting disease such as tuberculosis.

7. Diet has a marked bearing upon the acute diseases, many of which are directly due to dietary indiscretions. It is said that over 3,000,000 people are constantly on the sick list, much of which is due to diet.

8. Our work is educational in character. The Health Reform Movement is an important part of the Message we are carrying to the world.

### Chapter II

#### Classes of Foods

<table>
<thead>
<tr>
<th>General Classification</th>
<th>A. Organic-</th>
<th>1. Nitrogenous:</th>
<th>Proteins</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Non-Nitrogenous:</td>
<td>Fats, Oils, Carbohydrates</td>
<td></td>
</tr>
<tr>
<td>B. Combined Organic &amp; Inorganic:</td>
<td>1. Hemoglobin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Lecithin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Inorganic:</td>
<td>1. Mineral Salts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Oxygen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Proteins**

The word protein means "of first importance." In looking at the function of this material in the body one is at once convinced that this is a very appropriate term for the materials belonging to this class.

Proteins are composed of the chemical elements—carbon, hydrogen, nitrogen, oxygen, sulphur, phosphorus, and iron. The last three are not constant constituents. These elements are first grouped into smaller compounds called amino acids which are then united together in chains as cars in a train to form the full protein molecule. Proteins are colloidal in character, they do not diffuse through animal membranes and have molecules of very large size.

They yield tissue-building material and can also furnish energy for work but they are not as satisfactory for this latter purpose as are the fats and carbohydrates. The energy yield is the same as for the carbohydrates, namely 4.1 calories per gram or 116 per ounce of pure material.
Classification of Proteins.

The American Classification is the one most useful to the student and as here given is an abbreviated form, however, sufficiently full to answer for ordinary study:-

I. Simple Proteins
1. Albumins, e.g. ovalbumin, serum albumin.
2. Globulins, e.g. serum globulin, vegetable globulin
3. Gluteins, e.g. glutenin
4. Albuminoids, e.g. elastin, collagen, keratin.
5. Prolamins, e.g. zein, gliadin, hordein.
6. Histones, e.g. globin, thymus histone.
7. Protamins, e.g. salmine, sturne, clupeins.

II. Conjugated Proteins
1. Nucleoproteins, e.g. cytoglobulin, Nucleohistone.
2. Glycoproteins, e.g. mucin, mucoids.
3. Phosphoproteins, e.g. casein, ovovitellin.
4. Hemoglobins, e.g. hemoglobin, hemocyanin.
5. Lecithoproteins.

III. Derived Proteins
(a) Primary
1. Proteoses, e.g. protoproteose, deuteroproteose.
2. Metaproteins, e.g. acid and alkaline albuminate.
3. Cogulated proteins, e.g. coagulated egg.

(b) Secondary
1. Proteoses, e.g. protoproteose, deuteroproteose.
2. Peptones, e.g. antipeptone, amphopeptone.
3. Peptides, e.g. di, tri, tetra, pentapeptides.

Special Properties of Proteins

Coagulate upon the application of heat.
Precipitate when treated with certain metallic salts.
Give a number of characteristic color reactions.
Vary a great deal in solubilities.
Contain from 15 to 18 kinds of amino acids with as many as 120 individual acids in a single molecule.
Unstable in presence of bacteria, often yielding toxic products on bacterial decomposition. Somewhat variable in ability to nourish the body because of variation in amino acid content, for example:-

Zein has no glycocoll, lysin, or tryptophane.
Casein has no glycocoll.
Gelatin lacks cystin, tyrosin and tryptophane.
Gliadin lacks lysin.
Hordein lacks lysin.

These are simple illustrations of how the body may not be fully nourished when certain of these acids are lacking in the food intake.
The enzymes pepsin, trypsin and erepsin break the protein molecule into its individual amino acids which are absorbed as such and are then carried in the bloodstream from which they are picked out as needed by the various tissues.

It is the building and repair material for the working tissues of the animal organism. It also yields energy when oxidized, chiefly through its carbohydrate moiety. Not all proteins are capable of supplying complete nutrition on account of the lack of certain important constituents (amino acids) as above stated.

The following proteins are examples of those which promote growth because they contain lysin and other essential amino acids.

- Casein of milk
- Excelsin of the Brazil nut
- Ovalbumin of egg
- Glutenin of wheat
- Glycinin of soy beans

The following proteins are examples of those which will not allow good growth because of deficiency in composition.

- Hordein of barley
- Legumen of peas
- Gelatin of horn
- Zein of maize

The character of protein is also of importance in other ways as well, since some proteins seem to be able to give a greater return to the body than others. It has seemed that animal proteins such as those of eggs, milk and meat are more capable of supplying the body needs than are the proteins of vegetable origin. Some of this is undoubtedly due to greater difficulty of digestion as many of the vegetable products are held in a more or less resistant cellulose capsule and that thorough disintegration must be necessary before the digestive juices can attack them properly.

Fats

Has the elements carbon, hydrogen and oxygen. The fat molecule is composed of glycerine and fatty acids.

When pure, fats are odorless, tasteless, and usually colorless. They produce a grease spot on paper. They are insoluble in water, salt solutions, dilute acids and alkalis, but are readily soluble in ether, chloroform, benzene, and hot alcohol.
Dietetics

Fresh fats are neutral in reaction but upon standing for some time in contact with air they become rancid and then give a feeble acid reaction.

Classification of Fats

Fatty substances are classified under the general heading of lipins as follows:

1. Fats and fatty acids. Stearin and stearic acid.
2. Fatty oils
   a. Drying. Linseed oil.
3. Essential oils. Oil of cloves, oil of wintergreen.

Not all of these classes are of interest as foods. The first two groups enter most commonly into the food problem.

Special Properties of Fats

The various fats have individual melting points which help in their indentification.

Some fats are not fully saturated and by proper methods can be made to take on more hydrogen. This gives what is called the hydrogen number which helps in the characterization of some fats. The hydrogenation of fats has now come to be a process of commercial value. The unstable, unsaturated vegetable oils can by this process be converted into fairly stable solid fats of lard-like consistency.

Fats when boiled with alkali undergo a process called saponification, soap being formed and the glycerine is set free. The amount of alkali required to satisfy a gram of fat is called the saponification number.

The degree of saturation of a fat cam also be expressed by what is called the iodine number, iodine being taken on by the unsaturated bonds of the molecule.

By breaking up the fatty molecule by the process of hydrolysis some fats are found to contain volatile fatty acids, butter is such a fat. The determination of the amount of volatile fatty acid gives the Reichert-Meissl number. Certain fats such as butter and cod liver oil contain nutritive materials of special interest, vitamins. This gives fats a special significance as food.
## Digestion of Fats

Fats are digested in the stomach to a limited extent but the greater part of their digestion is carried out in the small intestine by steapsin, the lipase of the pancreatic juice which is activated by the bile. The change which is brought about by this enzyme is the breaking up of the fat into fatty acid and glycerine, some of the fatty acid is also converted into soap by the alkali of the intestinal juices. The fatty acids, glycerine and soaps are then absorbed and as they are absorbed they are again converted to neutral emulsified fat and appear as such in the circulation.

## Value of Fat to the Body

Fat performs several very important functions in animal nutrition. It is primarily a source of heat and energy and is of such a character that it can be stored in the tissues as a reserve of energy in large amounts. Fat also gives protection and shape to the body.

When oxidized in the organism, fat gives 9.3 calories per gram or 264 per ounce of the pure product.

Fat may be formed and stored in the tissues from all three classes of foods; protein, fat and carbohydrate.

Certain fats also supply the fat-soluble A vitamin which is of the very greatest importance to the normal nutritive processes.

## Carbohydrates

Carbohydrates have the elements carbon, hydrogen, and oxygen. The hydrogen and oxygen of the molecule is usually in the proportion to form water. Many of the carbohydrates are crystalline and sweet, but some are amorphous and insoluble. The molecule is either an aldehyde or a ketone form of the polyatomic alcohols.

These compounds are readily classified into the following groups:

I. Monosaccharides
   1. Pentoses; Xylose, Arabinose.
   2. Hexoses; Dextrose, Levulose, Galactose.

II. Disaccharides
   Sucrose, Maltose, Lactose.

III. Trisaccharides
   Raffinose.

IV. Polysaccharides
   Starch, Dextrin, Gums, Glycogen, Cellulose.

There are scores of other products which belong to the carbohydrate class of compounds but these are the ones of most interest in the way of foods.
Special Properties of Carbohydrates

Most of the carbohydrates are active chemically as reducing agents, this power being best seen in connection with their action in the metallic hydroxides such as those of copper and bismuth. Both of these metals are reduced to their lower oxides or even to the free metal in some instances. The higher members of the group are broken down to the lower by boiling with acids.

The character of the carbohydrates varies somewhat as to their usefulness in the body. Lactose being especially useful in early life since it has a constituent, galactose, which is an essential in the building of certain parts of the nervous system in that period of growth.

Digestion of Carbohydrates

Some of these compounds are already to be absorbed, but the other forms need to be broken by the enzymes of the saliva, pancreatic and intestinal juices into the monosaccharide forms, especially glucose, before they can be utilized.

Use of Carbohydrates

These foods are the most useful source of energy and make up more than half of the total calories used in the production of body energy. Carbohydrates can also be stored to a limited extent in the liver and muscles as a reserve fuel supply which can be called upon when food is not at hand to keep up the regular requirement.

Carbohydrates yield 4.1 calories per gram or 116 per ounce of the pure material.

Normally the body can tolerate a large quantity of this foodstuff but in case of diabetes the tolerance is greatly reduced so that in some cases no carbohydrate can be used at all.
Inorganic Salts of the Body

Salts of the body are of the most simple character. Might expect to find some rare powerful elements but they are the most common of nature.

Metals present are Calcium, Magnesium, Potassium, Sodium and Iron. These are combined in the form of salts with some of the most common acid radicals such as the phosphate, sulphate, carbonate and chloride.

These compounds occur in rather small amounts as follows:- Protoplasm has about 1.00%, muscle as much as 3.00%, and the entire body as much as 5-6%. The bones add very materially to the amount since they have a high percentage. These salts are found in some cases free as sodium chloride in the blood, but in many other cases they are definitely united in the tissues as a chemical compound with the organic structure of the organ in which they were found.

Amounts of Salts Needed

This is a subject that is not fully understood as yet, but we have some ideas in regard to a few of them. It is said that we need about .67 gram of calcium, .015 gram of iron, 1.44 grams of phosphorus, and 5.00 grams of sodium chloride for the same period.

The need for these essential foods has not been fully appreciated in the past, but at the present time an increased knowledge is calling for greater care in the selection of food so as to include these products with the other essentials.

It is being appreciated more and more that some of the prepared foods on the market are partially robbed of these essentials in the process of preparation, this is well seen when the composition of white flour is compared with that of the original wheat and polished rice is checked against the original product:

<table>
<thead>
<tr>
<th></th>
<th>Per cent. Ash</th>
<th>Per cent Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Wheat</td>
<td>1.75</td>
<td>White Flour</td>
</tr>
<tr>
<td>Unpolished Rice</td>
<td>1.00</td>
<td>Polished Rice</td>
</tr>
</tbody>
</table>

Use of Salts in the Body

The tissues are constantly being bathed in the nutritive fluids of the body and these are not capable of keeping the tissues in normal activity when the minerals are not present, this can be very well illustrated by the use of a frog's muscle in the laboratory. So long as the muscle is bathed with salt solution of proper concentration it will continue to contract but when not so treated it will very quickly lose its contractile power entirely.
These salts are also constituents of the body digestive juices and must be supplied in order that these chemical agencies may be kept active. The inorganic constituents of the food ingested also has much to do with normal control of tissue reaction, i.e., they prevent too great an increase of acid over base or base over acid and thus maintain tissue reaction at its normal point. The carrying of carbon dioxide is made possible by the presence in the blood of the alkali carbonates and it is their proper balance that maintains normal eliminative power for this waste product.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Per cent. in Human Body</th>
<th>Per cent. in Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>66.0</td>
<td>49.85</td>
</tr>
<tr>
<td>Carbon</td>
<td>17.5</td>
<td>.19</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>10.2</td>
<td>.97</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>2.4</td>
<td>trace</td>
</tr>
<tr>
<td>Calcium</td>
<td>1.6</td>
<td>3.18</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>.3</td>
<td>trace</td>
</tr>
<tr>
<td>Potassium</td>
<td>.4</td>
<td>2.33</td>
</tr>
<tr>
<td>Sodium</td>
<td>.3</td>
<td>2.33</td>
</tr>
<tr>
<td>Chlorine</td>
<td>.3</td>
<td>.20</td>
</tr>
<tr>
<td>Sulphur</td>
<td>.2</td>
<td>trace</td>
</tr>
<tr>
<td>Magnesium</td>
<td>.05</td>
<td>2.11</td>
</tr>
<tr>
<td>Iron</td>
<td>.005</td>
<td>4.12</td>
</tr>
<tr>
<td>Iodine</td>
<td>trace</td>
<td>trace</td>
</tr>
<tr>
<td>Fluorine</td>
<td>trace</td>
<td>trace</td>
</tr>
<tr>
<td>Other Elements</td>
<td>traces</td>
<td>1.00%</td>
</tr>
<tr>
<td>Silicon</td>
<td>-----</td>
<td>26.03</td>
</tr>
<tr>
<td>Aluminum</td>
<td>-----</td>
<td>7.28</td>
</tr>
<tr>
<td>Titanium</td>
<td>-----</td>
<td>.41</td>
</tr>
</tbody>
</table>

* Includes about 70 elements.

The body is made up quite largely of water; over 60% of its structure being composed of this constituent. An individual can live for weeks without food but without water life will cease in from 3 to 5 days. Water is the universal solvent and is the vehicle by which all the processes of the body are carried forward. The average individual needs about 6 glasses of water per day and it is better not to drink too freely at meals. A little care will enable one to do most of his drinking at a time when he will not be tempted to use it as a wash to get his food down quickly.
Properties of Water

Water is odorless and if absolutely pure is tasteless, yet most of the water we commonly drink does have some taste due to dissolved salts and gases. Water suitable for drinking purposes should be clear, colorless, of an agreeable taste, should not be too hard, free from poisonous minerals and organic matter and also free from the bacteria of disease.

Water is classified as hard or soft according to the amount of dissolved minerals. Hard water is not as good to drink unless the hardness is limited in amount. The hardest waters are those which come from deep wells, while the softest water is distilled or rain water.

Water is very easily contaminated and it is one of the most common avenues by which such diseases as typhoid fever and cholera are transmitted. If there is any doubt at all about the character of drinking water it should be put through some method of purification, the simplest of these and at the same time the most reliable in the home is boiling. The small filters which are attached to water faucets are unreliable and dangerous for they give one a false security which is worse than none. Purification on a large scale is best done by the large filtration plants, particularly the sand filter which is able to remove all harmful bacteria.

Mineral Waters

There are numerous waters on the market having more or less mineral matter which is claimed to be of medicinal value. In most of these cases the good that is experienced is largely due to regularity in drinking and on the combination of other conditions which go along with the plan for treating cases at such resorts. It is true that some waters contain purgative salts which by keeping elimination up, undoubtedly help to improve the patient's condition.

Classification of Mineral Waters:

1. Carbonated  
2. Sulphureted  
3. Alkaline  
4. Saline  
5. Chalybeate  
6. Acid  
7. Thermal
Vitamins

Recent research work has shown that most natural foods contain food elements in addition to protein, fat, carbohydrates and inorganic salts which are of very great importance in the maintenance of nutrition. These are called vitamins. The greater part of our knowledge of them has developed since the year 1910, although previous to that year some suggestive points had been observed.

The chemistry of vitamins has not been worked out as yet. This is quite largely due to the fact that they occur in such minute quantities in foods and also that they are other unstable substances, being destroyed possibly by some of the methods used in their separation. The presence of vitamins in foods has been proven by the use of the biological method of study, i.e., by the use of feeding experiments with animals.

Classification of Vitamins

The following grouping of vitamins seems to be the one most satisfactory up to the present time:

1. Fat Soluble A, sometimes called the antirachitic factor. It is necessary for the promotion of growth in young animals. When lacking in the diet, growth is interfered with and a condition of sore eyes called Xerophthalmia is developed in animal experimentation. The best sources of this vitamin are the green leaves of vegetables and certain fats of animal origin.

2. Water Soluble B, also called antineuritic or antiberiberi factor. This vitamin is also necessary for the maintenance of proper growth in young animals. When this constituent is lacking in the food, failure of nutrition occurs with the development of nervous manifestations of the neuritic type. This vitamin is found especially in yeast, in the outer coat of grains and in eggs.

3. Water Soluble C, also called antiscorbutic vitamin, since it is the factor which apparently controls scurvy. The best sources of this product are fresh vegetables and fruits.

There has been considerable variation in opinion as to how vitamins should be named, but the above system seems to be the most practical and on the whole is the most widely accepted by research men.
It is now understood that fat soluble A and water soluble B are fairly stable substances. They are very little affected by ordinary processes of food preparation except where alkalies are used. Water soluble C is damaged more or less by cooking and drying.

It is now an established fact that the human body needs these protective food principles to maintain it in its normal condition. Dr. McCollum says that there are three especially protective foods in nature, milk, eggs, and green vegetables. There is comparatively little danger that the average well fed person in this country will be below the mark on these products unless he makes too great use of highly refined foods, such as white flour and refined corn meal. If one uses a liberal variety of fresh foods in their natural state, he will not be in danger of vitamin deficiency. It has been known for some time that natural food products are of benefit, this is evidenced by the old statement, "An apple a day will keep the doctor away." Apparently this little adage has a great deal of truth in it and should be borne in mind by all.

The war experiences have added very greatly to our knowledge of food values, some of the experiments carried out at that time were nation wide in extent and have given information of the greatest value, practically all of which confirm our knowledge in regard to the value of both vitamins and inorganic salts as well as the other constituents. The problem of deficiency becomes more serious in times when there is food shortage as therewas in certain parts of the earth at the time of the great war.
The British Medical Research Committee have published a table to show the distribution of the three classes of vitamins in the more common foods. Following is a compilation from that report:

<table>
<thead>
<tr>
<th>Source</th>
<th>Soluble A</th>
<th>Soluble B</th>
<th>Soluble C</th>
</tr>
</thead>
</table>

1. **Eggs**
   - Eggs: +++
   - Egg Yolk: +++

2. **Fats and Oils**
   - Beef Fat: +
   - Butter: +++
   - Coconut Oil: -
   - Cod liver Oil: +++
   - Corn Oil: +
   - Cottonseed Oil: +
   - Dard: +
   - Olive Oil: -
   - Peanut Oil: -

3. **Fruits**
   - Apples: +
   - Bananas: +
   - Grape Juice: *
   - Grape Fruits: *
   - Lemon Juice: *
   - Lime: *
   - Orange Juice: +
   - Pears: *
   - Prunes: *
   - Raspberry: *
   - Tomatoes, raw or canned: +++
   - Tomatoes, dried: +++

4. **Grain Products**
   - Bread, whole wheat: +
   - Corn, white: +
   - Corn, Yellow:
   - Flupur, white: +
   - Grains, sprouted: +
   - Oats: +
   - Rice, polished: +
   - Rice, natural: +
   - Rye, whole: +
   - Wheat, whole: +
<table>
<thead>
<tr>
<th>Source</th>
<th>Fat Soluble</th>
<th>Water Soluble A</th>
<th>Water Soluble B</th>
<th>Water Soluble C</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Meats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish, fat</td>
<td>+</td>
<td>+</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Fish, lean</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td>++</td>
<td>++</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Meat, muscle</td>
<td>-to</td>
<td>+?</td>
<td>++</td>
<td>+?</td>
</tr>
<tr>
<td>Meat Extract</td>
<td>-</td>
<td>-?</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Meat, canned</td>
<td>-</td>
<td>slight</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>6. Milk and Milk Products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butter</td>
<td>+++</td>
<td>-</td>
<td>++</td>
<td>+ Variable</td>
</tr>
<tr>
<td>Butter milk</td>
<td>+</td>
<td>++</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Cottage Cheese</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cream</td>
<td>+++</td>
<td>++</td>
<td>+ Variable</td>
<td></td>
</tr>
<tr>
<td>Milk, condensed</td>
<td>+++</td>
<td>++</td>
<td>+ Variable</td>
<td></td>
</tr>
<tr>
<td>Milk, dried</td>
<td>+++</td>
<td>++</td>
<td>+ Variable</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>+++</td>
<td>++</td>
<td>+ Variable</td>
<td></td>
</tr>
<tr>
<td>7. Miscellaneous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yeast</td>
<td>-</td>
<td>+++</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Yeast extract</td>
<td>-</td>
<td>+++</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Nuts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almonds</td>
<td>+</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Brazil Nuts</td>
<td>-?</td>
<td>++</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Coconut</td>
<td>+</td>
<td>++</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Peanuts</td>
<td>+</td>
<td>++</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Walnuts, English</td>
<td>*</td>
<td>++</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>9. Vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans, navy</td>
<td>*</td>
<td>+++</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Beans, soy</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Beans, fresh, string</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Cabbage, fresh, raw</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>Cabbage, dried</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Carrots, fresh, raw</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Dandelion greens</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Lettuce</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>++</td>
<td>++</td>
<td>+?</td>
<td></td>
</tr>
<tr>
<td>Potatoes, Irish, raw</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Potatoes, Irish, baked</td>
<td>*</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Potatoes, sweet</td>
<td>++</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Spinach, fresh</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>*</td>
</tr>
<tr>
<td>Spinach, dried</td>
<td>+++</td>
<td>++</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ indicates that the food contains the vitamin.
++ indicates that the food is a good source of the vitamin.
+++ indicates that the food is an excellent source of the vitamin.
- indicates that the food contains no appreciable amount of the vitamin.
? indicates doubt as to presence or relative amount.
* indicates that evidence is lacking or appears insufficient.
Oxygen
---
The body can live for weeks without food, for days without water, but death will occur in a few minutes if oxygen is withheld. Oxygen makes the utilization of all other classes of food possible. Although often not classified with foods, yet in one sense such classification is correct.

Properties of Oxygen
-------
Oxygen is a colorless, odorless, tasteless gas, slightly heavier than air. It is very active chemically, uniting with nearly all other elements. In the body, the union of oxygen with hydrogen, carbon, etc., takes place through oxidation and liberates heat and other forms of energy. It is just as important to have an abundant supply of pure oxygen as it is to have a proper supply of other food elements, although this problem is more a part of hygiene than it is of dietetics.

Chapter III
Digestion and Absorption
------------------------

General Statement
-------
Digestion is a complicated process. It consists in the cleavage of the various food products into substances of fairly simple form and may be compared to the process involved in the cutting of a log into lumber. Most of the foods eaten are complicated and must be simplified before the body can utilize them fully. The cleavage products can be taken up by the various tissues and build into body structure that is needed or utilized to yield heat and energy in the production of bodily activity.

Digestion begins with the cooking of food for it is here that the first decomposition processes begin. Proper cooking greatly facilitates the digestive process in the body and should therefore be carefully applied so as to get the maximum benefit.

The digestive system is very greatly influenced by other systems of the body. The nervous system probably has as great influence as any of these parts of the organism. If one is happy, cheerful, and contented he can digest his food far more satisfactorily than if he is suffering with a load of care and is discouraged. Pavlov has shown the effect of such influences and has given us the idea about appetite.
General juice. He has shown that a person who eats a meal amid cheerful and appetizing surroundings is far more likely to digest it well than the one who eats under opposite conditions. This is a very practical point in the feeding of patients who in many cases do not have very good appetites. By seeking to make everything as favorable as possible one may be able to increase what little desire there is for food and thus make the nutritive conditions more favorable than they would otherwise be.

Absorption refers to the taking up of food from the digestive tract and the carrying of it to the various parts of the body for utilization. This will be brought out as each class of food is considered.

Only a brief summary can be given here, simply a suggestive outline for review since all these facts have been taken up by the student who has studied physiological chemistry. Saliva attacks cooked starch principally, raw starch is scarcely affected by it. Cooked starch, or soluble dextrin, is changed first into erythrodextrin, then achorodextrin; maltodextrin and finally maltose the end product is formed. This process goes on very rapidly in the mouth and is also continued for some 10 to 20 minutes in the stomach before the hydrochloric acid is sufficiently concentrated to stop the cleavage which does not proceed in the presence of an acid reaction of any strength. The maltose formed by the salivary digestion is further acted upon in the intestines by the enzyme maltase which converts it to glucose which is then absorbed by way of the portal circulation.

Salivary digestion is often prevented by careless habits of eating but when made use of it prepares the food for the other digestive processes and greatly facilitates their success.

In the stomach the salivary digestion continues as stated above and the process of protein digestion begins. Pepsin and hydrochloric acid are the active agents here and they attack the native proteins, breaking them through the various stages of acid albumin, proteases, and peptones to polypeptids. Proteins are not fully digested by the stomach even when the process is going at its very best but their decomposition is started off and then taken up and finished by the juices of the intestines.
There is also some work done in connection with emulsified fats in the stomach. Some 50% of emulsified fat may be digested in the stomach by what is called gastric lipase. This process consists in the breaking up of the fats into fatty acid and glycerine similar to what is done by the pancreatic juice in the intestinal tract.

In the duodenum and other parts of the small intestinal tract all classes of food are digested to the very best point of efficiency. The starches which have escaped the ptyalin of saliva are here attacked by the amylase and converted to maltose which is then converted to glucose by maltase. The steps in this process are like those which were enumerated for saliva.

The proteins are here attacked by trypsin the best of all the proteolytic enzymes and in conjunction with the enzyme erepsin of the intestinal juice the proteins are completely hydrolyzed to amino acids which are absorbed by way of the portal circulation and carried directly into the blood stream from which the tissues select the ones needed for keeping the organism in proper repair. The steps in the cleavage of protein are similar to those seen in the stomach except that the process goes further and the amino acids of the protein molecule are set free, thus the large protein molecule is completely disintegrated. Fats are attacked by enzyme steapsin of the pancreatic juice and are completely broken to fatty acid and glycerine and at the same time through the action of the alkali of the intestinal contents some soaps are formed. The bile helps to make this process go forward more speedily, but it has no active enzyme of itself. The fatty acids, soaps, and glycerine are all absorbed together by the lacteals during which process they are again put together to form neutral emulsified fat which appears as such in the lacteals and is poured into the venous circulation in this form.
### Digestive Enzymes

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Where Found</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ptyalin</td>
<td>Saliva</td>
<td>Starch to Maltose</td>
</tr>
<tr>
<td>Amylopsin</td>
<td>Pan. Juice</td>
<td>Starch to Maltose</td>
</tr>
<tr>
<td>Liver Glycogenase</td>
<td>Liver</td>
<td>Glycogen to Dextrose</td>
</tr>
<tr>
<td>Muscle Glycogenase</td>
<td>Muscles</td>
<td>Glycogen to Dextrose</td>
</tr>
<tr>
<td>Invertase</td>
<td>Sm. Intestine</td>
<td>Cane Sugar Inverted</td>
</tr>
<tr>
<td>Maltase</td>
<td>Sm. Intestine</td>
<td>Maltose to Dextrose</td>
</tr>
<tr>
<td>Lactase</td>
<td>Saliva</td>
<td>Lactose Inverted</td>
</tr>
<tr>
<td>Glycolytic?</td>
<td>Pan. Juice</td>
<td>Splits &amp; Oxidizes dextrose</td>
</tr>
<tr>
<td></td>
<td>Sm. Intestine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Muscles</td>
<td></td>
</tr>
</tbody>
</table>

### Acting on Carbohydrates

- **Lipase**
  - Pan. Juice
  - Fat Tissues
  - Blood
  - Splits Neutral Fats to fatty acids and glycerine

### Acting on Proteins

- **Pepsin**
  - Gastric Juice
  - Proteins to Peptones and Proteoses

- **Trypsin**
  - Pan. Juice
  - Proteins into their constituent amino acids.

- **Erepsin**
  - Sm. Intestine
  - Peptones and Proteoses into their constituent amino acids.

### Chapter IV

**CALORIES**

The large calorie is the one used in food work. It is a unit of heat measurement and is used in the analysis of fuels as well as in connection with foods. The large calorie is the amount of heat required to raise the temperature of one kilogram (2.2 pounds) of water 1 degree C. (1.8°F.). The most accurate method of measuring calories is by means of the Bomb calorimeter. This instrument is so constructed that a sample of food or fuel can be burned in it in the presence of oxygen.
under pressure and the heat measured. If an accurately weighed sample is taken, the yield in heat units of the food per gram or per ounce can quickly be calculated.

By the use of calories in feeding cases one can quite accurately record the food eaten from day to day and in many cases will be able to govern the nutrition of the individual more successfully than by any other means. It is true that one cannot judge a food simply by its ability to yield calories for some of the food constituents such as vitamins and inorganic salts have no power to yield calories. Of all the methods of computation, the calorie method is probably the best we have, and properly controlled, it is an excellent method.

As an illustration of the above let rice be cited. Unpolished rice has a fuel value of 1639 calories per pound, while the polished form yields 1630 for the same amount, yet the polished form is far less capable of maintaining complete nutrition than the other. The Chittenden Standard for a Balanced Ration allows the following distribution of calories:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>Protein</td>
</tr>
<tr>
<td>25%</td>
<td>Fat</td>
</tr>
<tr>
<td>65%</td>
<td>Carbohydrate</td>
</tr>
</tbody>
</table>

If the total caloric need per day is 2500, the number of calories of each class of food can quickly be calculated, and then taking care that the dietary includes a proper supply of vitamins and inorganic salts, a complete and balanced diet will be provided.

Pure protein has been found to yield 4.1 calories per gram, multiplying this by 28.4 grams, we find that one ounce will supply 116 calories. Pure fat on a similar basis gives 9.3 calories per gram, or 264 per ounce. Pure carbohydrate yields 4.1 calories per gram, or 116 per ounce.

By making use of these figures, the caloric yield of any given food can be calculated from its percentage composition. The percentage composition of all common foods may be obtained from Bulletin No. 28, U. S. Department of Agriculture, entitled "Composition of American Food Materials". If a food is only 1% protein it will contain 1/100 of 116, or 1.16 calories protein per ounce. Similarly for fats, 1/100 of 264 for every 1%, or 2.64 calories. For carbohydrates the factor would obviously be 1.16.

To illustrate this method, figure the caloric yield of one quart of milk and a 24 ounce loaf of bread:
Caloric Yield of Different Foods

Percentage composition of MILK
Calories per ounce
Calories per quart, 32 ounces
Total calories per quart milk

Percentage composition of Bread
Multiplying each by the factor
Calories per ounce
Calories per 24 ounce loaf
Total calories per 24 ounce loaf

The following figures illustrate the method of calculation per gram. Example, figure the caloric yield of 100 grams shelled almonds and 500 grams raisins.

Percentage composition Almonds
Multiplying by Calories per gm.

Total calories per 100 grams almonds

Percentage composition raisins
Multiplying by calories per gm.

