Effects of Cooking, by Herbert Shelton


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Speculations upon the origin of cooking are, perhaps futile. I have suggested that it may have developed out of ancient black magic - that it was an effort to impart the magic properties of fire to food. Certain it is, man did not cook his foods until after he learned to use fire and it was probably long thereafter, before he cooked much of it.

Someone has said: "Cod made man and the Devil made cooks." A British writer says: "Just try to imagine what a powerful lever the Devil possessed when he invented cooking and persuaded the primitive savages to seek after extraneous foodstuffs which could only be eaten if they were softened and made tasty by means of heat." Accepting the Devil as merely the personification of evil, he is undoubtedly the Father of Magic.

Simple prolonged heating of foodstuffs, especially at a high temperature and doubly so in the presence of water, either that contained in the foods themselves, or that added in the process of cooking, certainly results in a number of important changes in the foodstuffs which render them less and less valuable as foods. Even those foods that are regarded as fairly thermostable are certainly damaged by prolonged heating so that a diet that may be adequate in the uncooked state may be very inadequate after being thoroughly cooked. (High degrees of heat in the presence of water produces hydrolysis.)

At about 145 degrees Fahrenheit certain properties of plant life are destroyed. A leaf of cabbage, for example, if immersed in water that can be easily borne by the hand, will wilt, showing that part of its cellular life is destroyed at that low temperature. The heat to which such foods are subjected in cooking may be increased or prolonged until all the properties of the plant are destroyed. Many

articles of food which are baked in an oven are subjected to a very Intense heat ranging from 300 degrees F. to 400 degrees F. Much of their food value is destroyed, thereby. Bread that is browned in an oven is half-destroyed, being partly charcoal, tar, and ashes. If it had been left in an oven twice as long it would have been entirely destroyed. At every step in the process of cooking from the time the food is put in or upon the stove until it is entirely destroyed, if it be permitted to cook that long, destructive changes take place that impair its food value and unlit it for use by the body. I propose here to discuss the most important of these changes in the following order:

(1) Cooking coagulates (hardens) the proteins of milk, eggs, meat, etc., making them tough and, with the exception of egg protein, less digestible, while impairing their food values.

Protein digestibility is decreased by cooking, except in the case of egg whites. If egg white is just curdled it is rendered more easily digestible - if it is boiled hard it is made difficult of digestion. Meat protein is hardened at 1600 F. Meat is more easily digested raw than cooked. Milk protein is coagulated at 145° F. and becomes less digestible than raw milk.

Sensitive amines are supposed by some to be saponified by heat, especially in the presence of water. Becoming a bit technical, for which I apologize to my lay readers, the amine group is replaced by the hydroxyl group in the foodstuffs and it has been shown that the hydroxides cannot be reaminised by the animal body. This means that the protein has been reduced to useless substances. It is said that while among the synthetic amines there are many which, owing to peculiar structural conditions, the amine group is readily detachable, no such substances are known among the natural amines. This is not wholly true, for it is known that water in which meat has been boiled contains more ammonia than was demonstrable in the meat. There is unquestionably a splitting off of certain amines. To assume that this has no bearing on nutrition in the absence of direct proof of such effect does not seem to me to be justifiable.

When either cystin or cystein are heated in the presence of water the sulphur is split off so that, as Berg says: "both cystin and cystein are 000 rendered valueless for nutritive purposes, inasmuch as sulphydration cannot be affected in the animal body." He says that this decomposition of the sulphhydril group of amino acids by heat in the presence of water "does actually occur."

I quote the following from Vitamins by Ragnar Berg: "the experiments of Francis and Trowbridge and those of Trowbridge and Stanley have shown that when meat is boiled even for a comparatively brief period, organic phosphates are transformed into inorganic."

Berg says: "Besides the sulphur group, we have reason to suppose that the food contains other groups of substances with a readily modifiable composition. We are, however, certain that the proteins, and especially the neucleoproteins, contain thermoliable mixed organic compounds." He mentions certain phosphates that are rapidly transformed by the cooking process and points out that while the body is capable of taking the more complex phosphates and reducing them to lower stages, it is unable to reverse the process. Only plants can do this.

