

CHAPTER V.

THE ART OF COOKING.

FLAVORS AND CONDIMENTS.

THE science as well as the art of cooking lies in the production of a subtle something which gives zest to the food and which, though infinitesimal in quantity, is of priceless value. It is the savory potage, the mint, anise and cummin, the tasteful morsel, the appetizing odor, which is, rightly, the pride of the cook's heart.

avors.

The most general term for this class of stimulating substances is, perhaps, flavor—the *gout* of the French, the *Genuss-Mittel* (enjoyment-giver) of the Germans.

The development of this quality in food—taste, savor, relish, flavor or what not, which makes “the mouth water,” depends, in every case, upon chemical changes more subtle than any others known to us. The change in the coffee berry by roasting is a familiar illustration. The heat of the fire causes the breaking up of a substance existing in the berry and the production of several new ones. If the heat is not sufficient, the right odor will not be

given; if it is too great, the aroma will be dissipated into the air or the compound will be destroyed.

This is an excellent illustration of the narrow margin along which success lies. It is also chemically typical of the largest number of flavors, which seem to be of the nature of oils, set free by the breaking up of the complex substances of which they form a part. Nature has prepared these essential oils by the heat of the sun. They give the taste to green vegetables; while in fruits they are present with certain acids, and both together cause the pleasure-giving and therapeutic effects for which fruit is noted.

Nature of
Flavors.

It is probable that the flavors of roasted corn, well-cooked oatmeal, toasted bread, also belong to this class. Broiled steak and roasted turkey are also illustrations, and with coffee show how easily the mark is overstepped—a few seconds too long, a very few degrees too hot, and the delicate morsel becomes an acrid, irritating mass.

From this standpoint, cooking is an art as exact as the pharmacist's, and the person exercising it should receive as careful preparation; for these flavors, which are so highly prized, are many of them the drugs and poisons of the apothecary and are to be used with as much care. This is an additional reason for producing them by legitimate means from the food itself, and not by adding the

crude materials in quantities relatively enormous to those of the food substances.

Chemistry of
Flavors.

The chemistry of cooking is therefore largely the chemistry of flavor-production—the application of heat to the food material in such a way as to bring about the right changes and *only* these.

The flavors produced by cooking, correctly done, will be delicate and unobtrusive. Usually, except for broiled meats, a low heat applied for a long time, with the use of closed cooking vessels, develops the best flavors; while quick cooking, which necessitates a high temperature, robs the fine products of nature's laboratory of their choicest elements. Present American cookery, especially, sins in this respect. Either the food is insipid from lack of flavor or crudely seasoned at the last moment.

The secret of the success of our grandmothers' cooking lay not solely in the brick oven—in the low, steady heat it furnished—but in the care, thought, and infinite pains they put into the preparation of their simple foods. Compared with these, the "one-minute" cereals, the "lightning" pudding mixtures of the present are insipid, or tasteless. Experience with the Aladdin Oven is an education in flavor production.

Condiments
and their
Effect.

Another source of stimulating flavor is found in the addition of various substances called Condiments. These consist of materials, of whatever

nature, added to the food compounds, to give them a relish. Their use is legitimate; their abuse, harmful. The effect of flavors is due to the stimulation of the nerves of taste and smell. Condiments should be used in a way to cause a like stimulation of the nerves. If they are added to food materials before or during the cooking process, a small quantity imparts a flavor to the entire mixture. If added to the cooked food, a larger quantity is used and the effect lasts, not only while the food is in contact with the nerves of the mouth, but also throughout the digestive tract, causing an irritation of the mucous membranes themselves. The tissues become weakened, and, in time, lose the power of normal action.

Cayenne pepper directly applied to the food, although sometimes a help, is oftener the cause in dyspepsia. Highly seasoned food tends to weaken the digestion in the end, by calling for more secretion than is needed and so tiring out, as it were, the glands. It is like the too frequent and violent application of the whip to a willing steed—by and by he learns to disregard it. Just enough to accomplish the purpose is nature's economy.

This economy is quick to recognize and be satisfied with a food which is easily digested without impairing the functional powers of the digestive fluids. A child seldom shows a desire for condi-

ments unless these have been first unwisely added by adults. *Flavors* are largely odors, or odors and tastes combined, and act upon the nervous system in a natural way. *Condiments*, in many cases, are powerful, stimulating drugs, exciting the inner linings of the stomach to an increased and abnormal activity. Medicinally they may act as tonics. The skill of the cook consists in steering between the two digestion possibilities—hinder and help.

Stimulants.

Some relish-giving substances, as meat extracts, the caffeine of coffee, theine of tea, theo-bromine of cocoa, and alcohol of wines go directly into the blood and here act upon the nervous system. They quicken the circulation and, therefore, stimulate to increased activity. The cup of coffee thus drives out the feeling of lassitude from wearied nerves and muscles. Wine should never be treated as an article of diet, but as a *Genuss-Mittel*.

Cooking of Vegetables.