Calories per 100 grams
Calories per 500 grams
Total calories per 500 grams raisins

Using the bread and milk example to illustrate the percentage of each food stuff and its nearness to a balanced ration:

One qt. milk calories
One loaf bread calories

Totals
Grand Total
Distribution of Calories

Chittenden Standard
NOTE: - Distribution of Calories for nuts and raisins:

|                      | Protein | Fat | Carbo-
|----------------------|---------|-----|-----------------
| 100 grams shelled Almonds | 85.1    | 510.6 | hydrate 70.9 |
| 500 grams Raisins    | 53.5    | 153.5 | 1560.0          |
| Totals               | 139.6   | 664.1 | 1630.9         |
| Grand Total         |         |      | 2434.6         |

Distribution of Calories 5.7% 27.3% 67.0%

Chapter V

Balanced Ration And Caloric Needs Of The Body

<table>
<thead>
<tr>
<th></th>
<th>Body Wt. Grams</th>
<th>Total Calories</th>
<th>%Protein</th>
<th>%Fat</th>
<th>%CHO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eskimo</td>
<td>65</td>
<td>232</td>
<td>2604</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>Bengali</td>
<td>50</td>
<td>52</td>
<td>2390</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>European</td>
<td>70</td>
<td>118</td>
<td>3050</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

Dietary Standards

High Protein

<table>
<thead>
<tr>
<th>Author</th>
<th>Protein Grams</th>
<th>Fats Grams</th>
<th>Carbohydrate Grams</th>
<th>Total Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munk</td>
<td>105</td>
<td>56</td>
<td>500</td>
<td>3022</td>
</tr>
<tr>
<td>Wolff</td>
<td>125</td>
<td>35</td>
<td>540</td>
<td>3030</td>
</tr>
<tr>
<td>Voit</td>
<td>118</td>
<td>56</td>
<td>500</td>
<td>3055</td>
</tr>
<tr>
<td>Rubner</td>
<td>127</td>
<td>52</td>
<td>509</td>
<td>3092</td>
</tr>
<tr>
<td>Playfair</td>
<td>119</td>
<td>51</td>
<td>531</td>
<td>3140</td>
</tr>
<tr>
<td>Moleschott</td>
<td>130</td>
<td>40</td>
<td>556</td>
<td>3160</td>
</tr>
<tr>
<td>Atwater</td>
<td>125</td>
<td>125</td>
<td>450</td>
<td>3220</td>
</tr>
</tbody>
</table>

Average: 121 59 510 3155

Distribution of Calories 19.0% 14.3% 66.7%
Chittenden's work has shown that more protein is eaten generally than is necessary for maintenance and his experiments lead to the conclusion that just as good work can be done on the moderate protein ration as can be done when large amounts are taken.

Fisher's experiments have proven conclusively that the so-called low protein ration gives greater endurance than the high protein. The Sanitarium dietary such as is served in our institution here represents an average low protein standard about as follows:

<table>
<thead>
<tr>
<th>Protein</th>
<th>Fat</th>
<th>Carbohydrate</th>
<th>Total Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grams</td>
<td>Grams</td>
<td>Grams</td>
<td></td>
</tr>
<tr>
<td>Sanitarium Diet</td>
<td>75.0</td>
<td>80.0</td>
<td>475.0</td>
</tr>
</tbody>
</table>

This is based on the 3000 calorie ration and would be proportionately less for any program below that figure. The 3000 calorie amount was taken to make favorable comparison with the figures previously given.

Muscular activity has direct effect upon the energy requirement of an individual. When a rough approximation is all that is desired the following table gives the energy need in calories per hour.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Calories per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man sleeping</td>
<td>65</td>
</tr>
<tr>
<td>Man sitting at rest</td>
<td>100</td>
</tr>
<tr>
<td>Man at light muscular exercise</td>
<td>170</td>
</tr>
<tr>
<td>Man at active muscular exercise</td>
<td>290</td>
</tr>
<tr>
<td>Man at severe muscular exercise</td>
<td>450</td>
</tr>
</tbody>
</table>

The following table gives the computation of the energy production of the average student:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Heat Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeping eight hours</td>
<td>520</td>
</tr>
<tr>
<td>Sitting at rest six hours</td>
<td>600</td>
</tr>
<tr>
<td>Light muscular exercise ten hours</td>
<td>1700</td>
</tr>
<tr>
<td>Total 24 hours</td>
<td>2620</td>
</tr>
</tbody>
</table>

Lusk gives the following table which illustrates further the caloric needs of the average man at various kinds of work.
Caloric Needs of The Body

### Occupation

<table>
<thead>
<tr>
<th>Total calories per day for 155 lb. (70.4 Kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal rate</td>
</tr>
<tr>
<td>Tailor</td>
</tr>
<tr>
<td>Bookbinder</td>
</tr>
<tr>
<td>Shoemaker</td>
</tr>
<tr>
<td>Metal worker</td>
</tr>
<tr>
<td>Painter</td>
</tr>
<tr>
<td>Carpenter</td>
</tr>
<tr>
<td>Stone Mason</td>
</tr>
<tr>
<td>Sawing Wood</td>
</tr>
</tbody>
</table>

For an average the following figures are given.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total calories per day for 134 lb. (60.8 Kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal rate</td>
<td>1480</td>
</tr>
<tr>
<td>Needle work</td>
<td>1630</td>
</tr>
<tr>
<td>Typist, 50 words a minute</td>
<td>1770</td>
</tr>
<tr>
<td>Bookbinder</td>
<td>2030</td>
</tr>
<tr>
<td>Seamstress, using sewing machine</td>
<td>2980</td>
</tr>
<tr>
<td>Housemaid, moderate work</td>
<td>2220</td>
</tr>
<tr>
<td>Laundress, &quot;  &quot;</td>
<td>2850</td>
</tr>
<tr>
<td>Housemaid, hard work</td>
<td>2830</td>
</tr>
<tr>
<td>Laundress, &quot;  &quot;</td>
<td>3490</td>
</tr>
</tbody>
</table>

Age has a marked effect upon the energy requirement of the individual as is shown by the following table from Sherman.

<table>
<thead>
<tr>
<th>Age</th>
<th>Calories per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2 years, inclusive</td>
<td>1000 - 1200</td>
</tr>
<tr>
<td>2 - 5</td>
<td>1200 - 1500</td>
</tr>
<tr>
<td>6 - 9</td>
<td>1400 - 2000</td>
</tr>
<tr>
<td>10-13</td>
<td>1800 - 2400</td>
</tr>
<tr>
<td>10-13</td>
<td>2300 - 3000</td>
</tr>
<tr>
<td>14-17</td>
<td>2200 - 2600</td>
</tr>
<tr>
<td>14-17</td>
<td>2800 - 4000</td>
</tr>
</tbody>
</table>

Above the age of 17, the variation due to growth becomes less marked and that due to occupation becomes the most important factor.

Methods of Computing Caloric Needs of the energy requirements of an individual as follows:

1. DuBois surface area method.
2. Harris-Benedict height, weight and age method.
3. Dreger age and weight method.
Of these the DuBois surface area formula is the most used. It is reliable and easily employed and is therefore given below.

DuBois Normal Standards of Basal Metabolism.

(Height-Weight Formula)

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Calories per square meter</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>per hr.</td>
<td>per 24 hrs.</td>
</tr>
<tr>
<td>14-16</td>
<td></td>
<td>44.2</td>
<td>1060.8</td>
</tr>
<tr>
<td>16-18</td>
<td></td>
<td>41.2</td>
<td>986.8</td>
</tr>
<tr>
<td>18-20</td>
<td></td>
<td>39.2</td>
<td>940.8</td>
</tr>
<tr>
<td>20-30</td>
<td></td>
<td>37.7</td>
<td>904.8</td>
</tr>
<tr>
<td>30-40</td>
<td></td>
<td>37.7</td>
<td>904.8</td>
</tr>
<tr>
<td>40-50</td>
<td></td>
<td>36.7</td>
<td>880.8</td>
</tr>
<tr>
<td>50-60</td>
<td></td>
<td>35.7</td>
<td>856.8</td>
</tr>
<tr>
<td>60-70</td>
<td></td>
<td>34.7</td>
<td>832.8</td>
</tr>
<tr>
<td>70-80</td>
<td></td>
<td>33.7</td>
<td>808.8</td>
</tr>
</tbody>
</table>
### Chart for Determining Body Surface in Square Meters for Different Heights and Weights. (DuBois)

<table>
<thead>
<tr>
<th>Height in cm</th>
<th>Weight in Kilograms</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1.84 : 1.91 : 1.97 : 2.03 : 2.09 : 2.15 : 2.21 : 2.26 : 2.31 : 2.36 : 2.41</td>
</tr>
<tr>
<td>30</td>
<td>1.73 : 1.80 : 1.87 : 1.93 : 1.99 : 2.05 : 2.11 : 2.17 : 2.22 : 2.27 : 2.32 : 2.37</td>
</tr>
<tr>
<td>35</td>
<td>1.56 : 1.63 : 1.70 : 1.77 : 1.84 : 1.90 : 1.96 : 2.02 : 2.08 : 2.13 : 2.18 : 2.23</td>
</tr>
<tr>
<td>45</td>
<td>1.49 : 1.57 : 1.64 : 1.71 : 1.77 : 1.83 : 1.89 : 1.95 : 2.00 : 2.05 : 2.10 : 2.15 : 2.20 : 2.25</td>
</tr>
</tbody>
</table>
| 55           | 1.14 : 1.23 : 1.31 : 1.39 : 1.47 : 1.54 : 1.61 : 1.68 : 1.75 : 1.82 : 1.89 : 1.96 : 2.03 : 2.09 : 2.15 : 2.21 :
| 65           | 1.09 : 1.18 : 1.26 : 1.34 : 1.42 : 1.49 : 1.56 : 1.63 : 1.70 : 1.77 : 1.84 : 1.91 : 1.98 : 2.05 : 2.11 : 2.17 |
| 70           | 1.06 : 1.15 : 1.23 : 1.31 : 1.39 : 1.46 : 1.54 : 1.61 : 1.69 : 1.77 : 1.84 : 1.91 : 1.98 : 2.05 : 2.11 : 2.17 |
| 75           | 1.03 : 1.12 : 1.20 : 1.28 : 1.36 : 1.43 : 1.51 : 1.58 : 1.66 : 1.74 : 1.82 : 1.89 : 1.96 : 2.03 : 2.09 : 2.15 |
| 80           | 1.00 : 1.09 : 1.17 : 1.25 : 1.33 : 1.40 : 1.48 : 1.56 : 1.64 : 1.72 : 1.80 : 1.88 : 1.95 : 2.03 : 2.09 : 2.15 |
| 85           | 0.97 : 1.06 : 1.14 : 1.22 : 1.30 : 1.37 : 1.45 : 1.53 : 1.61 : 1.69 : 1.77 : 1.84 : 1.92 : 2.00 : 2.07 : 2.13 |
| 90           | 0.95 : 1.04 : 1.13 : 1.21 : 1.29 : 1.37 : 1.45 : 1.54 : 1.62 : 1.70 : 1.78 : 1.86 : 1.94 : 2.02 : 2.09 : 2.16 |
| 95           | 0.93 : 1.02 : 1.11 : 1.19 : 1.28 : 1.36 : 1.45 : 1.53 : 1.62 : 1.70 : 1.78 : 1.86 : 1.94 : 2.02 : 2.09 : 2.16 |
| 100          | 0.91 : 0.99 : 1.08 : 1.16 : 1.25 : 1.33 : 1.42 : 1.51 : 1.59 : 1.68 : 1.76 : 1.84 : 1.92 : 2.00 : 2.08 : 2.15 |
| 105          | 0.90 : 0.98 : 1.07 : 1.15 : 1.24 : 1.33 : 1.42 : 1.51 : 1.60 : 1.69 : 1.78 : 1.86 : 1.94 : 2.02 : 2.10 : 2.17 |
Food in Relation to Mental Work

Purpose of Cooking

In applying the above charts it is necessary to get the weight in Kilograms and the height in centimeters. These are applied to the height-weight chart and then the resulting skin area in square meters is multiplied by the caloric needs for the age in question and the resulting figure is the basal metabolic need of the individual. If work is being done by the person tested, the caloric supply will have to be proportionately increased according to the occupation.

The central nervous system runs in high gear all the time and is apparently not changed in metabolic rate by increase in mental effort. Experiments are being conducted upon this point at the present time.

Chapter VI

The Cooking of Food

Cookery is the art of preparing food. It may or may not include the use of heat in the process. Cookery is a real science and deserves the most careful attention. Most cooking is done in a very careless manner but great good can be accomplished by teaching our cooks to be accurate, doing their work on a laboratory basis.

When properly carried out, the preparation of food should accomplish the following points:-

1. Improve the flavor so as to promote the flow of the digestive juices.
2. Favor the digestive process and in some cases actually start the digestive work.
3. Favor mastication and disintegration of food from the mechanical standpoint.
4. Destroy parasites and bacteria of disease.
5. Destroy such poisons as those produced by the bacillus botulinus. These toxic products are destroyed by heating a food product to 80°C.

Cooking should also seek to preserve all the natural food elements, especially such as the vitamins and inorganic salts. Both of these substances are often lost by the use of improper methods of handling foods during the cooking process.
Effects of Cooking on Protein

Heat has a tendency to coagulate proteins. Often this process helps in the digestive work as it develops the flavor of the product and in some cases the coagulated form of the protein is more digestible than the native form. Egg white is a good example of this last point, the raw product contains antipepsin and antitrypsin both of which are destroyed by the heat and thus they no longer inhibit the action of pepsin and trypsin in their digestive work.

Effects of Cooking on Starches and Sugars

Raw starch is practically insoluble, the cooking process by means of heat attacks the starch granules rendering the starch more soluble and hence the digestive work proceeds more rapidly. Saliva is unable to digest raw starch but is very active in the hydrolysis of the cooked form. It is true however that the intestinal digestive enzymes are able to digest even raw starch but as a rule it is better to have the saliva start off the work of starch digestion. Sugars are sometimes carmelized and this helps to give more flavor to the food product. Some of the disaccharide sugars may be inverted especially if the heating is carried out in the presence of acids as in the cooking offruits with cane sugar.

Effects of Cooking on Fats

In the ordinary cooking process fats are not changed to any great extent but when foods are fried in grease the fat is apt to be broken up into fatty acids, glycerine, and if the heat is very high, some irritating products such as acrolein may be formed. The fatty acids and aldehyde are irritating to the digestive system and thus the process of frying foods is not desirable although it makes the food taste good.

The frying of food in deep fat is objectionable because it coats the food with fat and thus inhibits digestion.

Cooking a Part of Digestion

It should always be borne in mind that cooking is recognized by chemical workers as a part of the digestive process. Cooking has much to do with the palatability, digestibility and healthfulness of food.
Chapter IV

Bread as a Food

<table>
<thead>
<tr>
<th>Composition of Breads</th>
<th>% Water</th>
<th>% Protein</th>
<th>% Fat</th>
<th>% Carbohydrate</th>
<th>Calories per pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn Bread</td>
<td>38.9</td>
<td>7.9</td>
<td>4.7</td>
<td>46.3</td>
<td>1205</td>
</tr>
<tr>
<td>Rye Bread (whole)</td>
<td>50.7</td>
<td>9.0</td>
<td>0.6</td>
<td>49.7</td>
<td>1110</td>
</tr>
<tr>
<td>Rye Bread (white)</td>
<td>35.7</td>
<td>9.2</td>
<td>0.9</td>
<td>53.1</td>
<td>1215</td>
</tr>
<tr>
<td>Wheat Bread (white)</td>
<td>38.4</td>
<td>9.7</td>
<td>1.3</td>
<td>53.1</td>
<td>1110</td>
</tr>
<tr>
<td>Wheat Bread (entire)</td>
<td>40.0</td>
<td>11.5</td>
<td>1.6</td>
<td>61.2</td>
<td>1420</td>
</tr>
<tr>
<td>Toasted Bread</td>
<td>5.8</td>
<td>13.5</td>
<td>1.9</td>
<td>72.7</td>
<td>1773</td>
</tr>
<tr>
<td>Zwieback</td>
<td>2.3</td>
<td>7.9</td>
<td>0.6</td>
<td>91.0</td>
<td>1931</td>
</tr>
</tbody>
</table>

Methods for Making Bread

1. The most satisfactory method is the one in which yeast is used as the leavening agent. The growth of the yeast in the dough makes it light by the production of carbon dioxide gas. The gluten in the wheat flour holds the gas and gives body to the product. The growth of the yeast carries forward a process of fermentation, if the temperature is too high, or the process goes on too long a time the fermentation goes beyond the alcoholic stage and acetic acid is produced and "sour bread" is the result. When the fermentation has gone on sufficiently long to make the product light then the baking process is applied to kill the enzymes, fix the dough so it cannot fall by coagulating the gluten, drive off the alcohol, expand the carbon dioxide which has accumulated in the dough and at the same time the flavor is enhanced by the formation of dextrins on the surface of the loaf.

2. The "leaven" process is exactly the same except that some of the dough from the previous batch is used to start off the new fermentation process. "A little leaven leaveneth the whole lump."

3. The "Salt Rising" process. In this method bacteria and wild yeasts from the air and flour or corn meal bring about the fermentation process. By this method there is said to be only about 2% loss of constituents, whereas in the ordinary yeast methods the loss ranges from 1.81% to 5.15%. The gases which cause the dough to rise in this method are hydrogen and carbon dioxide.
Methods for Making Bread

4. The "Non-fermentation" methods are also of importance since they are used very frequently and some of them are of great value. The following are the most important of these:

- Mechanical beating of the dough, thus introducing cold air which expands greatly during the baking process, thus aerating the product.
- Beating with snow which introduces air.
- Mixing with eggs which have been beaten to a froth.
- Beating with brandy or other liquor.
- Chemical methods as follows:
  - Ammonium Carbonate and baking.
  - Sodium Bicarbonate and baking.
  - Baking Soda and molasses.
  - Baking Soda and hydrochloric acid.
  - Baking Soda and sour milk.
  - Aeration with carbon dioxide under pressure.

Baking Powders

There are three common types of baking powders in use as follows:

1. Tartrate Powders represented by the following equation:

   \[ \text{NaHCO}_3 + \text{KH}_2\text{CO}_4 = \text{NaK}_2\text{C}_4\text{H}_4\text{O}_6 + \text{CO}_2 + \text{H}_2\text{O} \]

2. Phosphate Powders illustrated by the following:

   \[ 2\text{NaHCO}_3 + \text{CaH}_2(\text{PO}_4)_2 = \text{CaHPO}_4 + \text{Na}_2\text{HPO}_4 + 2\text{CO}_2 \]
   \[ (2\text{H}_2\text{O}). \]

3. Alum Powders as follows:

   \[ 6\text{NaHCO}_3 + 2\text{KAl(SO}_4)_2 = 2\text{Al(OH)}_3 + 3\text{Na}_2\text{SO}_4 + \text{K}_2\text{SO}_4 \]
   \[ (1\frac{1}{2} \text{CO}_2). \]

The quantity of these powders used in a year in this country is very large, said to range in the neighborhood of 50,000,000 pounds. Their use is not to be desired as there are some definite points against them, chief of which are the irritant action on the kidneys and digestive tract of the residual salts. It has also been found that free soda in a product, in the presence of heat as in the baking process is definitely harmful.
Baking Powders

Caloric Yield of Bread

to the vitamin content of the food. Voegtlin, one of the government research workers has done some very interesting work along this line. (See Public Health Reports, Vol. 31, page 959).

The use of soda has been very definitely spoken against in the book Ministry of Healing (page 300) as follows: "The use of soda or baking powder in bread making is harmful and unnecessary."

One pound of bread yields on an average about 1140 calories; this makes a one ounce slice give about 75 calories. On this basis it is easy to calculate the actual food taken when using bread.

The distribution of calories in bread is well illustrated in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Calories</th>
<th>Calories</th>
<th>Calories</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Protein per ounce</td>
<td>Fat per ounce</td>
<td>CHO per ounce</td>
<td>total per ounce</td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>W. Wheat</td>
<td>11.3</td>
<td>2.4</td>
<td>57.6</td>
<td>71.3</td>
</tr>
<tr>
<td>White Bread</td>
<td>10.7</td>
<td>3.4</td>
<td>61.6</td>
<td>75.7</td>
</tr>
</tbody>
</table>

Yeast as a Food

Yeast has been recommended as a therapeutic agent in connection with these conditions in which there is a lack of water soluble B vitamin. It has also been used internally in the treatment of boils, acne, and pimples and also in overcoming constipation.

The benefits of the use of this product have been over rated. The indiscriminate use of yeast as food or remedial agent is not to be recommended. The chief objection is its tendency to favor undue fermentation.

Chapter VIII

Milk As A Food

Importance of Milk

Milk is the most important of animal foods. It contains all the elements for the maintenance of life. It is the most satisfactory single food. It is not perfect for the adult, as the protein and fat are high, the iron is too low; it is too dilute, leaves very little intestinal residue and is poor in carbohydrates. Milk is especially interesting and important on account of its vitamin content thus
Milk is usually graded A, B, or C according to bacterial count and the condition under which it is produced, this is often a help to the consumer in making selection of the proper product for safe use.

**Examination of Milk**

In testing milk to see whether it is a good product or not there are several points to be observed as follows:-

1. Fat test.
2. Specific Gravity test.
3. Protein content.
4. Presence or absence of preservatives, such as formaldehyde or hydrogen peroxide.
5. Detection of heated milk.

**Composition of Cream**

The following table gives the percentage composition of the different grades of cream as compared with ordinary milk:-

<table>
<thead>
<tr>
<th></th>
<th>Milk</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat</td>
<td>4.00</td>
<td>8.00</td>
<td>12.00</td>
<td>16.00</td>
<td>20.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Sugar</td>
<td>4.50</td>
<td>4.50</td>
<td>4.20</td>
<td>4.05</td>
<td>3.90</td>
<td>3.00</td>
</tr>
<tr>
<td>Protein</td>
<td>3.50</td>
<td>3.40</td>
<td>3.30</td>
<td>3.20</td>
<td>3.05</td>
<td>2.00</td>
</tr>
<tr>
<td>Salts</td>
<td>.75</td>
<td>.70</td>
<td>.65</td>
<td>.60</td>
<td>.55</td>
<td>.45</td>
</tr>
</tbody>
</table>

The following table gives information as to percentage of different layers of cream on standing over certain periods of time, the figures referring to a quart bottle and are given in percentage of fat in the layers:-

<table>
<thead>
<tr>
<th></th>
<th>After 4 hours</th>
<th>After 8 hours</th>
<th>After 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>20.50%</td>
<td>21.25%</td>
<td>22.00%</td>
</tr>
<tr>
<td>Second</td>
<td>6.00%</td>
<td>6.50%</td>
<td>6.50%</td>
</tr>
<tr>
<td>Third</td>
<td>1.50%</td>
<td>1.41%</td>
<td>1.00%</td>
</tr>
<tr>
<td>Fourth</td>
<td>1.20%</td>
<td>1.00%</td>
<td>.30%</td>
</tr>
<tr>
<td>Fifth</td>
<td>1.00%</td>
<td>1.00%</td>
<td>.20%</td>
</tr>
</tbody>
</table>
Composition of Various Milk Products

The following table gives percentage composition of several commonly used milk products in a form that will be useful to dietitians and other workers with foods.

<table>
<thead>
<tr>
<th>Product</th>
<th>Water (%)</th>
<th>Protein (%)</th>
<th>Fat (%)</th>
<th>CHO (%)</th>
<th>Salts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>9.00</td>
<td>.50</td>
<td>90.00</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Buttermilk(sweet)</td>
<td>89.74</td>
<td>3.28</td>
<td>1.21</td>
<td>4.98</td>
<td>.79</td>
</tr>
<tr>
<td>Buttermilk (sour)</td>
<td>90.93</td>
<td>3.37</td>
<td>.31</td>
<td>4.58</td>
<td>.81</td>
</tr>
<tr>
<td>Cheese (full Cr.)</td>
<td>34.20</td>
<td>25.90</td>
<td>33.70</td>
<td>2.40</td>
<td>3.80</td>
</tr>
<tr>
<td>Condensed Milk</td>
<td>68.20</td>
<td>9.60</td>
<td>9.30</td>
<td>11.20</td>
<td>1.70</td>
</tr>
<tr>
<td>Cottage Cheese</td>
<td>72.00</td>
<td>20.90</td>
<td>1.00</td>
<td>4.30</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Other Milk Products

Various milk products and proprietary foods containing milk are widely used both in the home and in infant and invalid dietaries. These are of value as foods especially when fresh milk cannot be obtained. When these are used it must be borne in mind that they are more or less inadequate in their supply of vitamins and inorganic salts and must be supplemented by natural foods which are rich in these substances. Orange juice is especially valuable in the feeding of infants when they are bottle fed. Some of the most common of these milk products are—condensed milk, evaporated milk, dried milk, and malted milk.

In 1912 there were some 300 factories producing condensed milk products the total value of which for that year was $33,000,000.

Special Properties of Milk

The proteins of milk are casein, lactalbumin, and lactoglobulin. These are all of good character and are capable of supplying all the amino acids the body needs for full nutrition.

The fats of milk are slightly different from the ordinary food fats in that they contain from 5 to 10% volatile fatty acids. This property at once stamps butter fat with properties which enables its detection when mixed with other food fats. The volatile fatty acids are especially interesting and easy to detect because of the presence of butyric acid among them. Milk fat exists normally in a fine emulsion, conglomeration of the droplets as in churning, gives butter.
Special Properties of Milk

The sugar content of milk is made up of lactose, a carbohydrate having properties which are especially desirable for the development of the young of all mammalian types. Milk is also fairly rich in vitamins as has already been stated, being especially well supplied with Fat-Soluble A. The salts of milk, as previously stated are especially characterized by a liberal supply of phosphates which are of great value in nutrition.

Caloric Yield of Milk

The following table gives the caloric yield of cow’s and human milk per ounce of the product:

<table>
<thead>
<tr>
<th></th>
<th>Calories</th>
<th>Calories</th>
<th>Calories</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>3.8</td>
<td>2.7</td>
<td>5.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Fat</td>
<td>10.6</td>
<td>10.0</td>
<td>10.6</td>
<td>10.0</td>
</tr>
<tr>
<td>CHO</td>
<td>5.8</td>
<td>7.2</td>
<td>5.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Total</td>
<td>20.2</td>
<td>19.9</td>
<td>20.2</td>
<td>19.9</td>
</tr>
</tbody>
</table>

Digestion of Milk

The following tabulation gives the comparative digestive work on milk alone and in combination with bread:

<table>
<thead>
<tr>
<th></th>
<th>Per cent. of Digestibility of Milk Alone</th>
<th>Per cent. of Digestibility of Bread &amp; Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>92.1</td>
<td>97.1</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>86.3</td>
<td>98.7</td>
</tr>
</tbody>
</table>

Milk is rendered more digestible by boiling, diluting, combining with solids and when curdled by the use of lactic acid bacilli as in yoghurt.

A Perfect Food

Hutchison gives the following requirements for a perfect food some of which are well filled by milk:

1. Must contain all the nutritive constituents required by the body, - protein, fat, carbohydrate, mineral salts and water.
2. Must contain these in proper relative proportion
3. Must contain daily total amount of nourishment in moderate compass.
4. Nutritive elements must be capable of easy absorption and yet leave certain bulk unabsorbed to act as intestinal ballast.
5. Must be obtainable at moderate cost.
**Value as A Food**

Eggs are like milk in their ability to yield good protein to the body. They also are similar to meat in that they supply protein of perfect character and they have fats that are exceptionally useful to the body. Eggs belong to the class of protective foods having both fat-soluble A and water-soluble B vitamins in liberal quantity. Eggs are low in purin content and fairly rich in iron. The yolk of egg has by far the greater part of food value, the white of egg being largely water.

**Composition of Eggs**

The average egg weighs about 2 ounces or 60 grams. Of this, 10% or 6 grams is shell, 30% or 18 grams is yolk and 60% or 36 grams is white. The following table gives composition of eggs as given in the Government Bulletin No. 28:

<table>
<thead>
<tr>
<th>Composition of Eggs</th>
<th>Water %</th>
<th>Protein %</th>
<th>Fat %</th>
<th>CHO %</th>
<th>Ash %</th>
<th>Calories per pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Egg (E.P.)</td>
<td>73.7</td>
<td>13.4</td>
<td>10.5</td>
<td>1.0</td>
<td></td>
<td>720</td>
</tr>
<tr>
<td>Egg White</td>
<td>86.2</td>
<td>12.3</td>
<td>.2</td>
<td>.6</td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>Egg Yolk</td>
<td>49.5</td>
<td>15.7</td>
<td>33.3</td>
<td>1.1</td>
<td></td>
<td>1705</td>
</tr>
</tbody>
</table>

The white of egg is chiefly albuminous, with four proteins present, Ovalbumin, Conalbumin, Ovomucin and Ovomucoid. The ovalbumin being the main constituent.

The yolk is more complex in composition. It has about 15% protein which is called vitellin, 20% of the common fats, palmitin, olein and stearin; special fatty bodies of the lecithin class; salts of iron, magnesium, potassium and calcium and over 1% phosphorus.

The shell of egg has no nutritive value, it consists chiefly of mineral matter, over 90% of which is calcium carbonate.

**Caloric Yield of Eggs**

The following table figured from the percentage composition given above shows the comparative caloric values of the whole egg as compared with the white and the yolk:
Caloric Yield of Eggs

<table>
<thead>
<tr>
<th>Whole Egg (E.P.)</th>
<th>Calories</th>
<th>Protein</th>
<th>Fat</th>
<th>Total</th>
<th>Calories as above</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
<td>27.7</td>
<td>43.2</td>
<td></td>
<td></td>
<td>77.7*</td>
</tr>
<tr>
<td>Egg White</td>
<td>14.3</td>
<td>.5</td>
<td>14.8</td>
<td></td>
<td>17.7*</td>
</tr>
<tr>
<td>Egg Yolk</td>
<td>18.2</td>
<td>87.9</td>
<td>106.1</td>
<td></td>
<td>63.7*</td>
</tr>
</tbody>
</table>

* These figures do not agree very well. They are only approximate, and are figured on a 60 gram egg as given above. Such figures are useful in the calculation of a diet even though they may not be exactly accurate.

Testing Freshness of Eggs

Langworthy’s test for freshness is carried out by a candleling method by which the transparency of the egg can be seen:

- Fresh eggs are nearly transparent.
- If incubation has begun, there is a spot varying in size to the length of the incubation period.
- Rotten eggs are dark colored all the way through.

Seibel has given a fairly good method for determining the approximate age of eggs. He makes the test on the basis of specific gravity, using a brine solution 2 ounces salt to the pint. A fresh egg sinks, one day old sinks just below the surface, 3 days old swims, then higher and higher as the days pass.