Simple prolonged heating of foodstuffs, especially at high temperatures or under

pressure, produces the following effects.
1. The disaminisation (deaminization) of vitally important amine compounds.
2. The decomposition of similar sulphur compounds (and perhaps of substances belonging to other unstable groups.)
3. The metamorphosis of metaphosphates and pyrophosphates into orthophosphates.
The first two of the above listed effects renders it impossible for the foodstuffs to be assimilated to form cell-substance, for the unstable groups in the food mixture will have been destroyed.
In considering the evils that may flow from deaminization of proteins (or of amino acids) by the cooking process, it is probably Important that we think primarily of the effects of cooking upon the essential amino acids. Berg's conclusion, however, after reviewing the evidence, is that deaminization is not as important as the change of organic phosphates into inorganic.
Prof. Charles Bichet, of the Paris Academy of Sciences, fed raw beef juice to tubercular patients and reported excellent results from this diet. He concluded however, that cooking meat interferes with the perfect assimilation of it that might otherwise occur. Rare beef has no vitamin value and its iron is said to be very poorly utilized by the body. This is probably not so of the iron in raw beef.
The British sociologist, Anthony Ludovici, recounts an instructive experience with cats. He bred cats for the purpose of studying the process of birth. He discovered that cats actually enjoy the process of birth, that they purr while their kittens are being born. Mr. Ludovici realizing that animals never cook their foods, took it for granted that his cats should have raw meat. Then, on one occasion, he was called away to the country and left one of his female cats in the care of some friends. When her kittens were born shortly after his return, her flanks heaved helplessly for several hours and she groaned almost like a human being. He despaired of her ever delivering her kittens. Inquiry revealed that his friend had fed the cat on cooked meat, vegetables, bread and milk and milk puddings. Further investigation revealed that not merely the happiness of cats during parturition but of other animals also, is inseparably connected with optimum condition during gestation - pregnancy. He found he was able to produce pleasurable or painful parturition at will by feeding his cats in different manners and keeping them indoors or outdoors. He discovered that he could do the same thing with bitches and, upon inquiry among shepherds, discovered the same thing among sheep. He tells of difficulties among cows and horses fed in certain very unwholesome ways. I have never seen difficulty in cows, and I have watched the birth of many calves, but these cows were supplied with good pasturage and were outdoors all through gestation. Not merely raw flesh foods, but uncooked foods of all kinds, are best for food.
In Vol. 39 (pages 21-31), 1939 of the Transactions of the American Therapeutic Society F. M. Pottenger, M. D., and D. C. Simonsen recount the results of some experiments which they performed with cats. For a lengthy period of time they fed two groups of cats on similar quantities of meats and vegetables. The only difference between the diets of the two groups was that the meat of one group was

uncooked, that of the other group cooked.

These men report that all the cats that received the uncooked flesh led normal lives, appeared perfectly healthy and were able to reproduce themselves throughout the length of the experiment which ran through several generations. On the other hand, none of the eats fed cooked meat were able to maintain good health for any length of time, nor were some of the second and third generations able to reproduce. All of the cats eating cooked flesh developed very serious troubles, such as softening of the bones, including those of the skull, bowed legs, rickets, curvature of the spine, paralysis of the legs, thyroid abscesses, convulsions, cyanosis of the liver and kidneys, enlarged colon, degeneration of the motor nerve ganglion cells throughout the spinal cord and brain stem, with some cells affected in the cerebellum and cerebral cortex.

The reader's attention is directed to the cumulative effects of this diet. A diet that seems adequate in one generation may turn out to be very inadequate if carried out through a few generations. It should not be thought that because a particular mode of eating seems adequate for an individual that it will not produce serious results in the children or grandchildren. Long ago it was said: "The fathers have eaten sour grapes and the children's teeth are set on edge."

(2) Cooking alters the fats in food rendering them less digestible and converting some of them into poisons.

Fatty emulsions tend to break down when exposed to heat, while fats exposed to high temperatures are made less digestible. The application of heat to fats and oils of all kinds develop free fatty acids which are not only non-assimilable, but are often poisonous.

(3) Cooking causes a great loss of the soluble minerals in the food.

It has been shown that when meats are boiled, from 20 to 67% of their salts are found in the broth. When these are baked 2.5 to 57.2% of the mineral is found in the drippings of the meat. The meat is already predominantly acid-forming, before it is subjected to these processes.