The secret of the cooking of vegetables is the judicious production of flavor. In this the French cook excels. She adds a little meat juice to the cooked vegetables, thus obtaining the desired flavor with the cheaper nutritious food. This wise use of meats for flavor, while the actual food value is made up from the vegetable kingdom, is an important item in public kitchens, institutions, or wherever expense must be closely calculated.

Economy in Cooking.

In the study of economy, flavor-creation is of the

utmost importance. In foods, as everywhere, science and art must supplement the purse, making the few and cheaper materials necessary for nutrition into a variety of savory dishes. Without the appetizing flavor, many a combination of food materials is utterly worthless, for this alone stimulates the desire or appetite, the absence of which may prevent digestion. Food which pleases the palate, unless this has been abnormally educated, is usually wholesome, and judgment based on flavor is normally a sound one.

Starch may be cooked according to the most approved methods; but, if there is no saliva, the starch is without food value. The piece of meat may be done to a turn; but, if there is no gastric juice in the stomach, it will not be dissolved, and hence is useless. A homely illustration will best serve our turn,—a cow may retain her milk by force of will. It is well known how much a contented mind has to do with her readiness to give milk and the quantity of milk she will yield. The various glands of the human body seem to have a like action. The dry mouth fails to moisten the food, and the stimulating flavor is lost. On the other hand the mouth “waters,” and food is soon digested. The cow may be utterly foolish and whimsical in her ideas—so may persons. There may not be the least reason

Conditions
for Digestion.

why a person should turn away from a given food, but if he does——? He suffers for his whims.

Serving

Hence the cook's art is most important, for its results must often overcome adverse mental conditions by nerve-stimulating flavors. The art of serving, though out of place here, should be attentively studied with the effect on the appetite especially in view. This is of the utmost importance in connection with hospital cooking.

Discretion in Cooking.

Specific flavors, though agreeable in themselves, should be used with discretion. In Norway, the salmon is designedly cooked so as not to retain much of its characteristic savor, for this is too decided a flavor for an article of daily diet. In soups and stews a "bouquet" of flavors is better than the prominence of any one, although certain favorite dishes may have a constant flavor.

Bacterial Action Produces Flavors.

Nature has produced many flavors and guarded well the secret of their production; but science is fast discovering their sources, as bacterial life and action are better understood. Now, the "June flavor" of butter may be produced in December, by inoculating milk with the right "butter bacillus."

Cooking an Art.

Cooking has thus become an art worthy the attention of intelligent and learned women. The laws of chemical action are founded upon the laws of definite proportions, and whatever is added more

than enough, is in the way. The head of every household should study the condition of her family, and tempt them with dainty dishes, if that is what they need. Let her see to it that no burst of ill temper, no sullen disposition, no intemperance of any kind be caused by *her ignorance* or *her disregard* of the chemical laws governing the reactions of the food she furnishes.

When this science and this art takes its place beside the other sciences and other arts, one crying need of the world will be satisfied.

We have now considered the three classes of food in one or more of which all staple articles of diet may be placed—the carbohydrates (starch and sugar), the fats and the nitrogenous material. Some general principles of diet, indicated by science, remain to be discussed.

DIET.

All preparation of food-stuffs necessary to make them into suitable food for man comes under the head of what has been called "*external digestion.*" The processes of *internal digestion* begin in the mouth. Here the saliva not only lubricates the finely divided portions of the food materials, but, in the case of starch, begins the process of changing the insoluble starch into a soluble sugar. This process is renewed in the small intestine. The fats

Processes of
Digestion.
Saliva.

are emulsified in the small intestine, and, with the soluble carbohydrates, are here largely absorbed.

Mastication.

All the chemical changes which the nitrogenous food stuffs undergo are not well understood. Such food should be finely comminuted in the mouth, because, as before stated, chemical action is rapid in proportion to the fineness of division; but it is in the stomach that the first chemical change occurs.

**Pepsin and
Acid of
Stomach.**

The chief agents of this change are pepsin and related substances, aided by the acid of the gastric juice; these together render the nitrogenous substance soluble and capable of passing through the membranes. Neither seems able to do this alone, for if the acid is neutralized, action ceases; and if pepsin is absent, digestion does not take place.

**Decomposi-
tion Products.**

Decompositions of a very complex kind occur, *peptones* are formed which are soluble compounds, and the nitrogen finally passes out of the system as *urea*, being separated by the kidneys, as carbon dioxide is separated by the lungs.

One of the most obvious questions is: Which is best for human food—starch or fat, beans and peas, or flesh? As to starch or fat, the question has been answered by experience, and science has only tried to explain the reason. The colder the climate, the more fat the people eat. The tropical nations live

chiefly on starchy foods, as rice. From previous statements it will be seen that this is right in principle. Fat yields more heat than rice; therefore the inference is plain that in the cold of winter fat is appropriate food, while in the heat of summer rice or some other starchy food should be substituted.

The diet of summer should also contain much fruit. Increased perspiration makes necessary an increased supply of water. This may be furnished largely by fruits, and with the water certain acids are taken which act as correctives in the digestive processes.

Seasonable
Diet.

No evident rule can be seen in the case of the albuminous foods. At most, the class can be divided into three groups. The first includes the material of vegetable origin, as peas, lentils, and the gluten of wheat. The second comprises the white of egg and the curd of milk—material of animal origin. The third takes in all the animal flesh used by mankind as food.