Digestibility of Eggs

Raw white of egg resists digestion on account of the presence of antipepsin and antitrypsin. These antibodies are destroyed by heating the egg to 70 degrees C. Thus eggs that are boiled are more completely digested than raw ones. The raw yolk is not so much involved in this problem.

Penzoldt’s figures as to digestibility of eggs are as follows:

- 2 soft boiled eggs leave the stomach in 1½ hours.
- 2 raw eggs                          2¾ hours
- 2 poached eggs and 5 grams butter  2½ hours
- 2 hard boiled eggs                 3 hours
- 2 egg omelet                        3 hours
DIETETICS

Preservation of Eggs

Eggs may be stored for future use by the following methods: Cold storage, freezing, and the use of preserving solutions such as sodium silicate and lime water. Eggs are made into powder by drying for commercial use.

Cooking of Eggs

Eggs are prepared for the table in a variety of ways, but are most digestible when cooked at a low temperature about 185°F. High temperatures make the protein tough and solid thus rendering it less digestible. Fried eggs are cooked at a relatively high temperature and less readily digested.

Chapter X

Composition of Vegetables

Vegetables as Food

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>H₂O</th>
<th>Protein</th>
<th>Fat</th>
<th>CHO</th>
<th>Ash</th>
<th>Calories Per Lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus</td>
<td>94.0</td>
<td>.8</td>
<td>.2</td>
<td>3.3</td>
<td>.7</td>
<td>105</td>
</tr>
<tr>
<td>Beets</td>
<td>87.5</td>
<td>1.6</td>
<td>.1</td>
<td>9.1</td>
<td>1.1</td>
<td>215</td>
</tr>
<tr>
<td>Cabbage</td>
<td>91.5</td>
<td>1.6</td>
<td>.3</td>
<td>5.6</td>
<td>1.0</td>
<td>143</td>
</tr>
<tr>
<td>Carrots</td>
<td>88.2</td>
<td>1.1</td>
<td>.4</td>
<td>9.5</td>
<td>1.0</td>
<td>210</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>92.3</td>
<td>1.8</td>
<td>.5</td>
<td>4.7</td>
<td>.7</td>
<td>140</td>
</tr>
<tr>
<td>Celery</td>
<td>94.5</td>
<td>1.1</td>
<td>.1</td>
<td>3.3</td>
<td>1.0</td>
<td>85</td>
</tr>
<tr>
<td>Corn, Green</td>
<td>75.4</td>
<td>3.1</td>
<td>1.1</td>
<td>19.7</td>
<td>.7</td>
<td>470</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>95.4</td>
<td>.8</td>
<td>.2</td>
<td>3.1</td>
<td>.5</td>
<td>80</td>
</tr>
<tr>
<td>Egg Plant</td>
<td>92.9</td>
<td>1.2</td>
<td>.3</td>
<td>5.1</td>
<td>.5</td>
<td>130</td>
</tr>
<tr>
<td>Lettuce</td>
<td>94.7</td>
<td>1.2</td>
<td>.3</td>
<td>2.9</td>
<td>.9</td>
<td>90</td>
</tr>
<tr>
<td>Onions</td>
<td>87.6</td>
<td>1.6</td>
<td>.3</td>
<td>9.9</td>
<td>.6</td>
<td>225</td>
</tr>
<tr>
<td>Parsnips</td>
<td>83.0</td>
<td>1.6</td>
<td>.5</td>
<td>13.5</td>
<td>1.4</td>
<td>300</td>
</tr>
<tr>
<td>Potatoes, Irish</td>
<td>78.3</td>
<td>2.2</td>
<td>.1</td>
<td>16.4</td>
<td>1.0</td>
<td>385</td>
</tr>
<tr>
<td>Potatoes, Sweet</td>
<td>69.0</td>
<td>1.6</td>
<td>.7</td>
<td>27.4</td>
<td>1.1</td>
<td>570</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>93.1</td>
<td>1.0</td>
<td>.1</td>
<td>5.2</td>
<td>.6</td>
<td>120</td>
</tr>
<tr>
<td>Radishes</td>
<td>91.8</td>
<td>1.3</td>
<td>.1</td>
<td>5.8</td>
<td>1.0</td>
<td>135</td>
</tr>
<tr>
<td>Spinach</td>
<td>92.3</td>
<td>2.1</td>
<td>.3</td>
<td>3.2</td>
<td>2.1</td>
<td>110</td>
</tr>
<tr>
<td>Squash</td>
<td>88.3</td>
<td>1.4</td>
<td>.5</td>
<td>9.0</td>
<td>.8</td>
<td>215</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>94.3</td>
<td>.9</td>
<td>.4</td>
<td>3.9</td>
<td>.5</td>
<td>105</td>
</tr>
<tr>
<td>Turnips</td>
<td>89.6</td>
<td>1.3</td>
<td>.2</td>
<td>8.1</td>
<td>.8</td>
<td>185</td>
</tr>
</tbody>
</table>

Average 88.7 1.5 3.4 8.6 .9 201
Composition of Legumes

<table>
<thead>
<tr>
<th>Legume</th>
<th>H₂O</th>
<th>Protein</th>
<th>Fat</th>
<th>CHO</th>
<th>Ash</th>
<th>Calories Per. Lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soy Beans</td>
<td>12.6</td>
<td>22.5</td>
<td>1.8</td>
<td>59.6</td>
<td>3.5</td>
<td>1605</td>
</tr>
<tr>
<td>Beans, dried</td>
<td>10.4</td>
<td>18.1</td>
<td>1.5</td>
<td>65.9</td>
<td>4.1</td>
<td>1625</td>
</tr>
<tr>
<td>Beans, Lima</td>
<td>89.2</td>
<td>2.3</td>
<td>.3</td>
<td>7.4</td>
<td>.8</td>
<td>195</td>
</tr>
<tr>
<td>Lentils, dried</td>
<td>8.4</td>
<td>25.7</td>
<td>1.0</td>
<td>59.2</td>
<td>5.7</td>
<td>1620</td>
</tr>
<tr>
<td>Peas, dried</td>
<td>5.5</td>
<td>24.6</td>
<td>1.0</td>
<td>62.0</td>
<td>2.9</td>
<td>1655</td>
</tr>
<tr>
<td>Peas, green</td>
<td>74.6</td>
<td>7.0</td>
<td>.5</td>
<td>16.9</td>
<td>1.0</td>
<td>465</td>
</tr>
</tbody>
</table>

General Statistics

The following figures culled from the U.S. Government year book for 1920 give some idea of the production of vegetables in the United States per year:-

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Statistics from Years</th>
<th>Average Yearly Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans</td>
<td>1917-1919</td>
<td>15,125,000 bushels</td>
</tr>
<tr>
<td>Cabbage</td>
<td>1917-1920</td>
<td>1,336,350,000 pounds</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>1917-1920</td>
<td>135,384,000 pounds</td>
</tr>
<tr>
<td>Lettuce</td>
<td>1917-1920</td>
<td>817,136,000 heads</td>
</tr>
<tr>
<td>Peas</td>
<td>1917-1920</td>
<td>7,129,000 bushels</td>
</tr>
<tr>
<td>Potatoes</td>
<td>1911-1920</td>
<td>274,170,000 bushels</td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>1917-1920</td>
<td>971,724,000 pounds</td>
</tr>
<tr>
<td>Sweet Potatoes</td>
<td>1917-1920</td>
<td>76,176,000 bushels</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>1917-1920</td>
<td>1,104,000 tons</td>
</tr>
</tbody>
</table>

The following table from Sherman gives some idea of the economy in using fruits and vegetables in the diet:-

<table>
<thead>
<tr>
<th>15 American Dietaries</th>
<th>Total Cost</th>
<th>Total Calories</th>
<th>Total Proteins</th>
<th>Total Phosphate</th>
<th>Total Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits And Vegetables</td>
<td>18.7</td>
<td>11.8</td>
<td>10.6</td>
<td>18.7</td>
<td>27.3</td>
</tr>
<tr>
<td>Vegetables</td>
<td>11.1</td>
<td>9.0</td>
<td>9.8</td>
<td>18.0</td>
<td>20.6</td>
</tr>
<tr>
<td>Potatoes</td>
<td>3.9</td>
<td>5.3</td>
<td>4.2</td>
<td>8.7</td>
<td>13.5</td>
</tr>
</tbody>
</table>
Digestibility

The following points are of special interest:-

1. Vegetables furnish very little protein.
2. The carbohydrate is abundant and is well utilized by the body.
3. They give a good variety and palatability.
4. Their organic acids and mineral salts are well utilized.
5. They give bulk for the gastrointestinal tract.
6. Following is a comparison of their absorbability as compared with other foods:

<table>
<thead>
<tr>
<th>Vegetables</th>
<th>White Bread 4% not absorbed.</th>
<th>Milk 9% not absorbed.</th>
<th>Peas 9%</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Macaroni</td>
<td>4%</td>
<td></td>
<td>Peas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>4%</td>
<td></td>
<td>Peas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>4%</td>
<td></td>
<td>Peas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>4%</td>
<td></td>
<td>Peas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>7%</td>
<td></td>
<td>Peas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turnips</td>
<td>7%</td>
<td></td>
<td>Peas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Vegetables possibly favor the digestion of other foods.
8. As a rule, vegetables are of low nutritive value.
9. In the coarse form they are hard for some to digest, but when made into puree, anyone can handle them.

Salts of the Vegetable Foods

The following table gives the inorganic constituents of various classes of vegetable foods per 1000 parts of solid dry matter:

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Potash</th>
<th>Soda</th>
<th>Lime</th>
<th>Mg.</th>
<th>Iron</th>
<th>H3PO4</th>
<th>H2SO4</th>
<th>SiO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat (Grain)</td>
<td>19.7</td>
<td>6.14</td>
<td>.44</td>
<td>.66</td>
<td>2.36</td>
<td>.26</td>
<td>9.26</td>
<td>.07</td>
</tr>
<tr>
<td>Potato (Tuber)</td>
<td>37.7</td>
<td>22.76</td>
<td>.99</td>
<td>.97</td>
<td>1.77</td>
<td>.45</td>
<td>6.53</td>
<td>2.45</td>
</tr>
<tr>
<td>Apple (Fruit)</td>
<td>14.4</td>
<td>5.14</td>
<td>3.76</td>
<td>.59</td>
<td>1.26</td>
<td>.20</td>
<td>1.96</td>
<td>.88</td>
</tr>
<tr>
<td>Peas (Seed)</td>
<td>27.3</td>
<td>11.41</td>
<td>.26</td>
<td>1.36</td>
<td>2.17</td>
<td>.16</td>
<td>9.95</td>
<td>.95</td>
</tr>
</tbody>
</table>

Dietotherapy, Volume 1, p. 366

Vegetable Foods VS Animal Foods

The following table gives the comparative distribution of the various nutrients in some animal and vegetable foods:

<table>
<thead>
<tr>
<th></th>
<th>Nitrogenous</th>
<th>Fat</th>
<th>Carbohydrates</th>
<th>Salts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Class of Constituents)</td>
<td>(Per cent)</td>
<td>(Per cent)</td>
<td>(Per cent)</td>
</tr>
<tr>
<td>Fat Beef</td>
<td>51.4</td>
<td>45.6</td>
<td></td>
<td>3.00</td>
</tr>
<tr>
<td>Lean Beef</td>
<td>89.4</td>
<td>5.5</td>
<td></td>
<td>5.10</td>
</tr>
<tr>
<td>Pea Flour</td>
<td>27.3</td>
<td>.8</td>
<td>68.9</td>
<td>3.00</td>
</tr>
<tr>
<td>Wheat</td>
<td>16.6</td>
<td>.9</td>
<td>81.9</td>
<td>.60</td>
</tr>
<tr>
<td>Rice</td>
<td>7.7</td>
<td>.4</td>
<td>91.2</td>
<td>.70</td>
</tr>
</tbody>
</table>

Yeo, in Food in Health & Disease, p. 60
Special Uses of Vegetables

There are a number of very valuable special uses for vegetables, the most important of which follow:

1. They are one of the best sources of iron.
   Comparison in this line is worth while:
   Average for 15 American Dietaries (Sherman)
   
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat Cost</td>
<td>35% Supplied 35% of the iron</td>
</tr>
<tr>
<td>Fruit &amp; Vegetable Cost</td>
<td>18% Supplied 27% of the iron</td>
</tr>
</tbody>
</table>

2. Vegetables lessen intestinal putrefaction by stimulating peristalsis and by furnishing a medium less likely to putrefy.

3. Vegetable foods lessen the acidity of the urine. Thus lessen total output of acid from the body. It is better to have the balance fall on the alkaline side. Meats and eggs show a balance on the acid side. Then eating such food it is important to have extra vegetable food to balance the diet properly.

4. Vegetables have a good supply of water-soluble C vitamin and are thus antiscorbutic in character.

5. Leafy vegetables, such as cabbage, lettuce, and spinach also have fat-soluble A and water-soluble B in fairly good amounts.

Cooking of Vegetables

While some of the vegetables are suitable to be eaten raw, the majority are cooked in some way or other before they are eaten. This is done to soften the cellulose and improve the texture and flavor and thus increase their digestibility. Since the inorganic salts are of such dietetic importance, care must be taken that these are not lost. Methods of cooking that will preserve these salts should be employed as far as possible such as the baking of potatoes, or steaming them in their jackets, the steaming of spinach and swiss chard and the boiling of vegetables in such a way as to retain and serve them in the juice in which they are cooked.

The addition of soda during the cooking of legumes or other vegetables is objectionable because it destroys the vitamins. The common methods of preserving vegetables are canning and dehydrating.

1. Plants fertilize the soil and so add to its productiveness.

2. Chief value is the high content of protein. "Poor Man's Beef". Chief protein present is legumin which is fairly digested and well absorbed but not as complete as some of the animal proteins in amino acid content.

Special Properties of The Legumes
3. Rich in carbohydrate but contain very little fat.

4. They are purin containing foods.

5. In boiling beans the water content rises from 14% to 73, and for peas from 9.7 to 56.9. Must take this into account when comparing with meat.

6. Give better results when combined with other foods.


8. Ash of vegetables is poorer in phosphate than cereals, but richer in potassium and calcium.

---

### Chapter XI

**Fruit As Food**

<table>
<thead>
<tr>
<th>Composition of Fruit</th>
<th>Fruit %</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>Calories/Per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₂O</td>
<td>Protein</td>
<td>Fat</td>
<td>CHO</td>
<td>Ash</td>
</tr>
<tr>
<td>Apples</td>
<td>84.6</td>
<td>.4</td>
<td>.5</td>
<td>14.2</td>
<td>.3</td>
</tr>
<tr>
<td>Apricots</td>
<td>85.0</td>
<td>1.1</td>
<td></td>
<td>13.4</td>
<td>.5</td>
</tr>
<tr>
<td>Bananas</td>
<td>75.3</td>
<td>1.3</td>
<td>.6</td>
<td>22.0</td>
<td>.8</td>
</tr>
<tr>
<td>Blackberries</td>
<td>86.3</td>
<td>1.3</td>
<td>1.0</td>
<td>10.9</td>
<td>.5</td>
</tr>
<tr>
<td>Cherries</td>
<td>80.9</td>
<td>1.0</td>
<td>.8</td>
<td>16.7</td>
<td>.6</td>
</tr>
<tr>
<td>Figs</td>
<td>79.1</td>
<td>1.5</td>
<td></td>
<td>18.8</td>
<td>.6</td>
</tr>
<tr>
<td>Grapes</td>
<td>77.4</td>
<td>1.3</td>
<td>1.6</td>
<td>19.2</td>
<td>.5</td>
</tr>
<tr>
<td>Lemons</td>
<td>89.3</td>
<td>1.0</td>
<td>.7</td>
<td>8.5</td>
<td>.5</td>
</tr>
<tr>
<td>Muskmelons</td>
<td>89.5</td>
<td>.6</td>
<td></td>
<td>9.3</td>
<td>.6</td>
</tr>
<tr>
<td>Oranges</td>
<td>86.9</td>
<td>.8</td>
<td>.2</td>
<td>11.6</td>
<td>.5</td>
</tr>
<tr>
<td>Peaches</td>
<td>89.4</td>
<td>.7</td>
<td>.1</td>
<td>9.4</td>
<td>.4</td>
</tr>
<tr>
<td>Pears</td>
<td>84.4</td>
<td>.6</td>
<td>.5</td>
<td>14.1</td>
<td>.4</td>
</tr>
<tr>
<td>Persimmons</td>
<td>66.1</td>
<td>.8</td>
<td>.7</td>
<td>31.5</td>
<td>.9</td>
</tr>
<tr>
<td>Ripeapples</td>
<td>89.3</td>
<td>.4</td>
<td>.3</td>
<td>9.7</td>
<td>.3</td>
</tr>
<tr>
<td>Plums</td>
<td>78.4</td>
<td>1.0</td>
<td></td>
<td>20.1</td>
<td>.5</td>
</tr>
<tr>
<td>Prunes</td>
<td>79.6</td>
<td>.9</td>
<td></td>
<td>18.9</td>
<td>.6</td>
</tr>
<tr>
<td>Strawberries</td>
<td>90.4</td>
<td>1.0</td>
<td>.6</td>
<td>7.4</td>
<td>.6</td>
</tr>
<tr>
<td>Watermelon</td>
<td>92.4</td>
<td>.4</td>
<td>.2</td>
<td>6.7</td>
<td>.3</td>
</tr>
</tbody>
</table>

**Average** 83.6 .9 .4 14.5 .5 306

<table>
<thead>
<tr>
<th>Fat Containing Fruits</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>Calories/Per Lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₂O</td>
<td>Protein</td>
<td>Fat</td>
<td>CHO</td>
<td>Ash</td>
</tr>
<tr>
<td>Avocado Pears</td>
<td>69.8</td>
<td>2.0</td>
<td>20.0</td>
<td>7.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Olives</td>
<td>64.7</td>
<td>1.7</td>
<td>25.9</td>
<td>4.3</td>
<td>3.4</td>
</tr>
</tbody>
</table>

**Average** 67.2 1.85 22.95 5.65 2.3 1108
Fat Containing Fruits

<table>
<thead>
<tr>
<th>Fruit</th>
<th>H2O</th>
<th>Protein</th>
<th>Fat</th>
<th>CHO</th>
<th>Ash</th>
<th>Calories Per Lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raisins</td>
<td>14.6</td>
<td>2.6</td>
<td>3.3</td>
<td>76.1</td>
<td>3.4</td>
<td>1605</td>
</tr>
<tr>
<td>Dates</td>
<td>15.4</td>
<td>2.1</td>
<td>2.8</td>
<td>78.4</td>
<td>1.3</td>
<td>1615</td>
</tr>
<tr>
<td>Figs</td>
<td>18.8</td>
<td>4.3</td>
<td>.3</td>
<td>74.2</td>
<td>2.4</td>
<td>1475</td>
</tr>
<tr>
<td>Prunes</td>
<td>22.3</td>
<td>2.1</td>
<td>73.3</td>
<td>2.3</td>
<td>1400</td>
<td></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>17.8</td>
<td>2.8</td>
<td>1.6</td>
<td>75.5</td>
<td>2.3</td>
<td>1524</td>
</tr>
</tbody>
</table>

Dietetics

The following figures culled from the U. S. Government year book for 1920 give some idea of the production of a few of the more important fruits:

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Statistics From Years</th>
<th>Average Yearly Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>1917-1920</td>
<td>182,513,000 bushels</td>
</tr>
<tr>
<td>Peaches</td>
<td>1911-1920</td>
<td>46,067,000 bushels</td>
</tr>
<tr>
<td>Pears</td>
<td>1911-1920</td>
<td>12,797,000 bushels</td>
</tr>
<tr>
<td>Oranges</td>
<td>1915-1920</td>
<td>21,617,000 boxes</td>
</tr>
<tr>
<td>Strawberries</td>
<td>1917-1920</td>
<td>135,290,000 quarts</td>
</tr>
</tbody>
</table>

Digestibility of Fruits

Jeffe in 28 digestion experiments found the following coefficients of digestibility for fruit and nut diet:

- Protein 90%
- Fat 85%
- Carbohydrate 95%

A person can maintain good nutrition on a diet of fruits and nuts. Nuts and raisins make a good combination.

The ash of fruits is less than one per cent. on the average, but it is of good quality and is well utilized by the body.

Ash of Fruit

<table>
<thead>
<tr>
<th>Fruit</th>
<th>CaO</th>
<th>MgO</th>
<th>H2O</th>
<th>Na2O</th>
<th>P2O5</th>
<th>Cl</th>
<th>S</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>.014</td>
<td>.014</td>
<td>.15</td>
<td>.02</td>
<td>.03</td>
<td>.004</td>
<td>.005</td>
<td>.0003</td>
</tr>
<tr>
<td>Bananas</td>
<td>.01</td>
<td>.04</td>
<td>.50</td>
<td>.02</td>
<td>.055</td>
<td>.20</td>
<td>.013</td>
<td>.0006</td>
</tr>
<tr>
<td>Figs (dried)</td>
<td>.299</td>
<td>.145</td>
<td>1.478</td>
<td>.064</td>
<td>.332</td>
<td>.056</td>
<td>.056</td>
<td>.0032</td>
</tr>
<tr>
<td>Grapes</td>
<td>.024</td>
<td>.014</td>
<td>.25</td>
<td>.03</td>
<td>.12</td>
<td>.61</td>
<td>.024</td>
<td>.0013</td>
</tr>
<tr>
<td>Oranges</td>
<td>.06</td>
<td>.02</td>
<td>.22</td>
<td>.01</td>
<td>.05</td>
<td>.01</td>
<td>.013</td>
<td>.0003</td>
</tr>
<tr>
<td>Raisins</td>
<td>.08</td>
<td>.15</td>
<td>1.00</td>
<td>.19</td>
<td>.29</td>
<td>.07</td>
<td>.06</td>
<td>.005</td>
</tr>
<tr>
<td>Strawberries</td>
<td>.05</td>
<td>.03</td>
<td>.18</td>
<td>.07</td>
<td>.064</td>
<td>.01</td>
<td>.0009</td>
<td></td>
</tr>
</tbody>
</table>
Dietetics

Values of Fruits

1. Rich base-forming elements. Organic acids and salts are oxidized to alkaline carbonates.
2. They contain flavoring agents which are of great value in stimulating digestion in a psychic way.
3. They are diuretic, laxative and antiscorbutic.
4. Fresh fruits compare with vegetables in caloric yield. Dried fruits with bread and dried beans.
5. Fruit juices have a very useful place in feeding the sick and also in the ordinary diet. They have a relatively high caloric value; grapes yielding as many calories per ounce as milk.
6. Unripe fruits are of value in making jellies as they contain pectin bodies. As the fruit ripens these bodies become less in amount. Pectin resembles starch in some respects.
7. Fruits should not be looked upon as simply accessories to the diet but as staple articles. Flavor fruits have above 80% water, while those which have fairly high caloric yield have less than 80% water.
8. Fruits are more expensive than cereals but are no more expensive than meats. They are of great value in the diet of man. Dried are economical.
9. Fruit is very likely to be contaminated as it is often exposed on the dirty street. It should be carefully washed before being eaten as T. B. have been found on the skin. It depends to some extent on the character of the surface, in some cases the skin is hairy in character and has a tendency to hold dust and dirt. In cleaning apples as much as .3 pounds of dirt has been removed from 1000 pounds of the fruit.
10. Fruits have no special medicinal values, but from the food standpoint they are of great service.
11. The personal idiosyncrasy of the individual must be taken into consideration in the feeding of fruit.
12. Fruits lend themselves admirably to canning and drying and thus can be made a remarkable addition to the diet throughout the year.

Potential Alkalinity of Fruits

Fruits contain organic acids and their salts, which when oxidized in the body yield alkaline carbonates. This is expressed in c.c. normal alkali. The figure is expressed in one of three ways in the ordinary texts, per 100 calorie sample; per pound of fruit, or per 100 gram sample. The following table gives the two first mentioned as they are the most practical for ordinary use:
### Potential Alkalinity of Fruits

<table>
<thead>
<tr>
<th>Fruit</th>
<th>c.c. Normal Alkali per 100 calorie sample</th>
<th>c.c. Normal Alkali per pound of Fruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>6.0</td>
<td>12.8</td>
</tr>
<tr>
<td>Apricots</td>
<td>10.6</td>
<td>26.9</td>
</tr>
<tr>
<td>Bananas</td>
<td>5.6</td>
<td>16.2</td>
</tr>
<tr>
<td>Grapes</td>
<td>2.8</td>
<td>9.2</td>
</tr>
<tr>
<td>Lemons</td>
<td>12.3</td>
<td>27.4</td>
</tr>
<tr>
<td>Muskmelons</td>
<td>18.8</td>
<td>19.0</td>
</tr>
<tr>
<td>Olives</td>
<td>18.9</td>
<td>188.1</td>
</tr>
<tr>
<td>Oranges</td>
<td>10.9</td>
<td>18.4</td>
</tr>
<tr>
<td>Peaches</td>
<td>12.2</td>
<td>15.6</td>
</tr>
<tr>
<td>Pears</td>
<td>5.6</td>
<td>14.3</td>
</tr>
<tr>
<td>Pineapple</td>
<td>15.7</td>
<td>30.8</td>
</tr>
<tr>
<td>Raisins</td>
<td>6.9</td>
<td>97.0</td>
</tr>
<tr>
<td>Watermelon</td>
<td>8.9</td>
<td>5.1</td>
</tr>
</tbody>
</table>


Blatherwick says there are three fruits which have an acid-yielding ash on account of the benzoic acid derivatives which they contain, they are plums, prunes and cranberries.

### Acids in Fruits

One cannot tell by the taste as to how much acid is present. Ripening offruit lessens the degree of acidity as a rule, and converts much of the starch into sugars. Fruit acid is of value to the body as a flavor substance, these acids are capable of yielding 2.6 calories per gram and they are alkalinizers of the blood and tissues. The most common of these acids are citric, malic, and tartaric.

### Sugars in Fruit

Invert sugar is the most common form present. The following fruits have their sugar in this form:-

- Cherries
- Gooseberries
- Figs
- Grapes

Many fruits have a fairly food quantity of cane sugar mixed with the invert form. The following fruits have the larger part of their sugar in the form of sucrose:-

- Banana
- Pineapple
The following table from Leach, gives definite figures in connection with both the sugar and acid content of fruit:

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Cane Sugar</th>
<th>Reducing Sugar</th>
<th>Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>2.19</td>
<td>5.45</td>
<td>.633</td>
</tr>
<tr>
<td>Apples (other sampl)</td>
<td>5.28</td>
<td>8.72</td>
<td>1.148</td>
</tr>
<tr>
<td>Apricots</td>
<td>6.04</td>
<td>2.74</td>
<td>1.864</td>
</tr>
<tr>
<td>English Cherries</td>
<td>.00</td>
<td>10.00</td>
<td>.661</td>
</tr>
<tr>
<td>Figs</td>
<td>.00</td>
<td>11.55</td>
<td>.57</td>
</tr>
<tr>
<td>Gooseberries</td>
<td>.00</td>
<td>6.40</td>
<td>1.574</td>
</tr>
<tr>
<td>Grapes (hothouse)</td>
<td>.00</td>
<td>17.26</td>
<td>.345</td>
</tr>
<tr>
<td>Grapes (green)</td>
<td>.00</td>
<td>1.60</td>
<td>2.485</td>
</tr>
<tr>
<td>Lemons</td>
<td>.41</td>
<td>1.06</td>
<td>4.706</td>
</tr>
<tr>
<td>Oranges</td>
<td>4.22</td>
<td>4.36</td>
<td>.448</td>
</tr>
<tr>
<td>Peaches (green)</td>
<td>.92</td>
<td>1.07</td>
<td>3.900</td>
</tr>
<tr>
<td>Pears (Madeline)</td>
<td>.36</td>
<td>8.42</td>
<td>.115</td>
</tr>
<tr>
<td>Pineapple</td>
<td>11.33</td>
<td>1.98</td>
<td>.547</td>
</tr>
<tr>
<td>Prunes</td>
<td>5.24</td>
<td>2.43</td>
<td>1.288</td>
</tr>
<tr>
<td>Raspberries</td>
<td>2.01</td>
<td>5.22</td>
<td>1.380</td>
</tr>
<tr>
<td>Strawberries</td>
<td>6.33</td>
<td>4.98</td>
<td>.550</td>
</tr>
</tbody>
</table>

Caloric Yield of Fruit

Fresh fruits yield about 17-19 calories per ounce, 270 to 306 per pound.

Dried fruits average about 95 per ounce, 1524 per pound.

It has been stated, the value of a food cannot always be judged by its ability to yield calories of energy alone.
The following table culled from various sources gives a good idea of the great value of cereals as nutrients:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>10.9</td>
<td>12.4</td>
<td>1.8</td>
<td>69.8</td>
<td>2.7</td>
<td>2.4</td>
<td>14.4</td>
<td>4.7</td>
<td>81.0</td>
<td>100.1</td>
</tr>
<tr>
<td>Buck-Wheat</td>
<td>12.6</td>
<td>10.0</td>
<td>2.2</td>
<td>64.5</td>
<td>8.7</td>
<td>2.0</td>
<td>11.6</td>
<td>5.8</td>
<td>74.8</td>
<td>92.2</td>
</tr>
<tr>
<td>Corn</td>
<td>10.7</td>
<td>10.0</td>
<td>4.3</td>
<td>71.8</td>
<td>1.7</td>
<td>1.5</td>
<td>11.6</td>
<td>11.4</td>
<td>83.3</td>
<td>106.3</td>
</tr>
<tr>
<td>Oats</td>
<td>11.0</td>
<td>11.8</td>
<td>5.0</td>
<td>59.7</td>
<td>9.5</td>
<td>3.0</td>
<td>13.7</td>
<td>13.2</td>
<td>69.3</td>
<td>96.2</td>
</tr>
<tr>
<td>Rice</td>
<td>11.9</td>
<td>8.0</td>
<td>1.9</td>
<td>76.0</td>
<td>.9</td>
<td>1.1</td>
<td>9.3</td>
<td>5.0</td>
<td>88.2</td>
<td>102.5</td>
</tr>
<tr>
<td>Rye</td>
<td>11.6</td>
<td>10.6</td>
<td>1.7</td>
<td>72.0</td>
<td>1.7</td>
<td>1.9</td>
<td>12.3</td>
<td>4.5</td>
<td>83.5</td>
<td>100.3</td>
</tr>
<tr>
<td>Wheat</td>
<td>10.4</td>
<td>12.5</td>
<td>2.2</td>
<td>71.2</td>
<td>1.8</td>
<td>1.9</td>
<td>14.5</td>
<td>5.8</td>
<td>82.6</td>
<td>102.9</td>
</tr>
<tr>
<td>Average</td>
<td>11.3</td>
<td>10.7</td>
<td>2.7</td>
<td>69.3</td>
<td>3.9</td>
<td>2.0</td>
<td>12.5</td>
<td>7.2</td>
<td>80.4</td>
<td>100.1</td>
</tr>
</tbody>
</table>
General Statistics Cereals

The following figures culled from the U. S. Government year book for 1920 give some idea of the annual yield of cereal crops.