When potatoes are peeled and soaked in cold water before boiling 38% of their mineral matter is lost. Green vegetables, when boiled and the water in which they are boiled is poured off or rejected, lose practically all of their soluble minerals. White flour, denatured corn-meal, polished rice, and all other denatured or demineralized foods have lost most of their minerals. Beans and peas, cooked in the usual manner lose much of their mineral content.

Prof. Snyder showed that 100 lbs. of cabbage contains 7.5 lbs. of solids, more than one-third of which - 2.50 or 3 lbs. - are lost when cooked in water. Spinach has a solid content of 10%, of which, nearly one-fourth is lost when cooked in water. Carrots cut into small pieces and cooked in water lose 20% to 30% of their weight. If rice is boiled and the water poured off, it loses so much of its valuable nutriments that Native Indian soldiers preferred to drink the liquid and leave the rice for the British.

Milo Hastings writing about some cooking experiments conducted in the laboratory of the department of agricultural chemistry of the University of Wisconsin, says:

"In this interesting investigation sixteen kinds of vegetables were cooked in three different ways. One lot of each vegetable was boiled in enough water to cover the cut up vegetables. A second lot was cooked in twice as much water. A third lot was steamed without coming in contact with the water except such water as would collect on the vegetables by the condensation of steam.
"The raw vegetables and those cooked in these different fashions were all carefully analyzed for the total amount of food elements, of protein and of calcium, magnesium, phosphorus and iron. The results showed that all food elements are lost to a much greater extent in boiling than in steaming.
"The general average of loss of total nutriments was three times as great in boiling as in steaming. The loss was naturally greater from the leaf vegetables than from the root vegetables. Cabbage seemed to suffer more than any other type of food in the experiment. The reason for this is that cabbage, when cut up for cooking is cut across the leaf structure. Spinach suffers less because the leaves are cooked whole. Cabbage cooked in the larger volume of water lost 60 % of its total dry matter, 62 % of its protein, 72% of its calcium, 60% of its phosphorus and 87 % of its iron. In other words, when one eats cooked cabbage, he is getting only a third of the value of raw cabbage, to say nothing of the destruction of the vitamins. Even the steaming process of cooking cabbage gives none too good a record, as this showed losses of from 22 to 48% of the above listed food elements.
"In the case of spinach the loss of iron is of especial interest as spinach is the richest known source of food iron. Boiling in enough water to cover showed a loss of 48 % of the iron in spinach. Cooking in twice that much water showed a loss of 57% of the spinach iron. Steaming showing a loss of 25 % of the iron.
"Not all foods showed such large losses from the cooking, thus potatoes, even though pared showed only 9% loss of total food in boiling and only 4% loss in steaming.
"This investigation will certainly help to explain why the ordinary boiled vegetable dinner, such as is served in the unprogressive restaurants, is such a flat tasted and washed out affair. Nearly half of the valuable mineral elements have probably been poured down the sewer along with the dish water. Clever cooks make sauces for such washed-out vegetables that may compensate for the loss in tastiness of the natural ingredients, but only intelligent cooks try to prevent such losses."
Berg says: "the mere steaming of vegetables for five minutes dissolves out so large a proportion of the inorganic bases that the residue contains an excess of acids. Simultaneously the vitally important complettins (vitamins) are entirely dissolved out of the vegetables."
(4) Cooking destroys the elementary plant form, tearing down go structure, changing its composition and bringing about certain destructive changes in the element-groupings in all foods, returning part of these elements, especially the organic salts, to their inorganic and, therefore, useless state, so that a large part of their mineral content is lost.
Plant processes take the unorganized elements of the earth and air and organize these into related compounds, which, then, become available for animal life. Without vegetation there could be no animal life, for the reason that soil and rock are not available substances for animal replenishment. This being true, it is only

natural to conclude that once plants have organized these elements into forms available for animal sustenance, any process which returns them wholly, or in part, to their primitive condition renders them, to that degree, unfit for food, and more or less disease producing. That cooking brings about more or less oxidation and disorganization in every oxidizable substance in foods of all types, admits of no doubt. When nutriment has been oxidized in the body, the resulting "ashes" cease to be usable and are eliminated. What reason have we to believe that food oxidized outside the body is more fit for use? Ralph E. Sunderland, chemist and food scientist, declares oxidation to be the chief destroyer of foods and explains the matter thus:

"The same elements (the sixteen chemical elements composing the human body), are the component parts of technically 'fertile' soil in which they are present in inorganic form and as such are not assimilable by the human body, else we could look directly to the soil for our substance. In order to convert these inorganic elements or minerals into a form which can be assimilated by the human body it is necessary for nature to create from the soil vegetation in which these same elements are present in organic form. In vegetation they remain organic until, by oxidation, they return again to their original inorganic form ready to produce more vegetation.

"True food is totally organic substance. If that organic substance is permitted to become, to any degree, inorganic, it simultaneously becomes to that degree useless as food.

"All organic minerals oxidize when they come in contact with oxygen and moisture. That is, they thus become inorganic again.

In ordinary room-temperature the process of oxidation proceeds; but in the presence of heat oxidation is very greatly increased. Therefore, the cooking of vegetation in the presence of the oxygen of the air - the condition under which all home cooking and most commercial cooking occurs - changes a large part of what was organic and useful as food into inorganic oxides which cannot be assimilated by the human body."

French investigators found that when milk is boiled the complex calcium-magnesium carbono-phosphate it contains, is decomposed and precipitated in an insoluble form. This means that a natural organic salt which is directly assimilable and available for immediate bony growth, is changed into a form almost impossible of assimilation.

McCollum and Parsons in this country, found that the precipitated salts cling to the walls of the vessel or container so that part of them are actually eliminated from the milk. The excess of bases in the milk is thus greatly reduced. As this excess is low in even the best of milk, the double robbery of alkalis occasioned by boiling has grave consequences.

It is a fact, therefore, that the longer foods are cooked and the higher the temperature to which they are subjected, the more oxidation takes place and the greater is the destruction of the food. I may add, also, that efforts to cook out of the presence of the oxygen of the air, though not as destructive as the common forms of cooking, produces great ruin to the food. Cooking onions, cabbage, cauliflower, etc., oxidizes the sulphur. These foods should never be cooked.

(5) Cooking renders starches less digestible and more prone to fermentation. Cooked starches are said, by many, to be easiest of digestion. Toasted bread is said to be dextrinized. Are these things so? It has long been known that animals digest raw starch best and that they do not fare well on cooked foods. Farmers quit cooking food for their animals years ago. Mio Hastings says

"Closely akin to the idea of predigesting cereals by roasting and toasting them are the old notions that raw starch is indigestible and that all home cooked starchy foods need very long, tedious periods of cooking. This idea was almost universal a generation ago and is probably still taught in school text-books, which are usually a generation behind.

"I got suspicious of the idea that humans couldn't digest raw starch when I was in college and read about experiments in cooking grain for farm animals, in which the scientists proved that the cooked foods were less digestible than uncooked foods - for animals.

"The human food teachers came back by saying that man's digestive system has been changed by long ages of cooking and had lost the power to digest raw starch. So I tried it, and did my college thesis with a series of experiments on the digestion of raw versus long cooked cereal starches. I found out that my own particular digestive organs worked just like the pigs' and cows'. Worse yet for the popular theory, my mother insists that I wasn't descended from raw turnip eaters, but that our folks came over in the next ship after the Mayflower and had been cooking as long as the rest of them."

The Department of Agriculture, in Washington, conducted experiments which revealed that raw corn, rice and other starches are digested in amounts up to eight ounces, daily. Raw potatoes showed digestibility of seventy-eight per cent. Kellogg, Langworth and Devel have each shown that raw starches digest quite easily. The Scotch Highlanders have, from time immemorial, eaten their oatmeal simply scalded. Hon. W. N. Beaver for many years a magistrate in Papua, New Guinea, says that the natives of Kiwai formerly ate their rice raw.

Raw cabbage digests in two hours whereas it requires four hours for cooked cabbage to digest. As almost everybody has difficulty with cooked cabbage and almost nobody has trouble with raw cabbage these differences are common knowledge.

High temperatures are required to change most sugars although the sugar of milk is changed in pasteurizing.