Considering the question from a purely chemical standpoint, without regarding the moral or social aspects of the case, two views stand out clearly: 1st. If the stored-up vegetable matter has required the force derived from the sun to prepare it, the tearing apart and giving back to the air and earth the elements of which it was built up will yield the same amount of force to whatever tears it down;

Economy of
a Mixed
Diet.

but a certain amount of energy must be used up in this destruction. 2d. If the animal, having accomplished the decomposition of the vegetable and appropriated the material, is killed, and the prepared nitrogenous food in the form of muscle is eaten by man, then little force is necessary to render the food assimilable; it is only to be dissolved in order that it may enter into the circulation. The force-producing power is not lost; it is only transferred to another animal body. Hence the ox or the sheep can do a part of man's work for him in preparing the vegetable food for use, and man may thus accomplish more than he otherwise could. This digestion of material outside of the body is carried still further, by man, in the manufacture of partially digested foods,—“malted,” “peptonized,” “pre-digested,” etc. Exclusive use of these is fraught with danger, for the organs of digestion lose power, if that which they have, however little, be long unused.

Food of
Young
Animals.

Nearly all, if not all, young animals live on food of animal origin. The young of the human race live on milk; but it has been found by experience that milk is not the best food for the adult to live upon to the exclusion of all else. It is not conducive to quickness of thought or general bodily activity.

Need of Veg-
etable Food.

Experience leads to the conclusion that mankind

needs some vegetable food. Two facts sustain this inference. The digestive organs of the herbivorous animals form fifteen to twenty per cent of the whole weight of the body. Those of the carnivorous animals form five to six per cent, those of the human race, about eight per cent. The length of the canal through which the food passes varies in about the same ratio in the three classes. A mixed diet seems to be indicated as desirable by every test which has been applied; but the proportions in which the vegetable and animal food are to be mingled, as well as the relative quantities of carbonaceous and nitrogenous material which will give the best efficiency to the human machine are not so easily determined.

Nature seems to have made provision for the excess of heat resulting from the oxidation of too much starch or fat, by the ready means of evaporation of water from the surface; this loss of water being supplied by drinking a fresh supply, which goes, without change, into the circulation. The greater the heat, the greater the evaporation; hence the importance of water as an article of diet, especially for children, must not be overlooked. For an active person, the supply has been estimated at three quarts per day. Water is the heat regulator of the animal body. An article entitled "Water

Water and
Air as Food.

and Air as Food,"* by one of the authors of this book, treats this subject more thoroughly.

Dangers of
Excess.

While dangerous disease seldom results from eating an excess of starch or fat, because the portion not wanted is rejected as if it were so much sand, many of the most complicated disorders do result from an excess of nitrogenous diet.

The readiness with which such substances undergo putrefaction, and the many noxious products to which such changes give rise, should lead us to be more careful as to the quantity of this food.

From experiments made by the best investigators, it seems probable that only one third of the estimated daily supply of food is available for kinetic force; that is, that only about one third of the total energy contained in the daily food can be utilized in digging trenches, carrying bricks, climbing mountains, designing bridges, or writing poems and essays. The other two thirds is used up in the internal work of the body—the action of the heart, lungs, and the production of the large amount of heat necessary to life.

Dietaries.

It has been estimated that a *growing* person needs about one part of nitrogenous food to four of starch and fat; a *grown* person, one part nitrogenous to five or six of starch and fat. If this is

* Rumford Kitchen Leaflet, No. 6, *American Kitchen Magazine*, Vol. IV., 257.

true, then we may make out a life ration, or that amount of food which is necessary to keep the human machine in existence.

For this climate, and for the habits of our people, we have estimated this life ration as approximately:

Proteid. 75 grams.	Fat. 40 grams.	Carbohydrates. 325 grams.	Calories. 2,000.
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The amount of energy given out in the form of work cannot exceed the amount of energy taken in in the form of food; so this life ration is increased to make a maximum and minimum for a work ration. For professional or literary persons the following may be considered a sufficient maximum and minimum:

Proteid. 125 grams. 110 grams.	Fat. 125 grams. 90 grams.	Carbohydrates. 450 grams. 420 grams.	Calories. 3,500. 3,000.
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For hard manual labor about one-third is to be added to the above rations. An examination of the actual dietaries of some of the very poor who eat just enough to live, without doing any work, shows that in twelve cases the average diet was:

Proteid. 31 grams.	Fat. 81 grams.	Carbohydrates. 272 grams.	Calories. 2,257.
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For further information on these points see the list of works at the end of this book.

The first office of the food, then, is to keep the human body in a high condition of health; the second, to enable it to exert force in doing the work

Offices of
Food.

of the world; and a third, the value of which it is hardly possible to estimate, is to furnish an important factor in the restoration of the body to normal condition, when health is lost. In sickness, far more than in health, a knowledge of the right proportions of the essential food substances, and of the absolute quantity or food value given, is important. How many a life has been lost because of a lack of this knowledge the world will never know.