<table>
<thead>
<tr>
<th>Cereal</th>
<th>The Average Annual Production From 1911 to 1920</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>199,972,000 bushels</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>15,619,000 bushels</td>
</tr>
<tr>
<td>Corn</td>
<td>2,799,652,000 bushels</td>
</tr>
<tr>
<td>Oats</td>
<td>1,327,300,000 bushels</td>
</tr>
<tr>
<td>Rice</td>
<td>33,703,000 bushels</td>
</tr>
<tr>
<td>Rye</td>
<td>56,605,000 bushels</td>
</tr>
<tr>
<td>Wheat</td>
<td>792,760,000 bushels</td>
</tr>
<tr>
<td></td>
<td>Total 5,225,311,000 bushels</td>
</tr>
</tbody>
</table>

Character & Import of Each Grain

1. Barley is one of the most important sources of vitamins in the grain family since it contains the product in the middle of the grain as well as in the outer coat. Has a protein, hordein, which is very good. Barley is also used in making malt.

2. Buckwheat is not so important as a food product. It has a very high fiber content but when refined can be used as a food. Relatively small amount is grown.

3. Corn is the most important of our cereal crops. In a normal year, the crop runs up to 3,000,000,000 bushels. 85 to 90% of the crop is fed to stock. 40,000,000 bushels are used in the making of glucose. The fat content varies from 2.66 to 7.57%. Corn products are quite numerous; sil, starch, corn meal and glucose being among the most important. Corn is our greatest reserve of food. It is not the cause of pellagra, but is an excellent food and quite easily digested.

4. Oats are next to corn in amount. Used as stock food chiefly, yet are of great value as human food, being chiefly used as a breakfast cereal. The sil content is high, ranging from 4.33 to 8.14%. Oats are a purin containing food.
5. Rice is the most important cereal crop in the world. Most of the rice in the world is polished. By this process one eighth of the grain, is removed, and over one half of the salts, as well as a large part of the vitamin; this accounts for the production of BeriBeri. When polished rice is used as the main article of diet, unpolished rice is a very wholesome food. Rice is easily and thoroughly digested.

6. Rye stands next to wheat so far as bread making is concerned. Much used for bread in Europe. Only about one tenth to one twelfth as much grown as wheat in the United States.

7. Wheat is the typical bread-making cereal of the world. Varieties are very variable, ranging in protein content from 8.5 to 18%. The gluten content is the property which gives wheat its bread-making qualities. Patent white flour is partially devitalized, since quite a part of its vitamin and inorganic salt is removed. Bread is not a true staff of life unless made from the entire grain.

Digestibility As a rule, cereals are well digested. Sherman gives the following coefficients of average digestibility as follows:

<table>
<thead>
<tr>
<th>Cereals</th>
<th>Protein</th>
<th>Fat</th>
<th>Carbohydrate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85%</td>
<td>90%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Special Points of Interest About Cereals

1. Gliadin of wheat, hordein of rye and zein of corn are proteins all of which are lacking in the amino acid lysin. Lack of lysin interferes with growth.

2. Zein of corn does not have tryptophane.

4. Most of the cereals have other proteins which are helpful in preventing too great deficiency in amino acid content.

5. Milk proteins are rich in those amino acids which the cereals lack and hence when milk is eaten with these foods the deficiency is made good.

6. Osborn & Mendel found that animals maintain full nutrition when three-fourths of the protein intake is zein with one-fourth lactalbumin.
Special Points of Interest About Cereals

7. Incomplete digestibility of cereal foods is largely due to the presence of coarse cellulose which is often present. The following table from Sherman well illustrates this.

<table>
<thead>
<tr>
<th>Coefficient of Digestibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
</tr>
<tr>
<td>Standard Patent Flour</td>
</tr>
<tr>
<td>Entire Wheat Flour</td>
</tr>
<tr>
<td>Graham Flour</td>
</tr>
</tbody>
</table>

The lower digestibility of the protein is practically offset by the greater amount of protein present.

8. The cereals contain natural laxative products, the oil of the germ and the phytin of the bran.

9. The ash is quite largely in the bran and germ.

The following comparative composition taken from the United States Department of Agriculture, Bulletin No. 13, gives more definite data:

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Protein</th>
<th>Fat</th>
<th>CHO</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>9.66</td>
<td>14.18</td>
<td>2.61</td>
<td>71.64</td>
<td>1.01</td>
</tr>
<tr>
<td>Bran</td>
<td>10.91</td>
<td>16.28</td>
<td>5.03</td>
<td>62.19</td>
<td>5.59</td>
</tr>
<tr>
<td>High Grade Flour</td>
<td>12.4</td>
<td>11.2</td>
<td>1.0</td>
<td>74.9</td>
<td>5</td>
</tr>
</tbody>
</table>

By this it will be seen that the ash of bran is over 10 times as great in amount as that of fine process flour. Sherman says that wheat contains from 3 to 5 times as much iron, phosphorus, and calcium as does the fine flour made from it. The vitamin content of the products runs somewhat parallel with the ash constituents. This emphasizes the statement given to us years ago that, "Fine flour bread is lacking in nutritive elements to be found in bread made from the whole wheat."

9. Cereals are acid-forming foods. The following table culled from Sherman gives definite information in this regard.

The figures here expressed are c.c. of normal acid represented by the ash of the product in question.
Potential Acidity

<table>
<thead>
<tr>
<th></th>
<th>Barley</th>
<th>Buckwheat</th>
<th>Corn</th>
<th>Oats</th>
<th>Rice</th>
<th>Wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>2.9</td>
<td>2.0</td>
<td>1.5</td>
<td>3.0</td>
<td>2.7</td>
<td>3.3</td>
</tr>
</tbody>
</table>

The following for comparison:

<table>
<thead>
<tr>
<th></th>
<th>Beef, Round</th>
<th>Eggs</th>
<th>Oysters</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>6.8</td>
<td>7.5</td>
<td>30.0</td>
</tr>
</tbody>
</table>

Flour, bread, cornmeal and oatmeal are the cheapest foods when all the facts are considered.
A pound of bread or 12 ounces of flour is equal to 5 or 6 ounces of butter, 1 to 2 pounds of steak or 2 to 3 pounds of fish.

Relative Economy of Cereals

Studies carried out at the University of Maine showed that 17% of the total expenditure for food, in grain products, furnished 40% of the total calories, 25% of the protein and 18% of the phosphorus compounds.

Langworthy figures that for 400 American dietaries grains furnished 43% of the protein, 9.1% of the fat, and 61.8% of the carbohydrate.

Free use of bread and other grain products makes for economy and for a well balanced diet.

The following table culled from the Dietetic Bureau, Boston, Mass., gives the relative economy of cereals versus other foods:

Class I. Very Economical

Oatmeal up to 16 cts. per pound.
Barley up to 10 cts. per pound.
Cornmeal up to 9 cts. per pound.
Hominy up to 8 cts. per pound.
Rice.
Prunes up to 16 cts. per pound.
Raisins up to 16 cts. per pound.
Other dried fruits up to 14 cts. per pound.
Fresh apples up to 2 cts. per pound.
Class 1. Very Economical (continued)

Dried legumes at any ordinary price up to 25 cts. per pound.
Spinach up to 10 cts. per pound.
Potatoes up to 5 cts per pound.
Carrots up to 4½ cts. per pound.
Onions up to 4 cts. per pound.

Class 2. Economical

Oatmeal at any reasonable price.
Barley at any reasonable price.
Cornmeal at any reasonable price.
Rice up to 15 cts. per pound.
Shredded wheat up to 15 cts. per box.
Cream of wheat up to 25 cts. per box.

Prunes up to 23 cts. per pound.
Raisins up to 23 cts. per pound.
Other dried fruits up to 20 cts. per lb.
Bananas up to 30 cts. per dozen.

Spinach up to 16 cts. per pound.
Potatoes up to 8 cts per pound.
Onions up to 6 cts. per pound.
Carrots up to 7 cts. per pound.
String beans up to 10 cts. per pound.
Tomatoes at 5 cts. per pound.

Class 3. Expensive

Corn flakes at any price.
Puffed wheat at any price.
Puffed rice at any price.
Post Toasties at any price.

Fruits in class 2 above price named.
Plums, peaches and pears over 1 ct. each.

Canned peas above 15 cts. a can.
Canned corn above 17 cts a can.
Any other canned vegetables purchased at the store
Asparagus above 10 cts. a pound.
Lettuce above 5 cts. a head.

The purpose of cooking these products is three fold.
1. To sterilize.
2. To improve the flavor and appearance.
3. To make the product more easily digested.

The time for cooking depends upon the toughness and amount of cellulose, ranging from 1 to 4 hours for the raw product. It is very important that cereals be thoroughly cooked before they are eaten.
### Chapter XIII
**Nuts As Food**

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#### Composition of Nuts

The following figures are culled from Bulletin No 28, United States Department of Agriculture, so far as percentage composition is concerned. The calories are figured from the percentage composition, and the acid and base yielding power is taken from Bherman:

<table>
<thead>
<tr>
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<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>4.8</td>
<td>21.0</td>
<td>54.9</td>
<td>17.3</td>
<td>2.0</td>
<td>24.4</td>
<td>144.9</td>
<td>20.1</td>
<td>189.4</td>
<td>3030</td>
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<td>-1.8</td>
<td>-1.8</td>
<td>20.1</td>
<td>3030</td>
<td>3030</td>
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<tr>
<td>Brazil Nuts</td>
<td>5.3</td>
<td>17.0</td>
<td>66.8</td>
<td>7.0</td>
<td>3.9</td>
<td>19.7</td>
<td>176.4</td>
<td>8.1</td>
<td>204.2</td>
<td>3267</td>
<td>-3.2</td>
<td>-3.2</td>
<td>-3.2</td>
<td>8.1</td>
<td>3267</td>
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<tr>
<td>Butter Nuts</td>
<td>4.4</td>
<td>27.9</td>
<td>61.2</td>
<td>3.5</td>
<td>2.9</td>
<td>32.4</td>
<td>161.6</td>
<td>4.1</td>
<td>193.8</td>
<td>3170</td>
<td>-1.2</td>
<td>-1.2</td>
<td>-1.2</td>
<td>4.1</td>
<td>3170</td>
<td>3170</td>
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<tr>
<td>Chestnuts</td>
<td>5.9</td>
<td>10.7</td>
<td>7.0</td>
<td>74.2</td>
<td>2.2</td>
<td>12.4</td>
<td>13.5</td>
<td>86.1</td>
<td>117.0</td>
<td>1872</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cocoanuts</td>
<td>14.1</td>
<td>5.7</td>
<td>50.6</td>
<td>27.9</td>
<td>1.7</td>
<td>6.6</td>
<td>133.6</td>
<td>32.4</td>
<td>172.6</td>
<td>2762</td>
<td>-1.2</td>
<td>-1.2</td>
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<td>32.4</td>
<td>2762</td>
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<tr>
<td>Filberts</td>
<td>3.7</td>
<td>15.6</td>
<td>65.3</td>
<td>13.0</td>
<td>2.4</td>
<td>18.1</td>
<td>172.4</td>
<td>15.1</td>
<td>205.6</td>
<td>3290</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hickory Nuts</td>
<td>3.7</td>
<td>15.4</td>
<td>67.4</td>
<td>11.4</td>
<td>2.1</td>
<td>17.9</td>
<td>177.9</td>
<td>13.2</td>
<td>209.0</td>
<td>3344</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanuts</td>
<td>9.2</td>
<td>25.8</td>
<td>36.6</td>
<td>24.4</td>
<td>2.0</td>
<td>29.9</td>
<td>101.8</td>
<td>28.3</td>
<td>160.0</td>
<td>2560</td>
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<td></td>
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</tr>
<tr>
<td>Pecans</td>
<td>2.7</td>
<td>9.6</td>
<td>70.5</td>
<td>15.3</td>
<td>1.9</td>
<td>11.1</td>
<td>136.1</td>
<td>17.7</td>
<td>214.9</td>
<td>3438</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pine Nuts</td>
<td>6.4</td>
<td>33.9</td>
<td>49.4</td>
<td>6.9</td>
<td>3.4</td>
<td>39.3</td>
<td>176.4</td>
<td>8.0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Walnuts (Eng.)</td>
<td>2.5</td>
<td>18.4</td>
<td>64.4</td>
<td>13.0</td>
<td>1.7</td>
<td>21.3</td>
<td>170.0</td>
<td>15.1</td>
<td>206.4</td>
<td>3302</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walnuts (Blk.)</td>
<td>2.5</td>
<td>27.6</td>
<td>56.3</td>
<td>11.7</td>
<td>1.9</td>
<td>32.0</td>
<td>148.6</td>
<td>13.6</td>
<td>194.2</td>
<td>3107</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Average**  
5.4  18.2  54.4  18.8  2.3  22.1  143.5  21.8  196.0  2999  -1.3

---
Peanuts are by far the most commonly produced of the nuts. However, peanuts are said by some to belong to the class of legumes. The high content of fat seems to give them a place among nuts.

An ordinary year produces nearly $20,000,000 worth of peanuts. The other common classes of nuts are worth about $5,000,000 for the year.

The tough cellulose framework makes digestion difficult but if thoroughly ground up either by chewing or by other means they are easily handled by the majority of people. They should be eaten sparingly since they are a very hearty food, and the high fat content tends to inhibit secretion and delay the passage of food from the stomach.

Prof. Jaffa of the Calif. Experimental station has done some very fine work on the digestibility of nuts and he states that they are a most excellent food.

1. The proteins of nuts have not been extensively analyzed, but those which have been investigated show protein of excellent quality capable of maintaining nutrition. Such nuts as the peanut, almond, and Brazil nut are capable of furnishing complete nutrition to the body.

2. Nuts should not be considered as a meat substitute but rather that meat has been substituted for nuts. Sherman bears this out but he looks at it from the viewpoint of evolution instead of Biblically.

3. Nuts in addition to having an excellent supply of both protein and fat also have a fair amount of carbohydrate, and in this respect are a more balanced food than meats.

4. From the economic viewpoint they are comparable with meat and in some cases are cheaper than meat. The following table will illustrate this:

<table>
<thead>
<tr>
<th>Calories</th>
<th>Cost per Pound</th>
<th>Calories per Protein per pound</th>
<th>Cost per 1000 Cals.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanuts (shelled)</td>
<td>15 cts. 2560</td>
<td>478</td>
<td>6 cts.</td>
</tr>
<tr>
<td>Almonds (shelled)</td>
<td>50 cts. 3030</td>
<td>390</td>
<td>16 2/3 &quot;</td>
</tr>
<tr>
<td>Walnuts (shelled)</td>
<td>60 cts. 3302</td>
<td>341</td>
<td>18 &quot;</td>
</tr>
<tr>
<td>Beef (lean)</td>
<td>20 cts. 900</td>
<td>352</td>
<td>22 &quot;</td>
</tr>
</tbody>
</table>
Special Points About Nuts

5. The protein varies greatly in the different classes of nuts, thus making it possible to plan a number of special dietaries. The average percentage of protein is 18, but coconut is as low as 5.7% while certain pine nuts go up to 33.9%.

6. Fat is very variable and is of good quality. The average for fat is 54.4%, but chestnuts go as low as 7.0% while pecans go up to 70.5%.

7. The water content of nuts is low.

8. They are mostly on the alkaline side, so far as a sh reaction is concerned.

9. Not a well balanced diet and hence are not to be used alone.

10. Walnuts, Almonds, Brazil Nuts, Butter Nuts, Hickory Nuts, and Pine Nuts are of use in diabetes on account of their low carbohydrate, but must be used with care as they have a very high fat content which is contraindicated in some conditions of diabetes.

11. Comparing nuts with white flour it is found that the nut meats contain about 5 times as much fat and about one-fifth the carbohydrate but double the fuel value.

12. Fisher and Fisk mention nuts among the best foods for man in the following:

"Among the best foods for most people are fruits, potatoes, nuts, milk, sour milk, and vegetables. Among the worst foods are the putrefactive cheeses, sweet breads, liver, kidneys, high game and poultry.

13. These authors also make the following statement:  "Peanuts, very slightly roasted and very thoroughly chewed, seldom disagree with one."

14. The common habit of eating nuts between meals or after a hearty meal is a very unhealthful practice. It is this use of nuts that has given them the stigma of being indigestible.
Meat

1. Factor in production of organic disease.
   H.B. arterio-sclerosis - Bright.

2. It is detrimental to attainment of the highest efficiency
   nervous, mental & muscular.

3. An adequate diet is possible without its use.

Lab. of agricultural chemistry U. of Wisconsin
reports: it is certain that all the components
of a successful diet are present
in foods of plant origin.
# Chapter XLIV

## Meat As Food

The following table is taken partly from Sherman. All figures on calories were figured from percentage composition.

<table>
<thead>
<tr>
<th>Protein</th>
<th>Fat</th>
<th>Ash</th>
<th>Cal. OZS</th>
<th>OZS.</th>
<th>OZS/LB</th>
<th>Cal. PER</th>
<th>Acid per 10 Cal. portion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beef (fat)</strong></td>
<td>59.7</td>
<td>17.6</td>
<td>22.0</td>
<td>20.6</td>
<td>58.1</td>
<td>78.7</td>
<td>1259</td>
</tr>
<tr>
<td><strong>Beef (lean)</strong></td>
<td>67.2</td>
<td>19.0</td>
<td>13.2</td>
<td>22.0</td>
<td>34.8</td>
<td>56.8</td>
<td>909</td>
</tr>
<tr>
<td><strong>Veal</strong></td>
<td>71.3</td>
<td>19.9</td>
<td>8.1</td>
<td>23.1</td>
<td>21.4</td>
<td>44.5</td>
<td>712</td>
</tr>
<tr>
<td><strong>Mutton</strong></td>
<td>53.6</td>
<td>16.0</td>
<td>29.8</td>
<td>18.6</td>
<td>78.7</td>
<td>97.3</td>
<td>1557</td>
</tr>
<tr>
<td><strong>Lamb</strong></td>
<td>58.2</td>
<td>17.6</td>
<td>23.1</td>
<td>20.4</td>
<td>61.0</td>
<td>81.4</td>
<td>1302</td>
</tr>
<tr>
<td><strong>Pork</strong></td>
<td>34.4</td>
<td>9.5</td>
<td>55.3</td>
<td>11.0</td>
<td>146.0</td>
<td>157.0</td>
<td>2512</td>
</tr>
<tr>
<td><strong>Fowl</strong></td>
<td>63.7</td>
<td>19.2</td>
<td>16.3</td>
<td>22.3</td>
<td>43.0</td>
<td>65.3</td>
<td>1045</td>
</tr>
<tr>
<td><strong>Bass</strong></td>
<td>77.7</td>
<td>13.5</td>
<td>2.8</td>
<td>21.5</td>
<td>7.4</td>
<td>23.9</td>
<td>462</td>
</tr>
<tr>
<td><strong>Blackfish</strong></td>
<td>79.1</td>
<td>16.8</td>
<td>1.3</td>
<td>21.6</td>
<td>3.4</td>
<td>25.0</td>
<td>400</td>
</tr>
<tr>
<td><strong>Halibut</strong></td>
<td>75.4</td>
<td>13.5</td>
<td>5.2</td>
<td>21.5</td>
<td>13.7</td>
<td>35.2</td>
<td>563</td>
</tr>
<tr>
<td><strong>Salmon</strong></td>
<td>64.6</td>
<td>21.6</td>
<td>12.8</td>
<td>25.1</td>
<td>33.8</td>
<td>56.9</td>
<td>942</td>
</tr>
<tr>
<td><strong>Shad</strong></td>
<td>70.6</td>
<td>18.7</td>
<td>9.5</td>
<td>21.7</td>
<td>25.1</td>
<td>46.8</td>
<td>749</td>
</tr>
<tr>
<td><strong>Trout</strong></td>
<td>70.8</td>
<td>17.8</td>
<td>10.3</td>
<td>20.6</td>
<td>27.2</td>
<td>47.8</td>
<td>765</td>
</tr>
</tbody>
</table>

| **Average** | 65.10 | 17.90 | 16.13 | 20.77 | 42.58 | 63.35 | 1031.6 | 5.27 |

Variation in fat makes it more difficult to set an accurate standard on meat products. It is also not very reliable to make an average on a table like the above, as there are such marked variations in the different products.
During the year 1917, the U.S. produced the following animals for meat:

- **Cattle**: 16,351,600 head
- **Calves**: 8,859,000
- **Sheep**: 12,143,000
- **Hogs**: 57,617,800

According to the World Almanac, the following meat was produced in the year 1917:

- **Carcasses**: 20,265,076,900 pounds
- **Other parts**: 3,348,946,900

The meat packing industry is one of the largest in the U.S. It is made up of some 1641 establishments. In addition to these large concerns there is a good deal of meat slaughtered on the farm. Our annual meat bill amounts to over $2,000,000,000.

The meat packing business began over 50 years ago in Cincinnati, which was then the center of the corn belt. Chicago is now the greatest meat packing center in the world. The following is the meat consumption per capita in the various countries as stated by Fitch in his book Dietotherapy:

- **Australia**: 240 pounds
- **United States**: 172
- **England**: 130
- **France**: 86

**Digestibility of Meat**

- Most easily digested when stewed; least digestible when fried. The kinds of meat less readily digested are pork and veal.
- Protein of meat digested about the same as that of milk and eggs, 97 to 98%.
- Extracted meat digests less readily than the full product, the figure for this being 92%. The extractives apparently stimulate the glands to increased activity.
- Mendel and Fine's work gives the following figures:

  - **Extracted meats**: 89.3 to 91.3%
  - **Fresh meats**: 93.7 to 94.5%

The fat of meat is said to digest to the extent of 95%.
**DIETETICS**

Ash Constituents: Sherman gives the ash constituents for average meat on the basis of 100 grams of protein as follows:

<table>
<thead>
<tr>
<th>Ash Constituent</th>
<th>Grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Oxide</td>
<td>0.75</td>
</tr>
<tr>
<td>Magnesium Oxide</td>
<td>0.2</td>
</tr>
<tr>
<td>Potassium Oxide</td>
<td>2.0</td>
</tr>
<tr>
<td>Sodium Oxide</td>
<td>0.4</td>
</tr>
<tr>
<td>Phosphorous Pentoxide</td>
<td>2.3</td>
</tr>
<tr>
<td>Chlorine</td>
<td>0.2</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.9</td>
</tr>
<tr>
<td>Iron</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Figuring average protein of meat as about 18%, there would be about 80 grams of protein in a pound, thus making the ash of one pound of meat about .8 of the above figures.

**Beef Extract**

35 pounds of meat make about one pound of concentrated extract and this one pound in turn is sufficient to make about seven gallons of beef tea.

The chief constituents of this extract are creatin, purin bodies, potassium phosphate, and lactic acid. Of these, creatin is the most abundant. Beef extract is stimulating, but it has no food value. Given alone it is worse than no food at all, as it stimulates the body without any real energy elements back of it to keep things going. Some of the constituents of meat extract are actually poisonous.

**Storage of Meats**

1. Cold storage is the most common method used for keeping meats.

Richardson and Scherubel give the following figures about bacteria in cold storage meats:

- Frozen meat is free from bacteria below one centimeter for as long a period as 600 days.
- Meat kept at from 2 to 4 degrees C. Bacteria penetrate to one centimeter in about 30 days.

Storage meats when brought out into a favorable temperature are more likely to decompose quickly than fresh products since numerous bacteria are already present ready to begin more active work as the opportunity offers.
Storage of Meats

2. Drying of meats. Dried beef is one of the most common of the products thus prepared. The process deprives the bacteria of the necessary moisture which they require for activity.

3. Meats are also canned to a considerable extent in the large meat packing plants. Fish are also handled to some extent in this way. The product is thoroughly sterilized by heating under pressure.

4. The use of preservatives such as salt, potassium nitrate, boric acid, and sodium sulphate. Vinegar, smoke, sugar and salt are not restricted as to their use, but the other chemical bodies are somewhat restricted by the pure food laws.

Special Points About Meat

1. Meat produces an excess of acid in the body.

2. Flesh foods are especially subject to putrefactive changes. Meats are always loaded with bacteria.

3. Meat contains waste products such as purin bodies. It is deficient in calcium and iron.

4. Fisher and Fisk say: "Meat eating and a high protein diet instead of increasing endurance, have been like alcohol, to reduce it."

Fisher's experimental work indicates that the low protein and non-flesh dietaries are favorable to increased endurance. Individuals living on such a diet are more enduring than those who live on the average American diet.

5. Prof. L. B. Mendel, in the American Journal of Medical Sciences, Sept., 1919, states the following:- "Milk casein as an article of diet exhibited far less tendency to give rise to intestinal putrefaction than did meat. Vegetable proteins stand in strong contrast to animal proteins, especially meat, in that they do not offer the slightest encouragement to the growth of intestinal putrefactive types of bacteria."

6. Sherman thinks that the use of meats in the United States should be cut down at least one half.

7. At a conference of physicians held in New York, Dr Graham Lusk declared that meat is the curse of the American Nation, and the foundation of the high cost living.

Dr. McCollom at the same meeting stated that unless the consumption of meat is reduced and fresh vegetables substituted, the nation will be visited with some sort of plague such as Beriberi or Pellagra. Dr McCollom stated that it is a mistaken idea that meat is an essential food. (Culled from the Review & Herald)
1. Definite diseases are transmitted by the flesh of animals, such as tape worm and trichina.

2. Meat is a carrier of germs as the following figures from the work of Weinzirl and Newton will show:

Hamburg steak as sold showed a bacterial count ranging from 269,000 to 525,000,000 per gram with about half of the samples above 10,000,000 (Sherman, page 194)

3. The United States Government conducts a very good meat inspection, but it is said that not more than half the animals slaughtered are inspected as a great deal of the work is done by small institutions and by the farmer himself; under these conditions it is not possible for all the meat produced to be looked over by an expert.

4. Ptoamine poisoning and Botulism are not infrequent and they occur quite largely as the result of the use of meats and meat products.

5. Sherman says: "Of the various classes of foods, meat is one of the most important and it is certainly the one most subject to conditions rendering it unwholesome and dangerous.

Chapter XV

Acid And Base Forming Foods

How Acids And Bases Are Produced

When protein in large amount is oxidized in the body, large amounts of sulphur and phosphorus are also oxidized to yield sulphuric and phosphoric acids. These acids require bases to neutralize them and hence the alkali of the body is called upon to keep the tissues near to neutrality.

In the case of fruits and vegetables there are always present acid salts of organic character and as the organic part of the compound is oxidized it leaves the base, mostly potassium, to combine with the oxidized part of the compound, to form alkaline carbonates which are basic in character. Meat, eggs and cereals are the chief acidic yielding foods, while milk, fruit, and vegetables are on the base yielding side.

Methods Of Expressing Potential Acid Or Base

There are three plans in use for expressing the acid or base yielding power:

1. In c.c. normal acid or alkali per 100 grams of edible portion of the product in question.

2. The same per 100 calorie portion.

3. Same basis of expressing, but per pound of food sample.
In a well balanced dietary the alkalies should be in excess. If the acid side is high, it should not exceed 25 units per day according to the best authorities.

Classificaiton of Foods as to Acid and Base

1. The acid-forming figures given represent c.c. of normal acid per 100 calorie sample of the food.

<table>
<thead>
<tr>
<th>Food</th>
<th>Acid Formation (c.c.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef, ribs, fat</td>
<td>1.9</td>
</tr>
<tr>
<td>Beef, round, free from visible fat</td>
<td>10.0</td>
</tr>
<tr>
<td>Bread, white, average</td>
<td>2.7</td>
</tr>
<tr>
<td>Corn meal</td>
<td>1.5</td>
</tr>
<tr>
<td>Crackers, soda</td>
<td>2.0</td>
</tr>
<tr>
<td>Eggs</td>
<td>7.5</td>
</tr>
<tr>
<td>Flour, wheat, entire</td>
<td>3.3</td>
</tr>
<tr>
<td>Lentils</td>
<td>1.8</td>
</tr>
<tr>
<td>Oysters, fresh</td>
<td>30.0</td>
</tr>
<tr>
<td>Peanuts</td>
<td>1.2</td>
</tr>
<tr>
<td>Rice</td>
<td>2.7</td>
</tr>
<tr>
<td>Shredded wheat</td>
<td>3.3</td>
</tr>
<tr>
<td>Walnuts, Calif. (English)</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Culled from Sherman

2. Base-forming. Figures expressed in terms of normal alkali per 100 calorie portion.

<table>
<thead>
<tr>
<th>Food</th>
<th>Base Formation  (c.c.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>1.8</td>
</tr>
<tr>
<td>Apples, fresh</td>
<td>6.0</td>
</tr>
<tr>
<td>Apricots, fresh</td>
<td>11.0</td>
</tr>
<tr>
<td>Asparagus, fresh</td>
<td>3.4</td>
</tr>
<tr>
<td>Bananas</td>
<td>5.8</td>
</tr>
<tr>
<td>Beans, baked</td>
<td>5.9</td>
</tr>
<tr>
<td>Beans, Lima, fresh</td>
<td>11.0</td>
</tr>
<tr>
<td>Beets, fresh</td>
<td>23.6</td>
</tr>
<tr>
<td>Cabbage</td>
<td>18.0</td>
</tr>
<tr>
<td>Carrots</td>
<td>24.0</td>
</tr>
<tr>
<td>Celery</td>
<td>42.2</td>
</tr>
<tr>
<td>Cocoanut</td>
<td>1.2</td>
</tr>
<tr>
<td>Cucumber, fresh</td>
<td>45.5</td>
</tr>
<tr>
<td>Dates</td>
<td>3.2</td>
</tr>
<tr>
<td>Figs, dried</td>
<td>32.3</td>
</tr>
<tr>
<td>Grapes</td>
<td>2.8</td>
</tr>
<tr>
<td>Grape Juice</td>
<td>4.0</td>
</tr>
<tr>
<td>Lemons</td>
<td>12.0</td>
</tr>
<tr>
<td>Lemon Juice</td>
<td>4.1</td>
</tr>
<tr>
<td>Lettuce</td>
<td>38.6</td>
</tr>
<tr>
<td>Milk, condensed, unsweetened</td>
<td>2.7</td>
</tr>
<tr>
<td>Milk, whole</td>
<td>2.5</td>
</tr>
<tr>
<td>Muskmelons</td>
<td>19.0</td>
</tr>
<tr>
<td>Olives</td>
<td>18.6</td>
</tr>
</tbody>
</table>
Classifications of Foods as to Acid and Base

<table>
<thead>
<tr>
<th>Foods</th>
<th>Acid</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oranges</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>Orange juice</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>Peaches, fresh</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>Peas, canned</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Peas, green</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Pineapple, fresh</td>
<td>15.7</td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Potatoes, sweet</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>Raisins</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Spinach</td>
<td>113.0</td>
<td></td>
</tr>
<tr>
<td>Tomatoes, fresh</td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td>Watermelon</td>
<td>8.8</td>
<td></td>
</tr>
</tbody>
</table>

Culled from Sherman


Starches, sugars, fats, and oils do not ordinarily contain acid or base-forming elements.

By the use of the above table one can pick out the foods which are the most useful in treating cases of acidosis. Allen's treatment of diabetes makes use of this principle in keeping down acidosis. The foods rich in alkali yield are better than the use of alkalies direct in the handling of such cases.

Chapter XVI

Preservatives, Colors, Flavors And Sweeteners

<table>
<thead>
<tr>
<th>Reason for Use of Preservatives</th>
<th>Common Preservatives And Foods In Which Each is Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>In many cases the preservative is used to help in keeping an inferior product. In other instances the food product is slighted in its preparation and is kept from spoiling by the addition of some chemical substance. In most cases if the food is given proper attention it will need no preservative.</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Animal Food, Milk</td>
</tr>
<tr>
<td>Borax: Acid &amp; Borax</td>
<td>Jams and Jellies</td>
</tr>
<tr>
<td>Salicylic Acid</td>
<td>Fruits and Vegetables</td>
</tr>
<tr>
<td>Benzoic Acid and Benzoates</td>
<td>Ketchups and table Sauces</td>
</tr>
<tr>
<td></td>
<td>Wines, Beer and Cider</td>
</tr>
<tr>
<td></td>
<td>Ketchup, Fruit Products</td>
</tr>
<tr>
<td></td>
<td>Soft Drinks, Wines</td>
</tr>
<tr>
<td></td>
<td>Codfish, Fat</td>
</tr>
</tbody>
</table>
List of Common Preservatives (continued)

Sulphurous Acid and Sulphates
Fruit Juices
Fruit Pulps
Vegetable Pulps
Wines
Malt Liquors
Malt Products
Meat Products
Fruit Products

Formic Acid

Fluorides, Fluosilicates, Fluoborates

Betanaphthol

Cider

Spices as Preservatives

1. Effective group
Cinnamon
Cloves
Mustard
Nutmeg
Allspice

2. Less effective
Ginger
Black Pepper
Ceyenne Pepper

3. Ineffective

Law on Preservatives

Law allows free use of those preservatives which are condimental in character such as salt, sugar, vinegar, wood smoke, and spices.

Potassium nitrate is used without restriction.

The benzoates can be used in small amounts but their presence and the amount used must be placed on the label.

Salicylic acid is forbidden.*

Coal Tar Dyes in Food

The following colors are permitted according to the Pure Food Law Ruling of 1907:-

Red Shades
107 Amaranth
55 Ponceau 3 R
517 Erythrosin

Orange Shade
85 Orange I

Yellow Shade
4 Naphthol Yellow S

Green Shade
435 Light Green S.F. Yellowish

Blue Shade
692 Indigo Disulphoacid

* Dr. H.W. Wiley, former head of the Chemistry Bureau of the Government is strongly against food preservatives. He says that good food does not need preservation of artificial color.
The flavoring extracts commonly used are vanilla, lemon, orange, almond, pineapple, strawberry, and wintergreen. There is a large list in addition to the above but they are less frequently used. These extracts are usually in liquid form and are made by dissolving the active agent in alcohol. There are two classes:

1. The natural or genuine.
2. The artificial or synthetic.

These have a limited use in cookery, in that they help to make certain foods more appetizing. They should be used in such a way that the natural food flavors will not be lost. Their flavoring properties are due to the volatile principles which they contain. The alcohol which these flavors contain is quickly volatilized during the baking or cooking process. The genuine extract is to be preferred when it can be obtained.

A number of products are on the market which are used in the place of sugars. They are usually much more active as sweetening agents but are valueless as foods and are undoubtedly harmful to the digestive tract if used for any length of time or in large amounts.

The following are among the most interesting examples:

- Saccharin - 300 to 500 times sweeter than cane sugar. Also somewhat antiseptic.
- Dulcin or Sucrol - 400 times sweeter than cane sugar.
- Glucin - 100 times sweeter than cane sugar.

According to the Pure Food Law Food is Adulterated:

1. If any substance has been mixed or packed with it so as to reduce or lower or injuriously effect its quality or strength.
2. If any substance has been substituted, wholly or in part.
3. If any valuable constituent has been wholly or in part abstracted.
4. If it be mixed, colored, coated, powdered, or stained in a manner whereby damage or inferiority is concealed.
5. If it contain any added poisonous or other added deleterious ingredient which may render it injurious to health.
6. If it consist in whole or in part of a filthy, decomposed, or putrid animal or vegetable substance or any portion of an animal unfit for food, or if it be the product of a diseased animal, or one that has died otherwise than by slaughter.
According to the Pure Food Law, food is misbranded:—

1. If it be an imitation of, or is offered for sale under the distinctive name of another article.
2. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when it is not so, or if the contents shall have been substituted in whole or in part, or if it fail to bear a statement on the label of the quantity or proportion of any narcotic or habit-forming drug it contains.
3. If, when sold in package form it fails to bear a correct statement of weight, measure, or numerical count of its contents; provision being made for reasonable variations and for certain exemptions.
4. If the package containing it or its label shall bear any statement, design, or device which is false or misleading in any particular.

Chapter XVII

STIMULANTS

1. Alcoholic liquors.
2. Coffee.
3. Tea.

Alcohol as a Food

Bastedo says that alcohol is not a food but that it should be classified with the narcotic poisons since it has the following actions:—

1. It is irritant locally.
2. It is destructive to tissue.
3. It has narcotic action.
4. Forms a vicious habit.

Atwater and Benedict found that as much as 6 ounces could be oxidized in the body in a day and this finding has led some to class it with the foods.

Krapelin says that \( \frac{1}{2} \) to 1 liter of beer lowers the clinical intellectual power, impairs memory and retards simple mental processes.

Careful tests have shown that even moderate doses lessen the ability of compositors to do their work,
Alcohol
From
Clinical Laboratory Standpoint

Now held that alcohol is in reality not a stimulant. Simply narrows the field of consciousness. The man who wakens up under alcohol is going to sleep so far as judgment and reason are concerned. (Fisher & Fisk)

Alcohol works like the anaesthetics.

Alcohol lessens muscular power.

It restricts the formation of antibodies.

It depresses the heart and circulation.

It is a protein sparer, according to Atwater, Benedict, and Beebe, and can to a certain extent take the place of carbohydrate and fat.

Alcohol and Fisher & Fisk gave the following statistics taken from Life American Companies:-

<table>
<thead>
<tr>
<th>Use of Alcohol in United States</th>
<th>Moderate Drinkers</th>
<th>Heavy Past Drinkers</th>
<th>Very Moderate Drinkers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>86% above average risk</td>
<td>50% &quot; &quot; &quot;</td>
<td>18% &quot; &quot; &quot;</td>
</tr>
</tbody>
</table>

It can thus be seen that even small amounts shorten life.

Alcohol has steadily climbed up in amount used until our present prohibition law went into effect. The following figures from the Temperance Torchlights are interesting in this connection:-

<table>
<thead>
<tr>
<th>Year</th>
<th>Gallons per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840</td>
<td>4</td>
</tr>
<tr>
<td>1860</td>
<td>5 1/3</td>
</tr>
<tr>
<td>1880</td>
<td>10</td>
</tr>
<tr>
<td>1890</td>
<td>15</td>
</tr>
<tr>
<td>1900</td>
<td>17 2/3</td>
</tr>
<tr>
<td>1908</td>
<td>23</td>
</tr>
</tbody>
</table>

Alcohol
A Fooler

Makes a man feel rich when poor.
Makes a man feel strong when he is weak.
Makes a man feel warm when he is cold.
"Wine is a mocker, strong drink is raging: and whosoever is deceived thereby is not wise." Prov. 20:1
"Look not upon the wine when it is red-- At last it biteth like a serpent and stingeth like an adder." Prov. 23:31-32
Tea

General Character

---

Tannic acid is one of the most active astringents. By its astringent property it definitely lessens secretion, and by its continued action day after day it damages the mucous membrane. It also precipitates the digestive enzymes to some extent. 1 cup of tea contains as much as 10 to 12 grains of this agent.

In coffee the tannic acid is combined in such a way that its astringent action is less marked.

Action of Caffeine

---

1. Stimulates higher centers producing wakefulness.
2. Stimulates the heart.
3. Stimulates the muscular system
4. Stimulates the kidney.
5. Markedly toxic in large doses.
6. Secondary effects are marked debility.

Comparison

---

Tea, Coffee And Cocoa

<table>
<thead>
<tr>
<th></th>
<th>Tea</th>
<th>Coffee</th>
<th>Cocoa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Harmful principles</td>
<td>Caffeine</td>
<td>Caffeine</td>
<td>Theobromine</td>
</tr>
<tr>
<td>2. Physiological effect</td>
<td>Stimulates brain, kidney and heart</td>
<td>Same</td>
<td>Stimulates kidney and heart. Brain none.</td>
</tr>
<tr>
<td>3. Nutritive value</td>
<td>None</td>
<td>None</td>
<td>40 Calories per 10 grams</td>
</tr>
<tr>
<td>4. Medicinal dose</td>
<td>1-5 grs</td>
<td>1-5 grs. 2-10 grs.</td>
<td></td>
</tr>
<tr>
<td>5. Amount in cup</td>
<td>1-2 grs</td>
<td>1½-3 grs. 1½-2 grs.</td>
<td></td>
</tr>
<tr>
<td>6. Habit formation</td>
<td>Marked</td>
<td>Marked</td>
<td>Very little</td>
</tr>
</tbody>
</table>

Beef Extract

---

Made by extracting the soluble material from meat by exposing it to pressure and then separating the fat and soluble material by cooling. 34 to 35 pounds of meat make one pound of the concentrated extract which on dilution, as in making beef tea, will give about 70 pints of the product, each pint of which represents about one half pound of original meat.

Beef extract was formerly thought to yield actual energy to the body, but Liebig himself, one of the first to prepare the product, states to the contrary as follows: "Meat extract cannot make us strong but it makes us aware of our strength."

Beef extract has practically no nutritive value and it is said that animals fed on beef tea alone will die more quickly than those who are placed upon a starvation program.
The explanation of such an occurrence lies in the fact that the animals thus fed are stimulated to increased activity without adequate energy supply to make the activity possible and in addition the beef extract contains substances that are more or less poisonous in character.

Hutchison says that beef extracts are flavoring agents, and their proper place is in the kitchen and not at the bedside. Vegetable extracts are being successfully used as flavoring agents instead of meat extracts. These are much less objectionable.

The following substances are the chief constituents of meat extracts:

- Creatin
- Purin Bases
- Amino Acids
- Potassium phosphate
- Lactic Acid

These constituents stamp the product as belonging to the excretory products of the body.

Chapter XVIII
Condiments And Spices

Use for Condiments And Spices

1. Supposed to be of value in stimulating the appetite. The mucous membrane of the stomach is stimulated and secretion as well as peristalsis are thought to be increased.

2. All agree that their excessive use may cause chronic congestion of the liver and chronic catarrh of the stomach.

3. Healthy individuals do not need such stimulation and such irritating substances are contra-indicated in disease. Their field of usefulness is very limited.

Grouping of Condimental Substances

1. Mustard, pepper, horseradish, ginger, cayenne pepper, allspice, pimento.

2. Cloves, nutmeg, mace, caraway, anise seed, cinnamon.

3. Mints, such as thyme, sage, mint.

4. Parsley, juniper, fennel.

The majority of the above substances are definitely injurious, this is especially true of mustard, horseradish, ginger, cayenne pepper, pepper and cloves.
Others of the group are practically harmless such as thyme, mint, sage and parsley.
In addition to the above groups there are prepared hot sauces, relishes, pickles, etc., which are very harmful.

Active Principles

In some cases the active principle is closely allied to phenol.
Others have balsams and resins as their active agent.
Still others have volatile oils as in the case of mustard, horseradish and garlic.
A few have stearoptens or camphor-like bodies.

On account of these constituents some are used in a medicinal way as antiseptics carminatives and antispasmodics.

Effects of Condiments

1. Their constant use prevents one from really appreciating good wholesome food flavors.
2. The highly seasoned food tends to cause overeating with its troubles.
3. Their constant contact with the stomach produces irritation which eventually results in disease.
4. The liver, kidneys and other vital organs are forced to fight constantly against irritant bodies which eventually cause damage to their structure.
5. The use of these substances produces a thirst for drink stronger than water.
6. Those who use condiments find it necessary to gradually increase the amount used to satisfy the unnatural appetite created by them.

Chapter XIX

Food Combinations

The problem of food combination is of the greatest importance, especially in disease, but as a matter of fact it is little thought of by the average medical man. In our work we should seek to intelligently plan the dietary for our cases so that the very best results will be obtained. Food combination must be considered from several viewpoints:

1. Acid and base balance.
2. Mixture of food.
3. Caloric balance.
4. As an art.
Acid And Base Forming Foods

1. Acid Forming, - Meat, Eggs, Cereals.

As has been previously stated, it is important not to have the balance of acid-forming foods in excess over the base-forming class. In fact, it is better to have the balance fall to the alkaline side. Some have said that an excess of acid-forming foods is an important factor in the causation of such diseases as nephritis. The use of low protein ration, especially where fruits and vegetables are used freely aids in maintaining the proper balance.

The following combinations of food have been found to be favorable to good digestion:

---
1. Cereals with any other class of foods.
2. Nuts with any other class of foods.
3. Eggs with any other class of foods.
4. Fruits with cereals and nuts.
5. Milk with cereals and sub-acid fruits.
6. Vegetables with cereals and nuts.
---

The following combinations of food have been found to be undesirable for good digestive work:

---
1. Large quantities of milk and sugar.
2. Fruit with coarse vegetables.
3. Milk with strong acids.
4. Cooked fruits containing sugar and milk.
5. Starch with acids in the same dish.
6. Too many kinds of food at one meal.
7. Complicated mixtures of any kind.
---

The dietary should be planned to supply proteins, fats and carbohydrates in the proper amount and proportion.

The combining of foods on the basis of the low protein ration is most satisfactory in the great majority of cases, the standard being 1 gram of protein per kilogram of body weight. The following percentage distribution of calories is about the way the ration should be worked out:

- Protein Calories 10% of total.
- Fat Calories 25% of total.
- Carbohydrate Calories 65% of total.

These figures are approximate only, but in general represent the most favorable combination to give efficiency and endurance. Care should be taken to supply protein of good quality, so that all bodily nitrogen needs will be met.
Combinations To Prevent Fermentation

A large number of people who suffer from gastrointestinal disorders have fermentative processes going on in the digestive tract producing gas, and a diet in which the following points are carefully carried out, gives great relief in the majority of cases:

1. Fairly dry foods which require much chewing.
2. Very little water at meal time.
3. No soups, or other largely liquid foods.
4. Simple combinations.
5. Restrict amount of food to actual body needs.
6. Avoid easily fermentable fruit beverages.
7. Avoid fruit and vegetables at the same meal.
8. Restrict the use of sugar.

Combining Food As An Art

The combination of food is both a science and an art. The meal may supply the foodstuffs in their proper proportion and amount and yet not be at all appetizing. It has been proven that the psychic factor as an aid to digestion is an important one. This must not be overlooked in feeding of the sick. Care should be taken to put the foods together in such a way as to constitute a meal that will appeal to all the senses.

Chapter XX

Vegetarianism Versus Mixed Diet

In the main, most people consider the problem of vegetarianism as chiefly related to the protein class of foods. The protein of vegetable foods is less available as a rule than that of meats. However, when the proteins of vegetable origin are thoroughly disintegrated, they are in many cases, just as satisfactory as those of flesh foods. Recent study has shown that the proteins of nut and especially useful since they are perfect in amino acid content and when properly eaten are easily digested.

Strict Vegetarianism

It is more difficult to properly balance the dietary with an entire absence of animal foods than it is to do so when foods like milk and eggs are included. It is the lacto-vegetarian program which is most desirable under the present conditions and this plan is recognized by authorities at the present time as the most desirable dietary for man. On such a program, it is fairly easy to maintain the low protein standard and still include sufficient other foods to keep up the energy requirements of the body.
From the economical viewpoint the argument is all on the side of a non-flesh program. The great war has taught us that we can live much more economically without meats than with them. We have also learned that meat is not essential to good nutrition. The production of meat is a wasteful process so far as food is concerned.

The idea that meat is essential to endurance and strength is not founded upon facts, as the following points will clearly indicate when they are carefully considered.

1. Chittenden's results in connection with low protein standard. This worker found that perfect nutrition, endurance and bodily health can be maintained on not more than one half the protein which was formerly thought necessary for a balanced ration.

2. Fisher's experiments on endurance proved conclusively that the non-flesh diet gives greater ability to endure than a diet containing meat.

3. Loteyko's experiments showing that vegetarians surpassed the carnivora by 53% in mechanical work.

4. The long distance races are easily won by vegetarians.

5. The long walk of Dr. Deighton on a meat program, from North Scotland to South England, a distance of one thousand miles, in twenty-four days and four hours, was beaten by George Allen on a non-flesh program, who made the same distance in seventeen days.

6. Even Rubner the great German dietitian states that too much meat is eaten by both old and young.

7. Prof. A.E. Taylor says: "Purely physiological and chemical data, abundantly sustained by laboratory researches and animal experimentation, confirm as well as elucidate the now widely made human experience that a properly selected and prepared vegetarian diet is a complete diet for all conditions and periods of life, beyond the lactation term of infancy."

The flesh of animals contains a number of waste products such as creatin, purines and lactic acid. Some of these have definite power as stimulants and
Flesh Foods in some respects resemble tea and coffee. As has been stated before, they do not furnish food material but increase the activities of the body in the same way that drug stimulants do.

Comparison of Meats With Vegetables

<table>
<thead>
<tr>
<th>Meats</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rich in protein</td>
<td>1. Low in protein</td>
</tr>
<tr>
<td>2. Rich in fat</td>
<td>2. Moderate in fat</td>
</tr>
<tr>
<td>3. Practically no carbohydrate</td>
<td>3. High in carbohydrate</td>
</tr>
<tr>
<td>4. Bulk small (hydrate)</td>
<td>4. Bulk larger</td>
</tr>
<tr>
<td>5. Have strong flavor</td>
<td>5. Less marked flavor, but it is enhanced by cooking and combining</td>
</tr>
<tr>
<td>6. Protein easily digested</td>
<td>6. Protein less available unless care is taken in preparation</td>
</tr>
<tr>
<td>7. Marked tendency to putrefaction</td>
<td>7. Very little tendency to putrefaction</td>
</tr>
<tr>
<td>8. Expensive foods</td>
<td>8. Economical foods in most cases</td>
</tr>
</tbody>
</table>

Meat Damaging In Certain Diseases

There are certain disease conditions in which all therapists recognize meat as an undesirable food, and in treating these cases a non-flesh diet is recommended. It will be noted that these diseases are those of a chronic type and they are among the most serious menaces to the human race. The following are the most important of these:

- Arteriosclerosis
- Kidney Diseases
- Gout
- Intestinal toxemia
- Hyperthyroidism
- Chronic skin diseases
- Renal calculi
- Chronic nervous diseases
- Rheumatism (cases
- Fevers
- Ulcer of the stomach
- Diseases of the liver

Transmission of Disease By Meat Eating

1. Dr. Schroeder of the Bureau of Animal Industry, says that 10% of the cattle in the United States are afflicted with tuberculosis.
2. Prof. Ravenal of the University of Wisconsin says that of 35,000,000 hogs slaughtered in the United States in a year, 7,000,000 had tuberculosis.
3. Dr. Turck of Chicago, once said that ulcer of the stomach is not found in those countries where the inhabitants eat largely of rice.
4. Dr. L. Duncan Bulkley, says, "We find that cancer has increased in proportion to the consumption of four articles, meat, coffee, tea and alcohol."
Transmission Of Disease By Meat Eating

- Dr. Lorenz the Vienna Surgeon, attributed our large percentage of appendicitis cases to the use of storage meats.
- Trichina and tape worm have been definitely proven to be transmitted by meats.
- Ptoine poisoning is largely due to meats.
- Bright's disease and high blood pressure are undoubtedly in a large part due to high protein of a heavy meat diet.
- Bacteriological studies have shown that practically all meats are contaminated with innumerable bacteria, some of which are of a damaging type.
- Roger makes the statement: "Decomposing meats (comprising practically all butcher's meats) are full of toxins and bacteria which find in the intestine excellent conditions for their development."

References On Meat Diet

1. M. H. p. 313 (Flesh food never was the best food)
2. M. H. p. 315 (The effects of a flesh diet may not be immediately realized.)

Chapter XXI

Relation of Diet to Disease

General Statement

There is an old adage that "The majority of the people dig their graves with their teeth." This is certainly worth careful thought, for eating does have a most marked bearing upon health.

Fitch in his dietetics says, "Overeating is probably quite as harmful as drinking too freely of alcoholic beverages and is much more common." This may seem an exaggerated statement, yet there is certainly a great deal of truth involved in it.

The chronic diseases which are so prevalent are without doubt in large part due to excessive indulgence in both eating and drinking and in other dietetic errors.

It must be borne in mind that people vary somewhat in their relation to foods; that is, one food may damage a given person far more than it would another. This is evidently referred to by the old adage "One man's meat is another man's poison."

Overeating and its Effects

There are several ways in which overeating damages an individual and the following points are of interest in this connection:
Mortality rate 1918
Organic Heart Disease 152. Per 100,000
Nephritis 96.9
Cerebral Hemorrhage 80.6
Cancer 79.8
Total 409
Overeating And Its Effects

1. Overeating causes an extra accumulation of waste material.
2. The excretory organs are placed under high tension in eliminating the surplus waste. This overload leads to degeneration.
3. It causes increased fermentation in the alimentary tract.
4. A gouty condition is often produced.
5. The working man stands such a program more easily than the business man who sits at a desk, the work tending to help in the oxidation and elimination of the surplus.
6. Overeating is one of the most common dietetic errors, in fact, in this country it is said that most people eat more than is necessary to keep them in normal nutrition.
7. "Many a student broken down by overeating."

Education, page 205

Disease Due to Improperly Balanced Diet

A number of definite disease processes have been traced to diet in a striking way. Among these the following are excellent examples:

1. Scurvy is due to lack of vitamin C, found in fresh fruits and vegetables.
2. Rickets is associated with an impoverished diet.
3. Constipation is due to too concentrated a diet.
4. Pellagra is due to an inadequate diet.
5. Beri Beri is due to lack of water-soluble B-vitamin.
6. Nephritis is due in large measure to too high a protein ration and to an excess of acid yielding foods.
7. Diabetes is closely associated with the excessive ingestion of carbohydrates.
8. "The diseases and suffering that everywhere prevail are largely due to popular errors in regard to diet."

Ministry of Healing, p. 295

Parasitic Diseases

Tape worm is transmitted to the human being by infected beef, pork, and fish that is improperly cooked.

Trichina is transmitted by pork that is infected with the parasite.

Acute Illnesses Due To Diet

Very commonly acute gastrointestinal disorders as gastritis and enteritis are caused by dietary indiscretions such as eating large amounts of candy, eating unripe or spoiled fruit, or indulgence in eating between meals.
Gilman Thompson has summarized the food factors and dietetic habits in relation to the production of disease as follows:

1. Insufficient food
2. Overeating and overdrinking
3. Wholesome food, but improperly balanced
4. Food containing animal parasites
5. Food containing ptomaines
6. Food containing other poisons
7. Food containing adulterants
8. Food containing microorganisms
9. Food against which certain individuals have an idiosyncrasy.
10. Alcohol.

The diet of the children of Israel was apparently very simple -manna- and there was not one feeble person among them. See Education page 38.

"An ounce of prevention is worth a pound of cure."

Chapter XXII
Diet a Therapeutic Agent

Since diet is such an important therapeutic agent, the diet prescription should be written with as much care and scientific knowledge as prescriptions for other lines of treatment.

A record of the food eaten is always of value especially in severe illness and also in diseases like diabetes.

In order to intelligently write a diet prescription the attending physician must have an accurate knowledge of food values and also must be well informed as to proper combinations of food.

Pawlow's experiments have shown that tasty foods and foods which tempt the appetite are more thoroughly digested and absorbed than those which do not appeal to the individual. It is therefore, very important for the attendant to take extra care in serving the foods in a dainty way, avoiding any distasteful condition in connection with the food or its service.
Diet
Compared
With Other
Therapeutic
Agents

1. It must be borne in mind that diet is not a panacea for all ills.

2. "The therapeutic value of diet in disease is as great, if not greater, than that of drugs, therefore it would be rational and advisable to instruct medical students as thoroughly in the principles of dietetics as in those of pharmacology." Fitch's Dietotherapy

3. "An appropriate diet in disease may be likened to some degree, to the oil by which parts of a rusty engine are lubricated and enabled to run again smoothly as before the break down." -Fitch

4. "An appropriate diet, in the majority of cases, will repair the losses of the organism induced by fatigue, the high temperature or dangerous chills, in a more effective manner than the administration of harmful stimulants." -Fitch

5. "Diet and rest go hand in hand in bringing the sick back to health. It is the rational way of treating disease, because it is in effect, merely the attempt to assist nature to do its work." -Fitch

6. "To be able to advise as to dietaries the physician should also know perfectly the different products available with their price and relative value as well as the best way of cooking in order to suit both the patient and his purse." -Buttner, page 211

7. "In the management of disease affecting the digestive organs proper, and in all affections of metabolism the diet may be said to represent the treatment, and there is hardly any disease which may not be benefited by intelligent feeding." -Pattee p. 331

8. "The physician who has nothing to offer against disease save a drug; the surgeon who knows no other curative agent than the knife, is just as dangerous, and I leave it to the reader to decide who is the greater quack— the naturopathic ignoramus, the prescription writer, or the scalpel hero." -Prof. A. Bier

9. Diet stands very high in the list of therapeutic agents, in most cases far ahead of drugs.

Guides in Dietetics

There are several important factors which should guide one in the handling of a patient's diet. Among these are the following are of great importance:
鳗科 in Dietetics

Guides in Dietetics

1. Body weight.
2. Metabolic rate.
3. Temperature.
4. Personal idiosyncrasy.
5. Appetite. This factor cannot be fully relied upon, but yet it is of considerable service especially if the patient is not perverted.

Rules in Watson gives the following directions for preparing Dietaries for the sick:

1. All directions specific and in writing.
2. Relation of meals to rest, exercise and work should be clearly defined.
3. Quality and quantity as important a consideration as the solid constituents of the food.
4. Bear in mind that the patient in many instances is allowing free play for his appetite. All that is necessary is to get him to stop overeating.
5. Begin by cutting off some of the extras. They may be throwing extra strain on the digestion.
6. Patient's previous experience should be consulted. Have regard to idiosyncrasy also.
7. All meals should be eaten slowly and with proper mastication.
8. Make changes of radical character slowly.
9. If no results in two or three weeks your method is no good.
10. Season of the year an important factor.

Special 1. "God's remedies are the simple agencies of nature. References Pure air and water, cleanliness, proper diet, purity of life and a firm trust in God, are remedies for the want of which thousands are dying." H.L. p. 960

It will be noticed that these remedies include diet as one of the very important factors in the treatment of disease.

2. The true remedies are given in Ministry of Healing, page 127, as follows:

1. Pure air
2. Sunlight
3. Abstemiousness
4. Rest
5. Exercise
6. Proper diet
7. Use of water
8. Trust in Divine power.

3. "As the right hand of the Third Angel's Message God's methods of treating disease will open doors for the entrance of present truth." Vol.7, p. 59
Rules to Guide in Eating

Chapter XXIII

Principles of Eating

1. Eat slowly.

2. Do not eat when exhausted or in an unhappy state of mind. Cheerfulness is an important aid to digestion.

3. Do not wash down your food with water or any kind of a beverage.

4. Avoid overeating.

5. There should be an interval of 5 to 6 hours between meals during which time nothing should be eaten.

6. Make your list of foods balance with 10% protein, 25% fat and 65% carbohydrate reckoned on the basis of caloric yield and a liberal supply of salts and vitamins.

7. Guard against a monotonous diet. Eat few kinds of food at each meal but vary the menu from day to day.

8. Do not eat late at night. The evening meal should be light.

9. Food should be properly cooked to get the best results. Avoid fried foods.

10. Eat green vegetables frequently. It is desirable to have some raw food in the diet daily as raw vegetable salad.

11. Fresh fruits are very healthful articles in the diet.

12. Combine fruits, grains and nuts.

13. Fruits and coarse vegetables are not a good combination.

14. It is better not to take large quantities of cane sugar with milk.

15. Do not eat rich and complicated mixtures.

16. Avoid excessive amounts of salt.

17. Do not use pepper or irritating spices.

18. Cheese, pickles and other such unhealthful foods should have no place in the dietary.
Rules to Guide In Eating

19. Tea and coffee are not foods.

20. Alcohol is a poison.

21. Flesh meats are expensive, make the protein high and are second hand foods, their place is easily supplied.

22. Ripened cheese is a product of putrefactive changes and is not good for food.

Chapter XXIV

DISEASES OF THE STOMACH

Diet In Gastritis

Classification

1. Acute Gastritis
   Usually caused by ingestion of some irritant toxic, such as strong acids, alcohol, strong alkalies, condiments and toxins due to failure of eliminative organs.

2. Chronic Gastric Catarrh
   Rather common condition. Caused by continued use of some irritant such as alcohol, May accompany hyperchlorhydria and hypochlorhydria. Often due to reflex from some other condition such as appendicitis and gall-bladder disease.

Diet Indicated

1. In the acute cases no food should be given for 12 to 48 hours or until the severe symptoms subside. In case of corrosive poison, some demulcent such as albumin water or gum arabic may be used to relieve irritation. Begin feeding with very small amounts (1 - 2 ounces at first) of rice gruel, albumin water, diluted milk, buttermilk or junket. Follow with soft non-irritant foods gradually until the regular diet can be taken.

2. If vomiting is present must have starvation period as in a acute cases. All irritants must be eliminated from the diet. Bland foods should be used, such as gruels, purees, cereal flake foods, rice and buttermilk. If there is an excess of acid present, fatty foods may be used in moderate amount to assist in the control of the acid.
Contraindications
Meats, meat extracts, pickles, condiments, tea and coffee, alcoholics, sugar, pastries, coarse vegetables, and complicated mixtures of any kind.

Special Note
The above outline of diet is suitable for use in cases of irritable stomach due to acute indigestion.

Diet in Hyperchlorhydria

Hyperchlorhydria is a very common condition, it is a symptom and not a definite disease.

Kauffman's classification as to its cause is as follows:
1. Those with an inborn disposition toward
2. Due to faulty habits, especially (acidity. food habits - tobacco, alcohol and intestinal toxemias.
3. Chronic intoxications.
4. Reflex from disturbance in other abdominal organs.

It is very important to eradicate the cause if possible. Treatment of symptoms alone is not capable of bringing about permanent results.

Indicated
Increase fatty foods especially cream and cream soups.
Use olive oil. All vegetables should be made as free as possible of coarse irritating fibre and are best prepared in the form of purées.

Milk is good because of its bland character and its ability to neutralize a large quantity of acid. In many cases it must be modified by dilution or taken in the form of junket. Well cooked cereals can be used. Bread in the form of toast and zwieback is better than the fresh product. Eggs may be used since they are capable of combining with acid readily. Only very simple desserts can be taken.

Contraindications
All condiments as spices, mustard, pepper, vinegar, horseradish and ginger should be eliminated from the diet. Coarse hard material should be avoided. An excess of salt is unfavorable. All acid fruits and in severe cases all fruits should be avoided. Alcoholics of all kinds should never be allowed. Meat and meat extracts stimulate an excessive secretion of acid and should not be used. Syrups, sugar and jellies should be used in very moderate quantity only. Hot biscuit and pastries of rich character as well as all complicated mixtures have a tendency to increase the secretory activity of the stomach.
Diet in Hypochlorhydria (Acidity)

General Statement
This is a condition of diminished or absence of free hydrochloric acid from the stomach.
The chief causes are long standing catarrh of the stomach, former hyperacidity that has caused exhaustion of the glands, pernicious anemia, cancer of the stomach or malignancy of other organs in its advanced stages, severe infectious diseases and general debility from other causes.

Diet Indicated
The diet in these cases is less restricted than in most other conditions. Use must be made of all factors which tend to increase the flow of the digestive juices. Acid fruits are to be used freely. Thorough mastication is very important. A low protein diet is indicated. Free use may be made of cereals, vegetables except those that require a long period for digestion, and milk products such as yoghurt and buttermilk.

Clear soups are good for their stimulating effect.
Eggs may be eaten in moderation especially soft cooked.
All fruit juices are valuable and may be taken to advantage one half hour before meals. Only simple desserts may be taken. The use of dilute hydrochloric acid is often helpful.

Some of these patients have a gastric atony and must be fed small amounts at a time but at more frequent intervals. The food must be very easily digested and of a nature to pass very readily from the stomach.

Contraindications
Meats of all sorts should be prohibited because they require a large amount of acid for their digestion and their putrefactive bacteria are not destroyed.
Excessive amounts of fats inhibit acid secretion.
Indigestible foods of all kinds.

Diet in Peptic Ulcer

General Statement
Peptic ulcer is an erosion of the gastric or duodenal mucosa. They are either acute or chronic in character.
Their chief symptoms are pain which is most pronounced at the height of digestion, and which is relieved by food; gastric discomfort, tenderness on pressure over the stomach usually quite localized in character, nausea and vomiting and in severe cases hemorrhage.
No one symptom is characteristic. The X-Ray has done a great deal to make the diagnosis more certain.
Gastric ulcer is a serious disease and deserves the most careful attention. Dietetics is one of the most important methods of treatment.
Diet in Peptic Ulcer

In considering the medical treatment of ulcer the dietary is of chief importance. There are a number of different plans of treatment employed at the present time. No hard and fast rule can be laid down for ulcer for the various complications and involvements that appear require that the treatment be varied to suit the individual case. There are certain factors however, that favor healing that should be considered for all cases.

1. Fasting.
During fasting the stomach walls are contracted. The peristaltic function and tonal and hunger contractions tend to bring the ulcer edges together. Peristaltic waves and stomach distention widen the gap and retard healing.

2. Lowered Residual Acidity.
It is also known that the fasting residuum contains less than half the free acidity of the digestive phase. There is also a reflux of duodenal contents which neutralizes acidity. This lowered acidity favors healing.

3. Rest.
In the treatment of ulcer one point stands out preeminently i.e. the necessity for rest. The patient should first be put to bed for 3 - 6 weeks. The time of fasting must be governed by the severity of the case. If there has been no hemorrhage or dilatation the fast need be only a couple of days. It should be longer in more severe cases and partial nutrition may be maintained by nutritive drip Murphy enema.

When feeding is begun it must (1) cause as little peristalsis and secretion as possible, (2) must resemble duodenal chyme as far as possible. Carbohydrates are therefore chiefly indicated and the most suitable food to be given first is a dilute solution of sugar, preferably dextrose. This may be followed by the use of macerated dextrinized cereals. Peptonized boiled milk, egg whites, sweet butter, and finely macerated cellulose-free vegetables may be added successfully. The feeding should progress cautiously but by the end of two weeks all these foods may be given.

If the gastric discomfort has entirely disappeared by this time, a more liberal or modified ulcer diet is begun. This diet includes, cream soups, simple custards, cream toast, finely ground cereals, milk, buttermilk, soft cooked eggs, subacid fruits, etc. This diet is gradually increased until the patient is taking a normal diet. Attention must be given to the
Diet for from 6 to 8 months after the ulcer is pronounced cured. 

**Indicated**

- Meat broths or Gravies
- Coarse foods
- Meats
- Acid fruits
- Stimulants
- Indigestible foods

---

The following outline called from Friedenwald & Ruch is very satisfactory plan to follow in applying the Sippy treatment:

1. Patient in bed three or four weeks.

2. Diet consists of three ounces of milk and cream, equal parts of each, every hour from 7 A.M. to 7 P.M. throughout the course.

3. On the third day add:
   
   - 10 A.M.: 1 oz. cereal gruel.
   - 12 Noon: 1 egg soft.
   - 2 P.M.: 1 oz. cereal gruel.
   - 4 P.M.: 1 oz. cereal gruel.

   This is continued until the sixth day.

4. On the sixth day increase to:
   
   - 8 A.M.: 1 egg soft
   - 10 A.M.: 2 oz. cereal gruel
   - 12 Noon: 1 egg soft
   - 2 P.M.: 2 oz. cereal gruel
   - 4 P.M.: 2 oz. cereal gruel

   This is continued until the tenth day.

5. On the tenth day the following increase is made:
   
   - 8 A.M.: 1 egg soft
   - 10 A.M.: 3 oz. cereal gruel
   - 12 Noon: 1 egg soft
   - 2 P.M.: 3 oz. cereal gruel
   - 4 P.M.: 3 oz. cereal gruel
   - 6 P.M.: 1 egg soft

   Feeding should never exceed more than 6 ounces.

6. Gradually increase the diet making the milk and cream basis, adding eggs, cereal gruels, vegetable purées, bread and butter.

7. At ten to twelve weeks increase intervals between feedings to two hours. At 20 weeks go to three meals a day.

8. Indication for alkalis:
   
   - A. Gastric ulcer no stagnation
     
     Midway between meals give powder, consisting of heavy calcined magnesia 10 grains.
Sippy
Treatment

A. Sodium bicarbonate 10 grains.
Alternating with powder containing:
- Bismuth subcarbonate 10 grain.
- Sodium bicarbonate 20-30 "

Early in the case it may be necessary to give powders at night for a time, but when treatment is well started, alkalies between the meals will be all that is necessary.

B. Pyloric or duodenal ulcer with stagnation.
May have to increase alkali.
Many cases of obstruction clear up after a week or two of treatment.

C. Determined control of acidity by aspiration of stomach contents late in the afternoon.
In obstructive cases a 7 hour meal may be used to determine motility.

Diet In Cancer of the Stomach

Cancer of the stomach involves either the cardia or the pylorus. The diet suitable in this condition depends upon the degree of involvement and complication that may be present. Diet offers no cure but aids in maintaining the nutrition of the patient as long as possible. If the growth involves the cardiac orifice, the difficulty in feeding is greatly increased as only liquid food can be taken. If the pylorus is involved the outlook is more hopeful as surgery may arrest the disease for a time at least.

Our chief aim in cancer of the stomach is to make the patient as comfortable as possible, selecting the foods that will be pleasing to his appetite and yet capable of nourishing the body without causing too much distress. It is important to feed a light diet, milk in most cases being a good food to rely upon.
Potatoes, spinach, carrots, peas and corn are suitable when made into the form of puree. All well cooked finely ground cereals are suitable. Eggs may be used preferably soft cooked. If diet is restricted to liquids, eggs may be used in the form of egg-nog.

In all cases of cancer of the stomach effort should be made to select foods that supply a maximum of nourishment but the least irritation since the stomach is usually greatly disturbed and there is more or less gastritis.

Contraindications

- Tea, coffee and alcoholics.
- Condiments, cheese, pickles, pastry & puddings
- Coarse vegetables, fruits or vegetables containing seeds, and rough cereals.
- Meats and all fried foods.
Chapter XXV

DISEASES OF THE INTESTINES

Diet in Enteritis

General Statement
An inflammation of the small intestine. Of frequent occurrence. Etiological factors are:- Indiscretions in diet, mercury or other poisons and irritantsm unhygienic conditions and exposure. Theremay or may not be an accompanying diarrhea. Usually much fermentation.

Diet Indicated
Put patient to bed and give thorough catharsis. Allow only water for 24 to 36 hours. Begin by feeding albumin water, rice water, thin gruels, in case of diarrhea boiled milk is good.

When the acute symptoms have disappeared, soft diet may be used such as finely ground cereals, soft eggs, custards, milk, and later vegetable puree's may be added. Work back gradually to regular diet.

Contraindications
Coarse fermentable vegetables, as cauliflower, cabbage, onions, fruits, spices and condiments.

Diet in Colitis

General Statement
Mucous colitis is a poorly understood disease. It occurs rather frequently but is not often as commonly recognized.

It is important to diagnose it since it makes a field more susceptible to other diseases. In severe cases there are four special manifestations of the disease as follows:-

1. Abdominal pain.
2. Intestinal putrefactive toxemia.
3. Neurotic manifestations.
4. Mucus in the stools.

Diet Indicated
Begin with bland lacto-farinaceous foods. Later a gradual transition to the coarser type with vegetables and fruits. Limitation of the putrefactive proteins such as flesh foods, eggs, beans, peas and lentils. Be sure to have ample quantity of food and insist upon its being eaten. Buttermilk and yogurt are of special value on account of their antiputrefactive action.

Diet in Diarrhea

General Statement
Diarrhea is recognized as being a symptom. In general the causes are as follows:-

1. Use of indigestible food.
2. Use of laxative drugs.
Diet In Diarrhea

General Statement

3. Diarrhea of nervous origin.
4. General toxemia.
5. Defective gastric digestion.
6. Various types of organisms especially in the chronic cases.

Unfortunately it is often difficult to find the actual cause. Effort should be made to accurately diagnose the condition before instituting the treatment.

Diet: Acute Cases
Indicated

Withhold food until the colon is cleansed with some suitable means. Give water freely. Feedings should begin by giving easily absorbed non-irritant foods as cereal gruels, clear vegetable soups, dry toast, and other dextrinized cereal products. Blackberry juice is sometimes indicated because of its astringent effect. Care should be taken not to increase the food too rapidly. Milk should be used with caution, better given boiled. Work gradually onto general diet.

Chronis Cases

The most important point in dealing with these cases is to make sure of the diagnosis. The most careful dietetic management will be of no avail when there is a definitely exciting factor such as ameba. After the diagnosis has been accurately made and the proper medical treatment instituted the diet indicated is a bland non-irritating one yet highly nutritious.

Contra-indications

Coarse food of any kind.
Meats and meat products.
Very fatty foods.
Nuts, pickles, condiments.
Puddings and pastries.

Diet in Constipation

General Statement

Constipation is the retention of feces from any cause. It is a disease of modern life.

Other etiological factors are:
1. Faulty habits of eating.
2. Lack of cellulose in the diet.
3. Sedentary life.
4. Faulty dress.
5. Neglect of the regular habit of bowel movement.
7. Indiscriminate use of cathartics.

The cases may be divided into the following groups:
1. Atonic. Due to inactive or lazy bowel.
Diet in Constipation

Groups

3. Mechanical. Due to organic obstruction such as:
   - Adhesions,
   - Jackson's veil,
   - Lane's kink.

Diet Indicated

Atonic Cases

The diet must include large amount of cellulose or roughage. All fruits, vegetables and whole cereals may be used for this purpose.

Prunes, dates, figs and raisins are especially valuable.

Bran because of its bulky character and its content of phytin, which is a natural laxative, is doubly useful.

Agar agar and paraffin oil are valuable food adjuncts.

Exclusive milk diet where 5 to 7 quarts are used daily.

Fats are valuable.

An exclusive diet of bran and fruit may be employed for a few days.

Massage, abdominal exercises and oil enema go hand in hand with the diet in dealing with these cases.

Spastic Cases

It is necessary to furnish bulk but it must be kept soft and non-irritating. Free use of fats is indicated as olive oil.

Agar agar and paraffin oil find their most important use in this type.

Fruits may be used except those that contain skins and seeds.

Mechanical Cases

Surgical treatment indicated after which the proper treatment as indicated above will help to complete the cure.

Contraindications

The individual should avoid astringents and any food that tends to produce delay in the intestine such as meat, cocoa, chocolate, tea, polished rice and refined cereal products.

Diet in Appendicitis

General Statement

Inflammation of the veriform appendix is the most important of acute intestinal disorders. An infection is an essential factor. Indigestible food, constipation and meat eating are factors favoring the infection.

Diet Indicated

At the onset of the attack all food should be withheld until the acute symptoms disappear or until after the appendix has been removed by operation.

The post-operative care is discussed elsewhere.
Diet in Auto-Intoxication

The whole subject of intestinal auto-intoxication is not well understood and authorities are not agreed as to whether the symptoms are due to chemical or mechanical effects.

There is still considerable evidence not disproven on the side of the chemical theory of the toxemia and the following outline of diet is based on that conception of the subject. Milk is an excellent medium for conveying these organisms since lactose supports their growth.

All are agreed that the lacto-vegetarian is the one indicated.

The diet outlined under constipation is to be followed here. Cultures of bacillus and of the lactic acid type particularly bacillus acidophilus and of the lactic acid type particularly bacillus bulgaricus are especially efficient in changing the intestinal flora when introduced into the colon by enema and are probably of some benefit when taken by mouth. Yogurt containing the above living organisms is of special value as an antiputreafactive agent.

Meat and all meat products are especially prone to favor putrefaction in the intestine. Eggs are best omitted.

Chapter XXVI

DISEASES OF THE HEART AND BLOOD VESSELS

Diet in Functional Heart Disturbances

Includes such conditions as tachycardia and arrhythmia.

Sutherland says: "More patients come to the doctor complaining of heart trouble when the digestion is at fault, than do those whose hearts are actually diseased."

Such disturbances are in many cases due to reflex over the vagus nerve.

Simplicity in eating so as to avoid excessive acid production and fermentation with its attendant gas formation, is the most important factor.

The formation of good habits in connection with eating such as eating slowly, chewing thoroughly and drinking little at meals is of greatest service.

Tea, coffee, alcoholics and tobacco.
Diet in Organic Heart Disease

General Statement

Organic heart disease includes a number of very important conditions such as:

1. Infections as endocarditis and pericarditis.
2. Disease of the muscle wall or myocarditis.
3. Valvular lesions in which the valves have been more or less injured by a disease process.

Some of these cases may be complicated with obesity. These cases may be compensated or not. In failure of compensation it is exceedingly important to keep the digestion in good order. This is difficult since all of the organs will be congested.

Diet Indicated

In endocarditis and pericarditis it is often necessary to feed the case in a similar way to that used in acute fevers, i.e., on a liquid diet consisting of milk, gruels, fruit juices, vegetable broths and purees.

In failure of compensation the quantity of fluids, solids and salt should be restricted for a time. The Karell cure is one of the best methods for the above. The following (is an outline of his method.

First 7 days -- 200 c.c. milk at 8 A.M., 12 Noon, 4 P.M., and 8 P.M. No other fluids.

Eighth day ---- Milk as above.

10 A.M. 1 soft egg.

6 P.M. 2 pieces dry toast.

Ninth day ---- Milk as above.

10 A.M. 1 soft egg, 2 pieces dry toast.

6 P.M. 1 soft egg, 2 pieces dry toast.

Tenth day ---- Milk same

Noon. Chopped meat, rice boiled in milk.

6 P.M. 1 soft egg.

Eleventh and twelfth days --- Same as tenth.

No salt is used throughout this diet.

All meats can advantageously be omitted.

Potter says: "The diet is subject to modification in various ways so as to avoid monotony."

The good effects of this program are said to be due to the following points:

1. The limited fluids.
2. The low salt content of the diet.
3. The elimination of toxins.
4. Antitoxic effect (against uremia).
5. Mechanical (no distention).
Von Noorden recommends "Thirst days" to cut fluid intake in a good many cases a salt-free diet alone using care in the selection of foods will give results. The Karell cure of necessity cuts down the strength of the individual and because of this is not considered favorably by some. It is of special value when the kidneys are involved.

It is very important to keep the bowels regulated and on an antitoxic program.

Diet in Arteriosclerosis and High Blood Pressure

Arteriosclerosis is a condition in which there are degenerative changes in the vessel walls with the result that the arterial walls are firmer and thus less elastic than normally. Such a condition increases the work of the heart and makes the circulation in the various organs less efficient. In some cases the blood pressure is markedly increased while in others it may not be affected at all. As to the cause of this condition Huchard has said:- "Arteriosclerosis begins by intoxication, continues by intoxication and ends by intoxication."

Much of the intoxication is recognized as coming from the intestinal tract as the result of putrefying proteins, especially those of flesh foods. Alcohol, tea, coffee and tobacco also have a very marked bearing on the of this condition. Continued degeneration of the blood vessel walls does injury to the kidney and finally elimination is impaired and a viscous circle is formed.

High blood pressure is a condition in which there is increased tension in the blood vessels which also seems to be due to toxemia. An excess of acid forming foods is also a factor. Stimulating foods, high living, narcotics and strenuous life are fundamental causes.

The low protein ration is of prime importance. A dietary that will keep the bowels moving freely is an essential. Restrict the amount of salt.

The rules given by Cornwall for the diet in hypertension cover the subject in a thoroughgoing way:-

1. Keep the protein low, 60 to 65 grams a day, largely purin-free or with low percentage of extractives.
2. Regulate the quantity to secure the minimum of work for the organs with the maximum nutrition. The caloric value of which should vary from 1500 to
D I E T E T I C S

Diet Indicated

2000 to 3000 accordingly, as the patient is in bed, leading a sedentary life, or working.

3. Restrict the diet so as to meet indications presented by the kidneys, liver, heart and gastrointestinal tract.

4. The diet should be antiputrefactive, excluding fermentable carbohydrates and should be laxative as well.

Contraindications

Flesh meats, tea, coffee, alcohol.

Condi ments.

Flesh meats, tea, coffee, alcohol.

Heavy meals.

Tobacco.

Chapter XXVII

Diseases of the Liver and Gall Bladder

Diet in Catarrhal Jaundice

General Statement

In catarrhal jaundice there is first a catarrhal condition in the duodenum which spreads into the bile ducts causing swelling and interference with the flow of bile. As the bile is secreted continuously by the liver, it must be removed from the ducts in some way to relieve the pressure, this causes absorption of the secretion by the blood with the consequent jaundice. When the bile is prevented from entering the intestine the fats are poorly digested, as much as one half the fat fails to be hydrolyzed and appears undigested in the feces. The excess of fat in the feces lessens digestion and absorption and hence favors putrefaction. A day or two of starvation is excellent at the beginning. Fats must be reduced to a minimum.

Diet Indicated

Skim milk, gruels, vegetable broths, and fruit juices are the mainstay in this condition. At times the stomach may show marked irritation and in view of this it is important to avoid all foods that would disturb this organ. An exclusive diet of skim milk may be employed for a short time. Plan the diet to combat intestinal stasis.

Contraindications

Since putrefaction is increased, high protein especially from meats is very unfavorable. All irritants such as condiments, spices, pickles, etc. Fatty foods.

Diet In Hepatic Congestion (Bilious Attack)

General Statement

The name "bilious attack" is not a satisfactory term to use from a scientific standpoint but it is used frequently by the laity.
Most of such attacks are really acute indigestion due to overeating and drinking and accumulation of waste products and are characterized by headaches, nausea and vomiting, which lasts for a day or two and then quickly disappears. The appetite is lost during the attack but returns as the stomach and intestinal tract are cleared of the offending materials.

Abstinence from food for 1/2 to 24 hours when there is nausea and vomiting, is the most important plan to follow. As the appetite returns, begin with small amounts of modified milk, gruels, vegetable broth and malted milk. The use of semisolid foods and finally in the course of two or three days the average case may return to ordinary wholesome foods.

In a mild attack without nausea and vomiting a fruit diet for a day or two followed by gradual return to normal diet.

In this disease there is definite injury to the liver substance which lessens its power to handle toxic materials. There are two classes of the disease depending upon the part of the organ involved:—1. Portal cirrhosis. 2. Biliary cirrhosis. The dietetic program is about the same in each case.

The chief cause of the portal cirrhosis is the use of irritating food, condiments and alcohol. The cause of the biliary cirrhosis is infection from the intestinal tract. In treating such cases it is obvious that the burden of the liver be cut to the minimum.

The milk diet has been most highly recommended since it lessens intestinal putrefaction and is non-irritating to the gastrointestinal tract. This program may be followed for several weeks. Then gruels, fresh vegetables, fruits and eggs are added. Osler recommends one month of this plan and then a return to the milk alone for a month and continuing alterations for several months. Constipation must be combated.

In cases complicated by ascites the Karell diet may be advantageously employed.

All irritating foods such as condiments and spices, pickles, vinegar, and lactic acid. Alcohol, tea and coffee. An excess of fat should be avoided as it may cause the formation of various organic acids.

Sugar is also unfavorable as it requires more work on the part of the liver.
Diet in Gall Stones

General Statement
Concretions which occur chiefly in the gall-bladder consisting largely of cholesterol. There are three ideas as to their origin:
1. Infection.
2. Stasis.
3. Cholesterol content of the blood.
Diet has no influence in their removal when once formed. This disease is surgical in character. Diet undoubtedly may have some influence in their formation and is thus important as a prophylactic and post operative agency. Faulty dietetic habits such as would favor catarrhal conditions in the stomach and intestines are thought to be influential in disturbing the gall-bladder.

The food should be easily and quickly digested. It should be taken in small quantity and a little more frequently, say four times a day, as this gives more stimulus to the emptying of the gall-bladder.

Fruits are of special value. Rice gruel, potato puree, sago, swolbeck are also valuable substances for this purpose. Unless there is marked distress and colic the diet may be fairly liberal.

Contra-indications
All irritants to the digestive tract as condiments, pickles, alcohol, etc. Meats and meat products on account of the flavor they offer to intestinal putrefaction.
Carbohydrates especially cane sugar, candy, jam and jelly.

Cholesterol free - as examples, jelly, meat

DISEASES OF THE KIDNEYS

Diet in Nephritis

General Statement
Nephritis is an inflammation of the kidney which results in the destruction of the epithelial cells and their replacement by scar tissue. These degenerative changes gradually impair the function of the kidney as an eliminative organ. The chief etiological factors are as follows:
1. Acute infectious diseases such as scarlet fever and diphtheria.
2. Focal infections from tonsils and teeth.
3. Mineral poisons such as lead and mercury.
4. An excessive use of acid producing foods as meats, eggs and cereals.
5. A high protein diet rich in purins.
6. Free use of condiments and spices.
The factors which must be taken into special consideration in dealing with the dietetics of nephritis have to do with the excretion of various substances derived from the digestion of foods, and the different behavior of the diseased kidney from the normal kidney with respect to their elimination. End products of metabolism.

Normal kidney ok.

Impaired function almost always involved.
7. Habitual use of tea, coffee, alcohol, and tobacco.
8. Irritating volatile oils as from garlic.
10. Strenuous life.

The classification of nephritis is both difficult and unsatisfactory. From the dietetic standpoint the most logical and useful grouping is as follows:

1. Acute
2. Chronic

Both of these classes can be subdivided into the following types:

A. Nitrogen retention
B. Salt and water retention

This grouping is made in the light of the present day methods of blood and urinary chemistry. These methods enable the clinician to determine the degree of impairment of kidney function and to classify the cases according to the above groups.

The general principle of the dietetic treatment of kidney diseases is to spare these organs unnecessary labor by lessening the intake of toxins and as far as possible lessen their production within the body; and at the same time supply appropriate food to meet the body’s needs.

**Acute Nephritis**

As a rule food and drink should be limited to the smallest amount. In case of acute uremia, withhold food for 24 hours, water and lemonade can be given if there is no water retention. The Karell diet is often satisfactory for these cases for the first week. As the acute symptoms disappear and the production of urine increases cereal foods may be added and the diet made more liberal by the addition of fats and some of the less fibrous vegetables. The milk diet is very commonly employed in these cases but the long continued use of this diet is unfavorable. In the prolonged cases of the acute type where there is salt and water retention the diet should be made salt free.

**Chronic Nephritis**

In this type it is necessary to make the diet chosen as palatable as possible and as nearly up to full nutrition as the case will permit. The limitations of the excretory power of the kidney should be determined from time to time. The lacto-vegetarian diet is indicated with only a very moderate use of egg yolks. Eggs and legumes are not allowed in severe nitrogen retention type.
**Chronic Nephritis**

As far as possible the diet should predominate in base yielding foods, namely, fruits, vegetables and milk. Care should be taken that the caloric intake does not exceed the actual needs. The diet must be planned so as to keep the bowels acting freely. When there is no water retention, free water drinking is of great value.

In case of water retention, as stated above, the diet should be made salt free and liquids restricted. Such a salt-poor diet can be prepared by the use of the following foods: - Rice, farina, bread (made without salt), milk, butter (unsalted), most fruits, lettuces, carrots, squash, beets, potatoes, sweet potatoes and cantaloupe.

**Contraindications**

1. Tea, coffee, cocoa, alcohol and tobacco.
2. Condiments of all kinds.
4. Meats of all kinds.
5. Celery, onion, garlic, rhubarb, and asparagus.
6. Acid producing fruits, plums, prunes and cranberries.
7. An excess of cereals especially oatmeal.

**Diet in Pyelitis**

An inflammation of the pelvis of the kidney. It is chiefly due to bacterial infection. Other causes which have been suggested are various fevers, cancer, hydatids, the ova of certain parasites, cold and over exertion.

The plan of feeding is the lacto-farinaceous diet. Fruit juices may be given to reduce the urinary acidity, but should not be used when Urotropin is being administered since the latter requires a strong acid reaction of the urine to be effective. Milk diet is often indicated. When there is no edema a large amount of liquid is valuable since it dilutes the waste products and renders the urine less irritating to the kidney. The diet should be planned to combat constipation.

**Contraindications**

Condiments and spices.
Excess of acid producing foods.
Meats and meat products.
Alcohol.
Diet In Urinary Calculi

General Statement

The formation in the kidney or in its pelvis of concretions, by the deposition of certain of the solid constituents of the urine. There are several varieties of calculi as follows:

1. Uric acid and urates
2. Calcium oxalate
3. Phosphatic calculi
4. Rare forms such as cystin, xanthan, calcium carbonate and indigo.

The exact mode of formation is not fully understood but it is quite likely that bacteria form a nucleus about which the chemical substance is deposited.

Diet Indicated

The diet must be simple and rather light.

Purin free foods.

Fruits and vegetables except those yielding oxalic acid are indicated. These can be used only moderately so that the urine will not be made alkaline in reaction.

Free use should be made of liquids.

Milk may be used freely and fats in moderate amounts.

Contraindications

All rich foods.

Meats, particularly of the glandular type.

Fruits yielding oxalic acid, rhubarb, strawberries, etc.

Chapter XXIX

DISEASES OF THE SKIN

Diet in Eczema

Eczema is one of the most important skin diseases since it constitutes about one third of all skin affections. Diet has a marked influence upon the disease both as an etiological factor and in a therapeutic way. The condition is aggravated by intestinal stasis.

The relation of diet to the cause of eczema may be summarized in the following points:

1. Overeating. The skin glands constantly overstimulated.


3. Rich and indigestible food. Clogs the digestive tract which is closely related to the skin.

4. Hypersusceptibility to certain foods. This is a type of anaphylaxis and is seen most frequently in connection with the following foods: Oysters, shellfish, pork, mutton, veal, strawberries, eggs, milk, and tomatoes.
Diet Indicated

The low protein ration is indicated.

Purin free foods.

Buttermilk, toast and citrus fruits have given good success as a diet in handling some of these cases. A bran and fruit regimen is also a valuable means of correcting the condition.

Rice, stale bread, butter and water for five days with a gradual return to an ordinary diet has been recommended in the acute forms of the disease.

A salt poor diet, sometimes gives marked benefit.

Bacillus acidophilus and bacillus bulgaricus in the form of sour milk products may be very useful.

Contra-indications

Meats and meat products.

Spices, condiments, and an excess of salt.

Fried foods, rich pastries, sweets and rich gravies.

Diet in Psoriasis

Psoriasis is a scaly skin disease apparently very closely related to the intake of protein.

Schamberg has shown by experiments that high protein aggravates the condition while marked diminution in the protein intake clears it up rapidly in many cases.

The low protein standard allowing 45 to 60 grams per day or even less for a short time. Care must be taken to supply sufficient nitrogen to keep up the actual needs of the body.

Cereals, fruits and vegetables with limited supply of milka re best suited for such a program.

Diet In Acne

Acne may be divided into two groups:

1. Acne rosacea.
2. Acne vulgaris.

The etiology seems to be somewhat different in the two groups.

Acne rosacea is due to vasomotor instability which is aggravated by alcohol, tea, hot soups, hot drinks, etc.
Dietetics

General Statement

Acne vulgaris is due to a lowered resistance of the skin to infection especially of the staphylococcus type, the infection occurring in the occluded ducts of the sebaceous glands. High blood sugar seems to be a very important factor in many cases. Malnutrition plays an important role in some cases. Acne vulgaris is seen most frequently during the period of adolescence. Acne rosacea requires the use of plain food with the elimination of tea, coffee, alcohol, hot soups, hot drinks, fried foods, fatty foods, excess of sugar and complicated mixtures of all kinds. Acne vulgaris calls for the use of plain wholesome food with limitation of sugars and sweets, pickles, condiments and spices and rich foods.

Yeast has been recommended for this condition and apparently gives good results in many cases.

Diet in Furunculosis

General Statement

Furunculosis is a condition of lowered resistance on the part of the skin. Diet seems to have a fairly definite influence. In cases of diabetes the resistance of the skin to infection is lessened and it is thought that the hyperglycemia is the cause. A good many cases of furunculosis show hyperglycemia and clinically the reduction of carbohydrate intake is very often beneficial.

Diet Indicated

Avoid an excess of carbohydrate by cutting down on sweets, candies and sugar. Fried foods, fatty soups and an excess of fats are to be avoided. Milk, bread, crackers, butter in small amount, vegetables and fruits are the best diet. Yogurt and buttermilk are good. Yeast has been recommended by some. Careful habits of eating such as regularity, proper chewing and the avoidance of overeating are of prime importance.

Contra-indications

Excess of sweets Fried foods and an excess of fatty foods.

Diet in Urticaria

General Statement

Urticaria is an irritated condition of the skin which in practically all acute cases is due to some form of anaphylaxis. In the chronic cases the etiology seems to be from the digestive tract.
General Statement

Heredity plays a part in the disease.

Fish, shellfish, cheese, tomatoes and strawberries seem to be the most common foods at fault. These foods are more active when the digestive tract is disturbed. Effort should be made to find the offending food which causes the trouble.

Diet Indicated

The lacto-vegetarian diet is the best suited for this condition. It is important to keep the bowels active.

Contra-Indications

Any food toward which the individual has an idiosyncrasy. Condiments, spices, garlic and alcohol.
Syrups, candy, cakes and preserves.
Coarser vegetables.
Meats, tobacco.

Chapter XXX

DISEASES OF THE RESPIRATORY TRACT

Diet In Pneumonia

General Statement

Pneumonia is an infection caused by pneumococcus, characterized by inflammation of the lungs, a toxemia of varying intensity, and a fever which usually terminates by crisis.

It is caused by the above organism, but exposure, cold, debility, unhygienic surroundings, alcoholism, ether, anesthesia, trauma, etc., play an important part in lowering the resistance of the individual.

The disease is self-limited and usually of short duration, 7 to 10 days, thus making the feeding problem less difficult than in a prolonged disease like typhoid fever.

Diet Indicated

Fever diet, during the height of the disease as follows:

- Gruels, as oatmeal, barley and rice.
- Purees of vegetables and fruits.
- Fruit juices.
- Potato puree.
- Yogurt and milk in moderation.
- Whey may also be used at times to advantage.

Salt should be restricted during the height of the disease. Water, lemonade, orangeade and grape juice should be given freely.

Cultures of the Bulgarian bacillus may be very useful. During convalescence fresh fruits, vegetables in the form of purees, potatoes and rice make a good reconstructive diet. Vary the diet as to keep up the appetite as much as possible. Keep the bowels moving regularly.
Contraindications

- Meats, meat products and other purin containing foods.
- High nitrogen diet.
- An excess of salt.
- Alcohol, tea and coffee.

Diet in Pneumonia

General Statement
Asthma is a reaction of anaphylactic nature in sensitized persons, in others possibly a reflex neurosis, characterized by spasm of the bronchial muscles with dyspnea, chiefly expiratory.

Asthma is similar to hay fever except that in the former the bronchial part of the respiratory tract is involved while in the latter the nasal.

In many cases it has been found that the individual is sensitive in some particular protein and the offending substance should be sought in both food and surroundings as the first step in the treatment of the case. This may be done by feeding tests and by skin reactions.

Diet Indicated
Simple easily digested food.
The diet should be capable of keeping the bowels active.
The offending protein should be found and eliminated from the diet. A fairly large amount of water should be taken preferably between meals.
Careful habits of eating as eating slowly, chewing thoroughly, avoiding overeating, and avoiding eating late at night.
The lacto-vegetarian diet is admirably suited to fill the above conditions.

Contraindications
An excess of sweets as candy, syrups, jams and jellies.
Alcohol, tea, coffee, and tobacco.
Meats and meat products.

Diet in Bronchitis

General Statement
Divided into two groups:
1. Acute
2. Chronic

Acute bronchitis is an acute catarrhal inflammation of the trachea, and larger bronchi. It is known as a cold in the chest and is due to infection. It is very contagious. Sudden climatic changes are important factors.
DIETETICS

Diet in Bronchitis

The chronic form may result from repeated attacks of the acute form but is most commonly met with in chronic lung affections, heart disease, neurism of the aorta, gout and in renal disease.

Diet Indicated

Acute form: When fever is present a fever diet is indicated which should consist of liquid and semiliquid foods such as cereal gruels, fruit juices, vegetable broths, and purees, milk, cream, milk toast and cream toast.

Chronic form: Low protein diet made up of simple easily digested foods. Fatty and laxative foods are helpful in many cases.

Contra-indications

Meats and meat products.
Indigestible foods.
Irritants.
Very coarse vegetables.

Diet in Tuberculosis of The Lungs

Tuberculosis is an infection caused by the bacillus tuberculosis, the lesions of which are characterized by nodular bodies, tubercules, and diffuse infiltrations, which either undergo caseation, necrosis, and ulceration, or heal with sclerosis and calcification.

Dr. Osler has said: "As a healing of a tubercular process is largely dependent upon the state of nutrition, the question of diet becomes of the very first importance."

The treatment of tuberculosis is set forth in the letters of the name "Pamsetgaar" which was given by Trudeau to an institution for the treatment of such cases.

pa - pure air
ms - Maximum sunshine
et - Equable temperature
ga - Good accommodations
af - abundant food.

In no other infectious disease is the proper diet prescription of so much importance. There has been considerable change in the dietetic treatment of the disease in the last few years. Formerly the patients were stuffed by the forced feeding of milk, meat and eggs, but now the dietetic treatment is on a rational basis. Factor of greatest importance is the amount of food digested assimilated not that eaten. Or forced feeding much passes through body undigested.
The diet must be highly nutritious, making free use of fats and a little higher proportion of protein than the normal diet. Forced feeding is unnecessary and irrational and is apt to produce gastrointestinal disturbances that will prevent the proper digestion and utilization of any of the food.

In planning the dietary for the tuberculous patient several factors must be taken into account:

1. Whether or not the patient has fever.
2. Whether the patient can rest, or if he must work.

Where the patient has fever, the diet must be suited to that condition and obviously the fever patient and the one who is required to work need more food.

Milk and eggs are the most valuable foods for this condition. They should be given on the basis of caloric value rather than by empirically overfeeding. Three meals a day or where the patient is unable to take sufficient nourishment in this way three small meals supplemented by three light lunches make the best distribution of the nourishment.

The diet should be planned so as to bring the patient up to normal weight. When this is gained, endeavor to maintain it at normal or slightly above. A marked increase of weight above normal is not desirable.

In addition to milk and eggs, well cooked cereals, fats, as olives and cream, vegetable purées, nourishing fruits and a moderate amount of nuts make up a suitable dietary.

Where there is a marked indigestion, the diet must be made simple, largely liquid until the acute symptoms disappear. Monotony in the diet should be avoided and the food must be thoroughly masticated and eaten under the most favorable and enjoyable conditions. The diet should be planned so that it will help to overcome autointoxication.

The physician must be prepared to plan a dietary that will meet all the nutritive needs of the patient and at the same time be within his means.

Contraindications
Bulky fermentable foods.
Alcohol, tea and coffee.
Meat and meat juices not essential.
Diet And Treatment

The following plan is largely based on Joslin's modification of the Allen treatment. The first step in treatment is to gain in tolerance of carbohydrates when the urine becomes sugar-free. The fundamental principle upon which any such classification is more or less arbitrary since any case may show marked variations is which the value of all therapeutic measures is determined.

Any such classification is more or less arbitrary since any case may show marked variations. The tendency of the diabetic patient to gain in tolerance of carbohydrates when the urine becomes sugar-free is the fundamental principle upon which any such classification is more or less arbitrary since any case may show marked variations.

The cases are classified into three groups:

1. Mild, 50 to 150 grams of carbohydrate in the diet with no sugar in the urine.
2. Moderately severe, 0 to 10 grams of carbohydrate in the diet with no sugar in the urine.
3. Severe, 0 to 10 grams of carbohydrate in the diet with no sugar in the urine.

The dietetic prescription is a weighed diet and the portion of the diet is calculated and recorded. The course of the disease is at all times controlled by the dietetic prescription.

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It is recognized that there is some metabolic disturbance in diabetes that is presumably associated with a deranged function of the (is) pancreas.

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Look up main topic.
Explain again necessity for fast to prevent acidosis. Fat burned in fats of CH10.

John Chatillon & Sons.
84 Cliff St., New York.

Waukesha Health Products Co.
Waukesha, Wis. 96gC flour (soy bean).

Diabetic Bread
1 cup Lister flour
3 eggs

Separate eggs. Beat yolks until thick & lemon color. Add
pinch of salt to whites and beat until very stiff.
Fold yolks into whites. Fold in gradually Lister's
Diabetic flour. Bake in well oiled tin 5 x 3 x 3
Each loaf in 1 day's supply and contains
6.58 gms 158.6 Calories 397.

Diabetic Muffins - 8 muffins each having Calorie
8 of 1 Egg.

1 cup Lister flour
1 Egg
3 tbsp 40% cream
2 " crisco

Separate and beat eggs as above.
Add cream and melted fat to yolks, beat again.
Fold yolk mixture into whites & lastly fold in 1/4 flour
Bake in well hot muffin tins. 15-20 min.
-listing flour & bran muffins

- 1 c. flour
- 1 c. grains
- 1 egg
- 1 pt listing flour
- about 1/3 c. water

Tie bran in cheesecloth and soak 1 hr. Work thoroughly
Changing water several times, wring dry
Make as directed above
Makes 9 muffins

agar muffins
- Bran 100 gms
- Powdered agar agar 20 gms
- salt

Whipped cream
- 2 oz 40% cream
- 1 pt cold water

Shake vigorously until cream is whipped
May be sweetened with saccharin
Contains only a trace of sugar

Breath Holding Test - Found...
in the treatment is to free the urine of sugar. In mild cases, the reduction of the total quantity of the diet may be all that is necessary to eliminate the sugar. Moderately severe cases commonly become sugar free during the preparation for the fast, but fasting must be resorted to in all severe, long-standing, obese cases, and cases showing acidosis.

Preparation for fasting: Three to four days are usually taken to safely prepare the patient for the fast. On the first day remove all fats from the diet and slightly reduce the proteins. Second day the proteins are omitted and cut the carbohydrates in half. The next day carbohydrates are halved again, and the following day the fast may be begun.

During the fast, clear vegetable broths and water may be taken as freely as desired. The fast should be continued four days unless the 24-hour urine is sugar-free before that time. The time required to render the urine sugar free is surprisingly variable in different cases. If glycosuria persists at the end of four days, give one gram of protein or .5 gram of carbohydrate per kilogram of body weight for two days, then fast again for three days unless sugar free earlier. The above preparation for fasting is the rational means for preventing acidosis.

Daily testing of the urine for sugar is carried out when the 24-hour urine is sugar-free, feeding of 5% vegetables is begun. First day give 150 to 300 grams of 5% vegetables. Increase by adding 150 to 300 grams daily until sugar reappears, or until the quantity is reached which it appears probable the patient will tolerate. The tolerance commonly ranges between 50 and 100 grams of pure carbohydrate.

As the carbohydrate is increasing day by day one can gradually replace a large part of the 5% vegetables with the 10% class, and if these are well borne, one can cautiously progress to the 15 and 20% groups.

After two days of this feeding 15 grams of protein is added to the diet, increasing the amount 15 grams daily until the patient is receiving 1 gram per kilogram of body weight. The protein may be given in the form of eggs or cottage cheese made from skim milk.
Diet and Treatment Indicated

Unless pt. is obese, or marked tendency to acidosis (5-10 re. daily only in 1st case)

Hyperactivity may be used, but it is better for the pt. to forget the sweet taste. Ford should not be heated after addition of saccharine.

Setbacks are frequent with these cases requiring a 24 hour fast and a gradual building up of the diet again.

When the carbohydrate tolerance is less than 20 grams fasting one day each week should be practiced. When the tolerance is over 20 grams a "greenday" each week is advisable, on which day only 5% vegetables should be taken.

The treatment of a patient with diabetes lasts through life and must be frequently checked up by blood and urine tests.

Diabetes is a disease that tests the metal of the patient.

By persistently and faithfully following the outlined plan of diet, the tolerance for food will eventually be built up to the point where enough food can be taken to allow one to live a comfortable and active life.

In ambulatory care, specimen of 24 hr urine should be brought at each visit, also a written list of the kind and weight of food eaten during the period. Insist on this. If carlessness is evidenced indifference to other advice follows. Change in Oza weight should be tested. Dietetic treatment is only successful when urine is sugar free and blood sugar normal.
### Diet in Diabetes Mellitus

#### Classification of Foods According to Content of Carbohydrate

Many of the common foods upon which diabetic patients must live are given here arranged according to the content of carbohydrate:

#### 1. Carbohydrate 0 - 5%

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>0%</td>
</tr>
<tr>
<td>Eggs</td>
<td>0%</td>
</tr>
<tr>
<td>Olive Oil</td>
<td>0%</td>
</tr>
<tr>
<td>String beans</td>
<td>1.9%</td>
</tr>
<tr>
<td>Spinach</td>
<td>2.6%</td>
</tr>
<tr>
<td>Lettuce</td>
<td>2.9%</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>3.1%</td>
</tr>
<tr>
<td>Beet greens</td>
<td>3.2%</td>
</tr>
<tr>
<td>Asparagus</td>
<td>3.3%</td>
</tr>
<tr>
<td>Celery</td>
<td>3.3%</td>
</tr>
<tr>
<td>Butternuts</td>
<td>3.5%</td>
</tr>
<tr>
<td>Ripe Olives</td>
<td>3.5%</td>
</tr>
<tr>
<td>Rhubarb</td>
<td>3.6%</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>3.9%</td>
</tr>
<tr>
<td>Cottage Cheese</td>
<td>4.3%</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>4.7%</td>
</tr>
<tr>
<td>Buttermilk</td>
<td>4.8%</td>
</tr>
<tr>
<td>Swiss chard</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

#### 2. Carbohydrate 5 - 10%

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogurt</td>
<td>5.1%</td>
</tr>
<tr>
<td>Eggplait</td>
<td>5.1%</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>5.2%</td>
</tr>
<tr>
<td>Kohl-rabi</td>
<td>5.5%</td>
</tr>
<tr>
<td>Cabbage</td>
<td>5.6%</td>
</tr>
<tr>
<td>Radishes</td>
<td>5.8%</td>
</tr>
<tr>
<td>Watermelon</td>
<td>6.7%</td>
</tr>
<tr>
<td>Pine nuts</td>
<td>6.9%</td>
</tr>
<tr>
<td>Nuttolene</td>
<td>7.0%</td>
</tr>
<tr>
<td>Brazil nuts</td>
<td>7.0%</td>
</tr>
<tr>
<td>Okra</td>
<td>7.0%</td>
</tr>
<tr>
<td>Strawberries</td>
<td>7.4%</td>
</tr>
<tr>
<td>Protose</td>
<td>8.6%</td>
</tr>
<tr>
<td>Lemons</td>
<td>8.5%</td>
</tr>
<tr>
<td>Squash</td>
<td>9.0%</td>
</tr>
<tr>
<td>Carrots</td>
<td>9.3%</td>
</tr>
<tr>
<td>Peaches</td>
<td>9.4%</td>
</tr>
<tr>
<td>Pineapples</td>
<td>9.7%</td>
</tr>
<tr>
<td>Cranberries</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

#### 3. Carbohydrate 10 - 15%

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape fruit</td>
<td>10.2%</td>
</tr>
<tr>
<td>Dandelion greens</td>
<td>10.6%</td>
</tr>
<tr>
<td>Blackberries</td>
<td>10.9%</td>
</tr>
<tr>
<td>Hickory nuts</td>
<td>11.4%</td>
</tr>
<tr>
<td>Oranges</td>
<td>11.6%</td>
</tr>
<tr>
<td>Black Walnuts</td>
<td>11.7%</td>
</tr>
<tr>
<td>Raspberries</td>
<td>12.6%</td>
</tr>
<tr>
<td>Currants</td>
<td>12.8%</td>
</tr>
<tr>
<td>Filberts</td>
<td>13.0%</td>
</tr>
<tr>
<td>English Walnuts</td>
<td>13.0%</td>
</tr>
<tr>
<td>Beechnuts</td>
<td>13.2%</td>
</tr>
<tr>
<td>Apricots</td>
<td>13.4%</td>
</tr>
<tr>
<td>Parsnips</td>
<td>13.5%</td>
</tr>
<tr>
<td>Pears</td>
<td>14.1%</td>
</tr>
<tr>
<td>Apples</td>
<td>14.2%</td>
</tr>
<tr>
<td>Lima beans</td>
<td>14.2%</td>
</tr>
</tbody>
</table>

#### 4. Carbohydrate 15 - 20%

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pecan nuts</td>
<td>15.3%</td>
</tr>
<tr>
<td>Boiled macaroni</td>
<td>15.8%</td>
</tr>
<tr>
<td>Cherries</td>
<td>16.7%</td>
</tr>
<tr>
<td>Blueberries</td>
<td>16.6%</td>
</tr>
<tr>
<td>Green peas</td>
<td>16.9%</td>
</tr>
<tr>
<td>Almonds</td>
<td>17.3%</td>
</tr>
<tr>
<td>Almonds</td>
<td>17.4%</td>
</tr>
<tr>
<td>Shell beans</td>
<td>18.5%</td>
</tr>
<tr>
<td>Green corn</td>
<td>19.0%</td>
</tr>
<tr>
<td>Plums</td>
<td>19.1%</td>
</tr>
<tr>
<td>Baked beans</td>
<td>19.6%</td>
</tr>
<tr>
<td>Potatoes</td>
<td>20.9%</td>
</tr>
</tbody>
</table>

#### 5. Carbohydrate 20 - 25%

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>22.0%</td>
</tr>
<tr>
<td>Boiled rice</td>
<td>24.4%</td>
</tr>
<tr>
<td>Peanuts</td>
<td>24.4%</td>
</tr>
</tbody>
</table>
The requirements of a diabetic case change during treatment and different individuals have different degrees of diabetes from the outset so that it is not practical to plan at once a final diet for any case.

It is necessary to carry each patient through a series of steps, each having a definite object in view before he can be told finally just what diet will be most suitable for him when he goes home. The groups of food outlined below are intended to be used in such a study, and there is no fixed way in which they can be used that is equally good for all cases or for any one case all the time, but in order to give a general idea of the plan of treatment which is followed, the following will be useful. It is subject to many variations. Sometimes it is necessary to split groups and sometimes they may be merged together.

At any time when sugar is found in the urine the average patient may start with Group I and continue on this diet until sugar-free if this does not require more than two or three days. When sugar is still present after two or threedays of this diet the vegetables will be omitted.

When sugar-free for 24 hours the remainder of Group I should be added, or if it has not been necessary to omit the vegetables of this, then Group II may be added. If the patient remains sugar-free for the next two days, Group III may be added. Each group or part of a group is added in this way until a balanced diet is reached or the patient passes sugar in the urine, in which case he should go back on Group I. The building up process is then repeated but the groups may then be added more rapidly or with changes in the light of experience. When the patient is taking the low diet of Group I or III inclusive, he should not attempt much exertion and if he feels so inclined, should remain in bed.
DIETETICS
SANTA BARBARA COTTAGE HOSPITAL

GROUP I

Clear broth, tea, coffee, pepper, salt, vinegar,* saccharin (up to 3 grains daily). These contain no sugar formers and may be used in the amounts desired by the patient. A bowl of broth or a cup of tea between meals and at bedtime frequently makes the fast more easily borne, especially by children.

400 grams 3% vegetables
6 to 12 bran agar muffins

GROUP II

400 grams of 3% vegetables or
200 grams of 6% vegetables

GROUP III

2 to 3 eggs

GROUP IV

3 to 6 diabetic muffins

GROUP V

15 to 60 grams of butter
10 grams of bacon *

GROUP VI

10 to 30 grams of dry oatmeal

GROUP VII

100 to 300 c.c. of sugar-free cream

GROUP VIII

25 to 75 grams of lean meat *

GROUP IX

100 grams of 10% fruits

GROUP X

15 to 30 grams of white bread

Fifteen to thirty grams of white bread or the equivalent in some other forms of carbohydrate together with some form of fat may be added every day or every second day that the patient
remains sugar-free until the upper limit or tolerance is reached.

Finally when the tolerance limit has been established, a diet should be arranged containing somewhat less than the maximum number of calories and not more than can be borne consistently day after day without a return of glycosuria when the patient is living as he will at home.

* Suitable substitutes can easily be found for tea, coffee, vinegar and meats.

**Diet in Diabetes Insipidus**

**General Statement**

A chronic affection characterized by the passage of large quantities of normal urine of low specific gravity.

There is good evidence to show that in some cases this disease is associated with an abnormal condition of the pituitary body. Injection of pituitrin has been helpful in some cases.

There is also a possibility that organic disease of other parts of the brain may be at fault in some cases since surgical procedures in certain areas have temporarily caused a marked increase in the volume of the urine.

**Diet Indicated**

A salt poor, low protein diet is the one giving the most help in these cases.

Sugar and excess of sweets should be cut to the minimum. Care should be taken to avoid all irritation of the gastrointestinal tract and a diet should be selected that will not produce putrefaction and fermentation.

Avoid foods that cause flatulence.

Sugar restricted because use of sugar increases blood sugar and aggravates polyuria.

Cold drinks as beer, cider, soda are diuretics and must be avoided.
Diet In Obesity

A disorder of metabolism characterized by excessive deposits of fat in the body.

Classes of Cases:

1. Exogenous. Due to overeating or to a life of laziness. Often complicated with heart involvement.

2. Endogenous. Due to slowing of nutrition. Food not metabolized as rapidly as average. Ductless glands involved such as thyroid, testicle or ovary.

Diet Indicated

This worker gives three degrees of reduction taking into consideration slight obesity, moderate and marked obesity.

1. For slight obesity the normal requirement of the individual is reduced by one fifth.

2. For moderate obesity the reduction is two fifths.

3. For marked obesity the reduction is three fifths. The diet is comprised of the normal protein allowance and an abundance of green vegetables, fresh fruits and skim milk. The approximate loss in weight in the above reductions are as follows:

   1st. degree 2 to 3 pounds per month.
   2nd. degree 6 to 10 pounds per month.
   3rd. degree 30 pounds per month. Some say it unsafe to reduce so rapidly.

In the third degree reduction constant supervision is required and such a course should never be carried out for longer than from four to six weeks.

Folin-Denis method of reduction:

This method consists of a complete fast for four days followed by a period of very moderate diet to cause the disappearance of acetone bodies which may have been formed by the fast. The fast is then resumed and carried on intermittently with intermediate periods of feeding until the desired results are obtained.
Contraindications

**Diet in Obesity**

Fats must be restricted to 3 grams a day.

Rice, potatoes, macaroni, corn, etc.

Sweets of all kinds.

It is often necessary to restrict the amount of fluid.

Desserts and other rich foods.

**Diet in Gout**

Gout is a disorder of metabolism associated with retention of uric acid and of other purin bodies in the body, characterized clinically by acute attacks of arthritis, the deposition of sodium-biurate in and about the joints, and by the occurrence of irregular constitutional symptoms.

Important factors in the etiology of the disease are the following:

1. Heredity.
2. Alcohol.
3. Overeating without exercise.
4. Poor food, defective hygiene and malt liquors make a common etiological combination.
5. Imperfect elimination rather than imperfect oxidation of the purins.

Garrod says only three established facts in gout:

1. The deposits in the tissues are sodium-biurate.
2. The blood contains an excess of uric acid.
3. Except during the attacks there is no excess output of uric acid in the urine.

Von Noorden and Schleip estimate the ability of the body to eliminate uric acid in such cases by a test diet, using it as a basis for the amount of purin foods they can take. Blood chemistry is now taking the place of such a test.

The free use of potatoes and other vegetables as spinach, beets, cabbage, cauliflower and turnips.

The liberal use of fruits except possibly the acid forming group, namely, plums, prunes and cranberries.

A low intake on salt is good for these cases.

The purin restriction program is just as essential in these cases as the strict carbohydrate plan for diabetes.

The lacto-vegetarian program is practically purin free, when the following foods are eliminated:

- Oatmeal, Peas, Beans, Lentils, Asparagus and Onions.

Good habits are essential in dealing with this disease, as regularity, chewing well and avoiding overeating.
Diet Indicated: In an acute attack, clearing of the bowels and a starvation program for 2½ to 48 hours is the best plan; in addition give large amounts of water.

Contraindications:
- Meats, meat products, rich gravies and sauces.
- Tea, coffee, cocoa, alcohol and tobacco.
- Foods rich in oxalic acid.
- An excess of cereals.
- All condiments.
- Rich and concentrated sweets.
- All indigestible foods.

Chapter XXXII

BLOOD DISEASES

Diet In Pernicious Anemia

General Statement: Pernicious anemia is a recurring and usually fatal disease caused by hemolytic agents and characterized by an embryonic type of blood regeneration.

The etiology is not well understood. It is a widespread disease and it appears to be increasing. Oral sepsis and intestinal toxemia have been brought forward and supported by many arguments but there must be something in addition.

Diet Indicated: The problem of feeding in this disease is usually much more difficult than in Chlorosis. In this condition there is commonly a lack of hydrochloric acid in the stomach. This must be considered in prescribing the dietary. There is also apt to be intestinal stasis and putrefaction. A free use of the fruits and green vegetables is indicated for each of these conditions.

Effort should be made to thoroughly nourish the patient and keep his resistance up to the highest point. The food must be of good quality and easily digestible. Non-essentials should not be included. The iron bearing foods are especially indicated. With the vegetables the coarse fiber should be removed.

Because of the patient's weakened condition and poor digestion it is often necessary to give small feedings four to six times during the 2½ hours rather than three meals per day.
Diet Indicated

The following list is suggestive of the foods most valuable in the dietetic treatment of this disease:

1. Fruits
   - Oranges
   - Grapefruit
   - Grapes
   - Raisins
   - Strawberries
   - Pineapple

2. Vegetables
   - Spinach
   - Mustard greens
   - Beet greens
   - Swiss chard
   - Carrots
   - Beets
   - Asparagus
   - Celery
   - Lentils
   - Beans and peas

3. Miscellaneous
   - Cream
   - Egg yolks
   - Olives
   - Pecans
   - Almonds
   - Buttermilk
   - Whole grains

Contraindications

- Meat and meat products.
- Spices, pickles and hot sauces.
- Devitalized foods.
- Tea, coffee, alcohol and tobacco.

Chlorosis is an anemia of unknown cause, occurring in young girls, characterized by marked diminution of the hemoglobin with cardiac-vascular and sometimes nervous symptoms. The age of onset is between 14 and 17 years. There is some evidence that the glands of internal secretion, such as the ovary and adrenal, are factors in the etiology of this disease.

In many cases of chlorosis the diet has consisted of very low protein and fat with an excess of carbohydrate with the use of tea, coffee and highly spiced foods. This disease occurs most frequently among working girls who take little or no breakfast, have fancy confection for dinner and but one proper meal during the day, and that at night when they are weary from the day of work.

Lack of proper exercise, sunshine and fresh air are also important factors.

Foods that are rich in iron are of first importance in the diet. It is recognized now by the best authorities that it is "food iron" that is converted into hemoglobin. It is important to have a good supply of complete proteins in the diet so that nutrition will be kept up to a high degree. Milk, eggs and nuts are a valuable source of protein. The same general outline as given for pernicious anemia holds good for this disease.
Look up research report on use of Iron by Whipple.
Diet in Chlorosis

Contraindications
- Tea, coffee, vinegar, pickles and condiments.
- Excessive use of carbohydrates.
- Irregularity in eating.

Chapter XXXIII
DEFICIENCY DISEASES

Diet in Scurvy

General Statement
Scurvy is caused by faulty metabolism and is now believed to be due to a deficiency in the diet of water soluble C vitamin.

Scurvy is seldom seen at present time among adults but is quite common among infants that are bottle fed. This disease is characterized by debility, a tendency to hemorrhage in various parts of the body, a weakness of the long bones and a condition of anemia. Unless recognized and treated, this disease is a serious one. Under treatment the prognosis is favorable.

Diet Indicated
An abundance of fresh fruits and vegetables, since these are rich in water soluble C vitamin. Among the vegetables, Cabbage, potatoes, onions, carrots, turnips and lettuce are especially effective.

Of the fruits, oranges, lemons, apples and grapes are especially indicated. Tomatoes canned, fresh or dried are a valuable source of this vitamin and are both economical and readily obtained.

The antiscorbutic action of vegetables is most marked when they are eaten raw as in salads. It should be borne in mind that in the absence of fresh fruits and vegetables, sprouted seeds are rich in the antiscorbutic principle and may be used in dealing with scurvy. Care must be taken to supply the patient with a well balanced ration made to include the foods mentioned above.

Infantile Scurvy
This disease is similar to the one mentioned above, but occurs in infants between the ages of 3 and 18 months. As stated before, it is found most commonly in bottle fed babies and if only mild, may exist for some time before it is recognized.

Orange juice is a specific in these cases and its addition to the feeding will prevent the development of scurvy in the bottle fed baby. It may be given as early as the
Infantile Scurvy

General Statement

Diet Incl...ca.

Diet

first month. Begin by giving one teaspoonful of water once a day, midway between feedings and gradually increase until at the end of three months an ounce or two is being taken daily.

Grape juice, tomato juice, potato water, or scraped apple may be used in the absence of oranges.

Diet In Pellagra

General Statement

Pellagra is a deficiency disease due to an impoverished diet, especially as related to defective protein supply. It is characterized by weakness, gastrointestinal disturbances, a dermatitis, and in some cases marked involvement of the nervous system.

Goldberger's conclusions are that the etiological factor is the result of some one or a combination of the following factors:

1. A physiologically defective protein (amino acid) supply.
2. A defective or inadequate mineral supply.
3. Deficiency in an as yet unknown dietary essential (vitamin?).

Diet Indicated

A diet should be provided that includes in sufficient quantity and proper proportion every element needed by the body.

All authorities agree that milk is the most valuable food. Eggs are valuable source of perfect protein. In addition to these a generous allowance of fruits, vegetables and whole cereals should be supplied daily. In the advanced cases, the mouth is so sensitive that a liquid diet is necessary. This should be made up of milk, bean, pea or potato puree; broth from whole vegetables; and gruel from entire cereals.

Diet In Beriberi

General Statement

Beriberi is an Asiatic disease resulting from a deficiency in the diet of the water soluble B vitamin.

"Clinically, beriberi is characterized by degenerative changes in the nervous system including a multiple peripheral neuritis, combined with generalized edema, serous effusions, and atendency to cardiac derangements followed by sudden cardiac failure."

The disease is not found in this country but occurs for the most part among people who make polished rice their staple article of diet.
Avoid the use of polished rice. If rice is used, the unmilled brown rice should be selected. Beans, peas and lentils make a valuable addition to the diet. An abundant allowance of fresh fruits and vegetables should be supplied daily. Milk, eggs, and nuts are to be relied upon as satisfactory sources of protein.

Whole cereal products should be given and in the presence of the disease whole wheat and barley supply the antiberiberi vitamin in good amounts. The yeast vitamin has been proved to be efficient in preventing the development and in curing polynurrritis in animal experimentation. In well advanced cases the condition is difficult to treat on account of the degenerated condition in the nervous system.

Avoid the use of polished rice. If rice is used, the unmilled brown rice should be selected. Beans, peas and lentils make a valuable addition to the diet. An abundant allowance of fresh fruits and vegetables should be supplied daily. Milk, eggs, and nuts are to be relied upon as satisfactory sources of protein.

Whole cereal products should be given and in the presence of the disease whole wheat and barley supply the antiberiberi vitamin in good amounts. The yeast vitamin has been proved to be efficient in preventing the development and in curing polynurrritis in animal experimentation. In well advanced cases the condition is difficult to treat on account of the degenerated condition in the nervous system.

Continued use of any highly milled products in large amounts.

"Rickets is the most common nutritional and metabolic disturbance in infancy, characterized by a loss of mineral salts from the bones with resulting deformity."

The disease occurs most commonly in the winter months of the year, indicating that there is a climatic factor as well as a dietetic. Recent investigation by Hess, McCollum and others has shown that sunlight as well as diet plays a very important part in the prevention and successful treatment of the disease. The whole problem of rickets is not perfectly understood as yet and is being investigated by some of the leading research workers. Rickets very seldom occurs among breast fed babies. The disease begins most commonly between the ages of six to twenty-four months.

Where possible, breast feeding is the most important single factor. The mother's health must be taken into consideration and she must be supplied with a liberal diet so that there will be no milk deficiency.

When it becomes necessary to feed ordinary foods, the dietary should consist of milk, cereals, fruit juices and vegetables prepared in such a way that they will be proper for the age. Care should be taken not to feed an excessive amount, especially of carbohydrate. In addition to the above, cod-liver oil and tricalcium phosphate are effective measures that may be employed.
Diet in Insomnia

General Statement
Insomnia is a condition of sleeplessness having a great many causative factors as:

1. Strenuous life.
2. Worry.
3. Excitement.
4. Use of stimulants.
5. Eating late at night.
6. Gastric irritation.
7. Overeating.
8. Use of drugs.
9. Irregularity in sleeping.
10. Intestinal toxemia.

Diet
The diet should be one to fully nourish the body but of the simplest sort. The heavy meal should be in the middle of the day. The evening meal should be light and made up largely of fruits and cereals. In cases of hyperchlorhydria it is sometimes of benefit to give the patient a cup of hot milk or hot-malted milk on retiring. This practice can be used to advantage for a limited time. Plan the diet to insure proper intestinal motility.

Contraindications
Stimulants and narcotics.
Meat and meat products.
Heavy meals at night.
Indigestible foods.

Diet in Migraine

General Statement
Migraine is a paroxysmal affection characterized by severe headache, usually unilateral and often associated with disorders of vision. The etiology is difficult to determine.

The following are some of the more important causes:

1. Heredity.
2. Autoindigestion.
3. Spasm of the arteries.
4. Focal infection.
5. A gouty tendency.
6. Reflex from the eyes, nose, or sex organs.
7. Chronic nephritis.

Diet
These cases do best on a low protein lacto-vegetarian diet. The diet should be so arranged as to combat constipation. In gouty conditions a purin free diet is indicated. Copious waterdrinking is highly important in the elimination of toxin.
Contraindications
Tea, coffee, and alcohol.
Foods subject to fermentation and putrefaction.

Diet in Migraine

General Statement
Chorea is a disease, probably an acute infection, chiefly affecting children, characterized by irregular, involuntary contraction of the muscles, a variable amount of psychical disturbance, and a remarkable liability to acute endocarditis.

The etiology is somewhat obscure but is probably the result of infection.

Diet Indicated
Due to the patient's anemic and run down condition the diet as outlined in anemia is the one indicated. Care should be taken to insure thorough and frequent evacuation of the bowels.

Diet in Chorea

General Statement
Neurasthenia is a condition of weakness or exhaustion of the nervous system, giving rise to various forms of mental and bodily inefficiency.

One of the most recent ideas of the cause of this condition is that it lies in various chronic intoxications as:

1. Chronic intestinal stasis with its attendant absorption.
2. Localized infections about teeth, tonsils, and pelvic organs.

Heredity, worry, loss of sleep, overwork, infectious diseases, and the use of drugs also are important causes. Rest, hydrotherapy, massage, diet and regulated exercise constitute the chief points in the treatment.

Diet Indicated
An easily digested nourishing diet. The fruit regimen may be used for a time to clear up the gastrointestinal tract and then the milk diet for a few weeks to push the nutrition. May repeat the program until good results are obtained.

Care must be taken to include sufficient green food to supply salts and vitamins as well as a balanced ration of other forms of nutrient material.
Diet in Neurasthenia

The Weir-Mitchell diet and treatment has been advocated by some and a modified outline of the same is given below:

1. This is often called the rest cure and is especially valuable in functional nervous diseases.
2. This treatment is good in tuberculosis if used early.
3. It is more likely to succeed in different cases than in the case of a half invalid.
4. The treatment consists in:
   (a) Isolation in an institution, not even letters being allowed to come to the patient.
   (b) The nurse should be a stranger but an agreeable person.
   (c) Visiting is forbidden, patient not allowed to talk about troubles.
   (d) Patient remains in bed six weeks to two months.
   (e) Treatments consist in sponging, massage, electricity and are given midway between meals.
   (f) The diet frequently used is the Karell method which is increased to 2 quarts of milk per day andafter tendays, three meals a day, 2 to 4 ounces of malt extract before each meal; butter is also used freely, cocoa and milk in early morning, cod liver or olive oil ½ ounce after every meal, iron is often used as a tonic.

For some types of neurasthenia, rest in bed, hydrotherapy and a full milk diet for from 3 to 5 weeks gives good results.

Contraindications:
- Concentrated foods in excess.
- High protein diet.
- Condiments, spices, and other nutrients.
- Tea, coffee, and alcohol.

Diet In Neuritis

General Statement:
Neuritis is an inflammation in a nerve. The condition is attended by pain and tenderness over the nerves, anesthesia, disturbances of sensation, paralysis, wasting and disappearance of reflexes.

The chief etiological factors are:-
1. Lead, alcohol, and arsenic.
2. Gout.
3. Injury.
4. Infectious diseases.
5. Focal infections.
Diet in Neuritis

Diet Indicated
Purin free diet especially for gouty type of cases.

The lacto-vegetarian dietary so arranged as to stimulate intestinal motility.
Cultures of bacillus acidophilus and bacillus bulgaricus.
In beriberi a liberal supply of water soluble vitamin B, through the use of antineuritis foods as leafy vegetables, whole cereals, tomatoes, etc.

Contraindications
Purin containing foods and alcohol.

Diet in Epilepsy

General Statement
Epilepsy is an affection of the nervous system characterized by attacks of unconsciousness with or without convulsions.

Diet Indicated
Simple bland food.
Vegetables and fruits should be freely used to make the diet laxative.
The maintenance of a low protein diet is very important.
Large quantities of water are beneficial.
Fasting has been recommended but the same results can be accomplished by a protein fast for a limited time.
The salt free diet is very useful in dealing with some of these cases.

Contraindications
Meats and meat products.
Tea, coffee, and alcoholic.
Overeating and too rapid eating.
Excess of salt.
Acid yielding foods.

Diet in Appoplexy

General Statement
Appoplexy is characterized by a sudden loss of consciousness followed by a complete or partial loss of power on one side of the body.
The immediate causes are:
2. Embolism. Plugging of blood in a vessel in the brain.

Diet Indicated
Same as for arteriosclerosis.
A basic diet consisting of easily digested vegetables and fruit.
Laxative foods must be supplied.
Foods subject to putrefaction should be avoided.
Light meals at night. Overeating at any time is contraindicated.
Diet in Typhoid Fever

Typhoid fever is a general infection caused by the bacillus typhosus, characterized anatomically by hyperplasia and ulceration of the intestinal lymph follicles, swelling of the mesenteric glands and spleen, and parenchymatous changes in other organs. Clinically, the disease is marked by fever, rose-colored eruption, abdominal tenderness, tympanities, and enlargement of the spleen; but these symptoms are extremely inconstant, and even the fever varies in its character.

The infection is carried to man by foods, chiefly through the medium of water and milk. The contamination comes through direct connection with excreta from a typhoid case or through the medium of flies. Lowered resistance on the part of the individual makes infection more likely. With the modern methods of prophylactic treatment, typhoid fever has ceased to be a scourge.
Within recent years, the dietetic management has been placed on a rational basis. The older methods of feeding restricted the diet to a very limited amount of food and water. Modern means of investigation have shown that metabolism is markedly increased during the fever (about 10% for each degree F.) and that digestion and absorption are only slightly decreased. The object sought in the feeding of these cases is to prevent loss of body tissue and strength as much as possible.

Formerly this disease was characterized by marked emaciation and a corresponding loss of strength but the high caloric plan of feeding has to a great degree eliminated this serious loss.

In the selection of foods for the typhoid patient, consideration must be given to their digestibility, freedom from harmful residues, their fuel value and palatability. Of the three classes of foodstuffs, carbohydrates are of most importance in preventing the consumption of body proteins and the greater portion of the energy of the diet should be supplied in the form of carbohydrate unless there is some definite contraindication.

The following carbohydrate yielding foods are especially valuable:

- Lemonaide, orange juice, fruit ices, apple sauce, steamed rice, rice gruel, baked or mashed potato, finely ground cereals as cream of wheat, milk sugar and malt sugar. No starchy food should be selected that contains cellulose. The fats are well borne in this disease, and because of their high caloric value should be included in the dietary of the typhoid case. The forms of fat most suitable are: Cream, butter and egg yolk.

The protein requirements of the body are not increased as are energy requirements. Meat protein is ruled out by the best authorities. The proteins are best supplied through milk and a moderate use of eggs.

The following is only suggestive, but illustrates the kind of food suitable for this condition and the amount to be given on the high caloric plan:
### Diet In Typhoid Fever

<table>
<thead>
<tr>
<th>Suggested Days Feeding</th>
<th>Hour</th>
<th>Food</th>
<th>Amount</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.00 A.M.</td>
<td>Toast</td>
<td>1 slice</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Butter</td>
<td>3/4 ounce</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>9.00 A.M.</td>
<td>Milk</td>
<td>6 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cream</td>
<td>2 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar (Lactose)</td>
<td>1 ounce</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>11.00 A.M.</td>
<td>Orange (eggnog)</td>
<td>8 ounces</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>1.00 P.M.</td>
<td>Baked Potato (Md)</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bread</td>
<td>1 slice</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Butter</td>
<td>3/4 ounce</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk</td>
<td>6 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cream</td>
<td>2 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar (Lactose)</td>
<td>1 ounce</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>4.00 P.M.</td>
<td>Milk</td>
<td>6 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cream</td>
<td>2 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar</td>
<td>1 ounce</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>6.00 P.M.</td>
<td>Cereal</td>
<td>3 tbps.</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cream</td>
<td>2 ounces</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Custard</td>
<td>4 ounces</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toast</td>
<td>1 slice</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Butter</td>
<td>3/4 ounce</td>
<td>110</td>
</tr>
</tbody>
</table>

#### Contraindications
- All purin containing foods.
- All stimulants as meat broths, alcohol, tea and coffee.
- All condiments, pickles, vinegar and highly seasoned foods.
- Coarse fermentable vegetables as cabbage, cauliflower, turnips, etc.
- Foods containing rough fiber, husks and seeds.
- Any food causing persistent digestive disturbance.

#### Diet In The Acute Infectious Diseases

**General Statement**

Under this heading such diseases as scarlet fever, smallpox, influenza, measles and acute rheumatic fever are included. In the discussion of diet in these diseases the considerations that apply to all the group will be taken up. These diseases are short duration and the feeding problem is not so difficult as in typhoid fever.

In these infections there is usually a loss of appetite and lessened digestive power. The feedings for this reason must be small in amount but more frequent and made up of very simple, easily digestible foods that are easy to take. It is also of considerable importance to have a liberal variety of foods for the appetite.
Liquid Diet - Coleman

milk 1 1/2 gts.
cream 1 pt.
lactose 8 1/3 oz.

Makes 6 feedings 7 8 1/3 oz.

Today - P. 60 gm. F. 150; Ch 3 45 gm = 3000 Cal

Beans j P. F + Ch + per 1 oz + Coloniz

<table>
<thead>
<tr>
<th>Food</th>
<th>P</th>
<th>F</th>
<th>Ch</th>
<th>Cal per oz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole milk</td>
<td>1</td>
<td>1.2</td>
<td>1.5</td>
<td>20</td>
</tr>
<tr>
<td>Cream 20%</td>
<td>0.15</td>
<td>5.5</td>
<td>1.3</td>
<td>60</td>
</tr>
<tr>
<td>Buttermilk</td>
<td>0.9</td>
<td>2</td>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>Sugar</td>
<td></td>
<td></td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Malted milk (dry)</td>
<td>4.6</td>
<td>2.2</td>
<td>19</td>
<td>119</td>
</tr>
<tr>
<td>Condensed milk</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
<td>50</td>
</tr>
</tbody>
</table>

unsweetened
Diet In Infectious Diseases

General Statement

Is often stimulated by the variety, smell and sight of food. Foods appropriate for healthy individuals are many times not suitable for fever patients. Food idiosyncrasies must be taken into consideration and any food that produces ill effects must be eliminated from the dietary.

The amount of food fed in these cases does not increase the temperature of the body and in planning the dietary, effort should be made to nourish the patient as fully as possible. Food should be chosen that is easily digested and assimilated.

of the three classes of food stuffs, the carbohydrates play the most important part in fever diets. These foods are easily digested, are body protein sparsers, highly nutritious and do not throw an excess of work on the eliminative organs.

The fats are also quite useful as energy producers and are best taken in the form of cream, butter and in egg yolks. The protein may be somewhat restricted, 40 to 60 grams per day being ample provision. Milk is the most satisfactory source of protein. Meat proteins are not suitable since they tend to add to the toxemia that already prevails.

Since dry mouth and excessive thirst are characteristic of these conditions a large part of the diet should be in liquid form. Liquids not only help to quench the thirst but are necessary also in eliminating the toxins from the body.

Foods Indicated

Milk, cream, buttermilk, yogurt, cereal gruels, proprietary foods as malted milk, Dennos food, etc., cream soups, vegetable broths, cream toast, fruit beverages, and fruit ices.

Diet In Arthritis

General Statement

Arthritis is a disease of the joints, the result of infection, characterized by inflammatory changes in the joint surface, the cartilages and in the surrounding tissues, and in some cases atrophic and hypertrophic changes in the bones.

The old idea that uric acid is the chief etiological factor is no longer held except in the gouty type, but focal infection is now known to be the principal cause. The infection enters the body from abscessed teeth, infected tonsils, infection of the nose or nasal sinuses, middle ear infections, infection of the biliary or urinary tract, pelvic infections in women and infection...
Dietetics

Diet In Arthritis

Middle ear infections, infection of the biliary or urinary tract, pelvic infections in women and infection of the prostate and seminal vesicles in men.

The carbohydrates are the item of first consideration. There seems to be a limit of toleration for carbohydrates which must be determined for each case. It will be necessary to make a reduction of carbohydrates varying from 40 to 60%.

The protein allowance needs to be only slightly reduced, 10 to 20%, but must be purinfree.

Fats may be used quite freely and thus help to increase the caloric value of the food ingested, but the total ingested calories should be kept to 25 to 30% below the normal for the individual in health. Thus a patient taking 3500 calories would be reduced to 2500.

After the arrest of the arthritis following the food curtailment the diet may be cautiously increased, using care not to overstep the patients' tolerance and thus favor a relapse.

The diet is made up very largely of fruits, green vegetables and coarse cereals. These bulky foods tend to satisfy the appetite without supplying much nutriment and at the same time stimulate elimination.

Contra-indications

- Sweets of all kinds.
- Foods rich in starch
- Proteins containing purin bases.
- Spices, pickles and condiments.

Diet In Tetanus

Tetanus is an infectious malady characterized by tonic spasms of the muscles with marked exacerbations.

The virus is produced by the bacillus tetani which occurs in earth, in putrefying fluids, and manure, and is a normal inhabitant of the intestines of many ruminants.

The toxin produced by the tetanus organism is probably one of the most poisonous agents which is known, being on the average about 250 times as poisonous as strychnine.

Diet has practically no influence upon this disease. The problem is largely one of knowing how and what to feed since in the active stage of the disease the patient cannot open his mouth. Any attempt at eating will in many cases start up the convulsions which
Diet Indicated

especially involve the muscles of mastication and those of the face and neck. If there is a tooth out, a tube may be passed through the opening and thus food be passed in this way or food may be given by means of a nasal tube.

The foods best suited for such feeding are: - Milk, cream, cereal gruels, eggs, gluten gruels, malted milk, malted nuts, lactose and maltose. Spraying the throat with cocaine may help to prevent the convulsion. In the most difficult cases the use of chloroform may be resorted to so as to get food into the stomach. Water may be given per rectum, and when there is no other means of feeding, nutritive enema may be given.

Diet In Cholera

Cholera is a specific infectious disease, caused by the comma bacillus of Koch, and characterized clinically by violent purging and rapid collapse. The disease progresses very rapidly, a fatal termination sometimes occurring in 8 to 12 hours, if recovery takes place it may be almost as rapid in some cases. The disease is transmitted chiefly through the medium of water. All water used during an epidemic of the disease should be boiled to insure destruction of the organism. Vegetables and fruits should not be eaten unless cooked and cooking utensils should be washed in boiled water to prevent contamination.

The use of acid drinks, as lemonade with 5 to 15 drops of dilute hydrochloric acid per glass and tartaric acid 1 to 15 grams to 1000 c.c. of sterile sweetened water, have been very highly recommended by some since the cholera organism does not thrive in an acid medium.

On account of the very marked irritation throughout the digestive tract the most mild and simple food must be used. During the early stages and height of the disease such preparations as barley water, rice water, and very thin gruels, excluding every part of rough material, are quite helpful, since they supply fluid to the body, and although they may be vomited, yet they are of service in washing the stomach. As the extreme acute

Sterilization of prime importance.
Drinking H2O
All foods, as vegetables, fruits (none taken raw)
Cooking utensiles.
Diet Indicated

Condition begins to abate, more nourishing foods, such as peptonized milk, koumyss, buttermilk and heavier gruels may be added. The convalescent diet should be quite similar to that used in typhoid fever.

Contraindications

- All coarse foods
- All irritants
- All raw foods
- All unboiled waters.

Diet In Yellow Fever

General Statement

Yellow fever is a fever of tropical and subtropical countries, characterized by a toxemia of varying intensity, with jaundice, albuminuria, and a marked tendency to hemorrhage, especially from the stomach, causing the black vomit. The disease is transmitted by the bite of a mosquito.

The knowledge of the mode of transmission has made possible the eradication of the disease from certain areas and the definite control of its spread in other places. It is one of the most fatal diseases, the mortality ranging from 15 to 65%.

Early in the disease no food is given but water should be administered freely. If vomiting is severe so that water cannot be retained when given by mouth it may be used quite freely by the rectum as the bowel is usually not very badly disturbed. Somerectal feeding can also be used to advantage in these cases. During the stage of calm, some of the more simple gruels, barley water and rice water may be used to advantage.

During the third stage, or secondary fever, when vomiting and diarrhea are present it is useless to give food either by mouth or rectum. If this stage is successfully passed, begin by feeding peptonized milk, cereal gruel, malted milk, orange eggnog and buttermilk, gradually progressing to a soft diet and back to normal feeding.

Diet In Sprue

General Statement

Sprue is an advanced stage of chronic tropical diarrhea, attended by severe symptoms of disordered digestion, malnutrition and progressive emaciation, characterized by a preface light foamy stool. The disease begins with a sore mouth and tongue and difficulty in swallowing. The mcosa of the gastrointestinal tract from mouth to anus becomes inflamed and hypersensitive.
DIETETICS

General Statement

These patients show marked debility and nervous symptoms. The disease shows many similarities to pellagra and has thus been thought by some to be due to deficiencies in diet. Others believe the disease to be of infectious origin caused by the organism monilia psilosis. The whole problem of etiology is still somewhat obscure.

Diet Indicated

 Authorities are agreed that the milk diet is the most valuable procedure. It should be begun by giving eight glasses during the first 24 hours and increased a glass a day until 14 glasses or 100 ounces are being given. The milk should always be taken slowly by sipping, or through a straw. This may be continued for 2 to 3 weeks and if favorable results are being obtained, further increase may be made, continuing the milk diet for six to eight weeks. Milk sometimes disagrees with these patients or seemingly fails of results. It is important to try it in every possible way, as by modification, boiling, peptonizing, or using it in the form of yogurt. During this early period of feeding, nothing but milk should be allowed. After the milk has been used 6 to 8 weeks, it may be supplemented by the addition of strawberries or ripe bananas.

The object of all diets is to prevent fermentation, to supply a thoroughly adequate diet, and to allay all irritation of the gastrointestinal tract.

Chapter XXXVI

DISEASES OF THE DUCTLESS GLANDS

Diet In Hyperthyroidism

Hyperthyroidism is a condition of hyper function of the thyroid gland characterized goiter, tachycardia, often by exophthalmus, hyperactivity of the nervous system and an increase in metabolic rate.

While there is some distinction between the ordinary ""hyperthyroid and true exophthalmic goiter, the dietetic treatment is the same.

It has been fairly well determined that the function of the gland has a notable influence upon carbohydrate metabolism probably through the pancreas. The metabolism of fat, protein and calcium is also affected to some extent. The determination of the basal metabolic rate in these cases is a most valuable aid in the diagnosis, treatment and the regulation of the diet. Hyperactivity
of the thyroid results in inhibition of pancreatic function.

Diet Indicated

The total caloric requirement of the patient is determined by his metabolic rate. The metabolism is increased from 10 to 100% or more in these cases. This means that these patients require an equal percentage of increase in food intake to prevent destruction of body tissue.

The diet should be low in protein and non-toxic in character to reduce to the minimum the stimulating effect of such products upon catabolism. The diet should be rather high in fats. All foods should be easily digestible.

The above conditions are admirably met by a lacto-vegetarian diet. It is very important to overcome intestinal stasis.

Contraindications

Meats and meat products.

All stimulating foods and drinks.

Spices, condiments, pickles and other irritants.

Diet In Hypothyroidism

Hypothyroidism is a constitutional disorder due to deficient functional activity on the part of the thyroid gland with resulting slowing of metabolism manifested by slowed circulatory, mental and physical activity. In these cases the metabolic rate is lessened from 10 to 40% and there should be at least a corresponding decrease in the intake of food. The main treatment is the administration of thyroid extract.

Diet Indicated

The food combinations must be very simple so as not to tax the digestive organs. The diet must be laxative in nature. The caloric reduction of the diet must be governed by the metabolic rate and the physical condition in the individual case.

The protein allowance remains about normal and the food given should be chosen to build up body strength. In obese cases the diet should be prescribed to supply the calories needed as indicated by the basal metabolic rate.

Diet In Addison's Disease

Addison's disease is a disease characterized - (a) pathologically by lesions (usually tuberculous) in the adrenal glands, or by degenerative changes in the adjacent abdominal sympathetic ganglia, and (b) clinically by muscular and mental adynamia, digestive disorders, pigmentation of the skin and a fatal issue.
Diet In Addison's Disease

Diet cannot accomplish much in the treatment of this disease. In fact no treatment has been found that is curative. Increase of carbohydrate in the diet is indicated on account of the adynamia. Low protein diet so as to avoid too much decomposition in the intestine.

Cultures of bacillus acidophilus and bacillus bulgaricus given in the form of sour milk are useful in combating the intestinal toxemia. Soft, non-irritating foods.

Chapter XXXVII

SURGICAL CONDITIONS

Diet Before Operation

The older idea of starvation before operation has been superseded by the more rational plan of maintaining the patient's nutrition by feeding simple and easily digested foods, especially carbohydrate up to within 8 to 12 hours prior to operation. It is often important to build up the patient's vitality before operation especially the anemic or emaciated. Copious water drinking up to two or three hours before operation is indicated.

The feeding of the light diet rich in carbohydrate, aids in cleansing the bowels by lessening the amount of bulk and decomposition. For abnormal surgery the precautions to be taken are more specific. When possible a patient should rest in bed 2 to 3 days. During this time the diet should be very nourishing and rich in carbohydrate so as to yield little bulk, and the bowels should be thoroughly cleansed by several enemas.

Diet After Operation

The kind of anesthetic is a modifying factor in planning the diet of the prospective case. The diet must be adjusted to meet the need of the individual. When severe thirst is present, chipped ice may be allowed after vomiting and nausea have ceased but the extra water needed is usually best supplied by the Murphy drip for the first 12 to 24 hours depending upon the nature of the operation.
Diet After Operation

In minor surgery, water may be given by mouth as soon as recovery from the anesthetic will permit, this may be soon followed by a liquid diet, then semisolid and on to normal feeding.

Operations on the mouth or throat usually require the withholding of food 12 to 24 hours. The plan of feeding is as above.

Operations on the gastrointestinal tract require more care in dietetic management. It is usually considered best to withhold food 2 or three days but some surgeons maintain that soothing liquid foods are better given as early as in ordinary surgical procedures. The latter idea is based upon the idea that secretion and peristalsis help to keep the tract free from stagnation and thus lessen decomposition of blood clots and secretions.

When feeding is begun, clear vegetable broth, strained rice or barley water, and fully peptonized milk may be used, alternating them, if desired, at hour intervals giving about one ounce at a time. This amount may be gradually increased and a milk and cream mixture may be added to it and by the end of the first week, junket, light custards, coddled eggs and finely ground cereals may be added. Three or four weeks should elapse before the patient is placed upon a general diet.

Chapter XXXVIII

MISCELLANEOUS METHODS

Duodenal Feeding

Indications for use according to Einhorn are as follows:

1. Ulcer of the stomach or duodenum.
2. Dilatation of stomach without organic obstruction.
3. Nervous vomiting and obstinate vomiting of pregnancy.
4. Atony of the stomach.
5. Disease of liver with faulty metabolic products in the circulation.
6. Inoperable cancer where pylorus is not closed and duodenum can be entered by pump.
Methods of using the Einhorn duodenal feeding.

Materials used for feeding:

- Whole milk 250 c.c. 170 calories
- 1 whole egg 50 gm. 80 "
- Lactose 15 gm. 60 "

These ingredients are mixed by beating and injected by the Einhorn apparatus through the duodenal tube, giving eight feedings in twenty-four hours at two hour intervals, making a total of 2400 calories for the day.

The duodenal tube can be kept in place for 10 to 15 days. There is some discomfort for the first two or three days then the method is fairly easy for the rest of the period.

Rectal Feeding

The problem of nourishing the body other than by mouth feeding is a problem of long standing. There are three general methods of artificial feeding:

1. Rectal.
2. Subcutaneous.
3. Intravenous.

Of these, rectal feeding is by far the most valuable.

The old plan of using milk, malted nuts, eggs, etc. as a nutrient enema is of little worth since the colon is not a digestive organ.

By the use of water, salts, sugars, thoroughly pancreatized proteins 25 to 35% of the caloric requirements of the body may be supplied. Absorption of the end products of digestion takes place in the colon and this is favored by reverse peristalsis which carries the nutrients up to the ileocecal valve.

The following formulas are useful for rectal feeding:

1. Dextrose 50 grams. (205 calories)
Pancreatized milk 1000 c.c. (200 available cal.
Salt 9 grams.

This solution may be given in 8 ounce doses every four hours.
Formulas 2. Dextrose 50 grams (205 calories) Commercial amino acids in solution 1000 c.c. (Sufficient to make 150 to 200 calories) Salt 9 grams

Give in same dosage as above formula.

3. Dextrose 20 grams (80 calories) Peptones 20 grams (80 calories) Salt 4 grams Water 500 c.c.

Give in two doses.

The rectum must be kept very clean and the food formula must be thoroughly sterilized. Fermentation may be prevented in rectal feeding by adding 1 part thymol to 4000 parts of the formula, this amount of thymol is non toxic. The temperature of the formula should be slightly above body temperature, about 105 degrees F.

General Statement

The milk diet is frequently used with the idea of increasing the weight and general resistance. Such a program may be carried out for three to eight weeks in an average case.

The following outline is one that is used in our Sanitarium work. It includes a small amount of fruit at intervals which helps in keeping the intestinal motility up to normal. The feedings in the following outline are 8 ounce quantities.

Feedings

3 quarts daily  4 quarts daily  6 quarts daily

A.M. 7:00 Milk A.M. 7:00 Milk A.M. 7:00 Milk
7:55 Fruit 7:45 Fruit 7:30 Fruit
8:30 Milk 8:30 Milk 8:00 Milk
9:45 Milk 9:15 Milk 8:30 Milk
10:40 Milk 10:00 Milk 9:00 Milk
11:35 Milk 10:45 Milk 9:30 Milk

MILK DIET
### DIETETICS

**MILK DIET**

<table>
<thead>
<tr>
<th>Feedings</th>
<th>3 quarts daily</th>
<th>4 quarts daily</th>
<th>6 quarts daily</th>
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<tr>
<td>P.M. 12:30 Milk</td>
<td>P.M. 12:45 Milk</td>
<td>A.M. 11:00 Milk</td>
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<tr>
<td>1.25 Fruit</td>
<td>1:00 Milk</td>
<td>11:30 Milk</td>
<td></td>
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<tr>
<td>2:30 Milk</td>
<td>1:45 Fruit</td>
<td>12:00 Milk</td>
<td></td>
</tr>
<tr>
<td>3:15 Milk</td>
<td>2:30 Milk</td>
<td>12:30 Milk</td>
<td></td>
</tr>
<tr>
<td>4:15 Milk</td>
<td>3:15 Milk</td>
<td></td>
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</tr>
<tr>
<td>5:05 Milk</td>
<td>4:00 Milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6:00 Fruit</td>
<td>4:45 Milk</td>
<td>P.M. 1:00 Milk</td>
<td></td>
</tr>
<tr>
<td>6:55 Milk</td>
<td>5:30 Milk</td>
<td>1:30 Fruit</td>
<td></td>
</tr>
<tr>
<td>7:30 Milk</td>
<td>6:15 Fruit</td>
<td>2:00 Milk</td>
<td></td>
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<tr>
<td>7:45 Milk</td>
<td>7:00 Milk</td>
<td>2:30 Milk</td>
<td></td>
</tr>
<tr>
<td>8:30 Milk</td>
<td>7:45 Milk</td>
<td>3:00 Milk</td>
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</tbody>
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**NOTE.** - In taking the milk diet, milk and yogurt may be used alternately. Three tablespoons of paraffin oil should be taken daily if the bowels are constipated. They are often most comfortably taken by the patient with the fruit meal. The fruit meal may be taken at the regular meal hour, as the schedule above. The ordinary milk regimen is fortwo weeks. It is customary to start with the three quarts schedule, keeping this up for two days, then take the four quarts schedule for two days, then the six quarts schedule for the remainder of the time.
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