Actual feeding tests have shown that the brown crust of bread has less food value than the soggy inside. In other words the most thoroughly cooked portions of food (any food) are less valuable as food than the less cooked portions.

The facts are that cooking renders starches less digestible, while boiling them so that they are saturated with water, prevents all salivary digestion. Very little dextrinization of starch is produced by cooking. It is the office of the salivary enzyme (ptyalin) to perform this work and we profit by permitting salivary digestion to digest our starches. Toasting bread charcoalizes rather than dextrinizes it.

(6) Cooking destroys the vitamins in foods and impairs or completely destroys their anti-neuritic, anti-scorbutic, etc., factors.

Before vitamins were ever heard of and before it was found that cooking destroys

or impairs vitamins, the advocates of eating of all food raw held that, besides the ordinary chemical elements in foods, there was something else which they termed life, which was destroyed by cooking. For example, Prof. Byron Tyler had an article in The New York Herald, Sunday, October 14, 1900 entitled "Cooked Food is Humanity's Greatest Curse," in which he proclaimed that "cooked food is dead food." That these men were right in principle is now undoubted. The "life" of foods was undoubtedly those qualities now called vitamins.

Raw food advocates also contended that man cannot use inorganic substances and that cooking returns food elements to their inorganic state. The change in the meaning or use of the word organic has resulted in much confusion, but the truth announced by our predecessors is unimpaired and cooking does, as they claimed, both disorganize food and return part of it to its inorganic (as they understood the term) state, thus making it useless to the body. There can be no doubt about this. Although reports on this conflict considerably, cooking undoubtedly destroys vitamins. Berg says: "Since the complettins (vitamins) C and B and the anitneuritic D are readily soluble in water, they are dissolved out in the first boiling."

Vitamins are very delicate and unstable things and are lost and destroyed in many ways. Foods that are cooked and held over to the next meal lose some or all of their remaining vitamins. Dried foods have lost much of their vitamins in the drying process. Canned foods that are cooked and stored in the warehouses lose their, vitamins. Canned foods and dried foods have very little to no protective power.

There are many methods of cooking. How much of the vitamin content of a particular food is lost in cooking depends upon: 1. the method of cooking employed; 2. the temperature to which the food is subjected; 3. the duration of the cooking time; 4. the abundance or relative abundance of oxygen that reaches the food while it is cooking; 5. the pressure to which it is subjected; 6. the presence or absence of light; 7. how much the food is cut up before being cooked; and 8. the kind of vessel in which it is cooked.

Riboflavin is destroyed in appreciable amounts when meats and vegetables are cooked in the presence of light. This vitamin is lost to but slight degree when the foods are cooked in the dark or in a closed container. The loss of pantothentic acid from cooking Is moderate to slight in vegetables but is up to one third in flesh foods. Pyrodoxin losses are moderate for flesh, much smaller for vegetables and it is claimed that the amount of this vitamin is increased by cooking in a few vegetables. Cooking causes a very high loss of biotin from flesh, even as high as 72% Its loss in vegetables is reported by some investigators to be only "moderate to negligible." vegetables are cooked they lose as high as 59% of their inositol. Flesh foods loose less of this vitamin. Folic acid losses in cooking are very great for most foods. From one third to one-half, even as much as two-thirds of niacin is lost from meats in cooking. Some investigators deny this, saying the loss of this vitamin is slight. Perhaps these differences of opinion grow out of the use of different methods of cooking in making their tests.

Studies of the -foods served to patrons of restaurants have shown that the average loss of vitamin C from vegetables is 45 per cent; of thiamin is 35 per cent. Heat and cooking them in water and throwing away the water accounted for these losses. An additional loss of about 15 per cent of vitamins occurs when the vegetables are

held for long periods on the steam table before serving them. Restaurant eaters are advised to concentrate on raw vegetables and to eat early before foods have stood for prolonged periods on the steam table.
Cooking foods under high pressure is rapidly destructive of their vitamins.
Prolonged cooking is also very destructive of vitamins.
Quick-cooked vegetables lose less of their vitamins and minerals. The longer they are cooked and the longer they stand after cooking, the more of their value they lose. They should be eaten soon after cooking is completed.

Cooking green soy beans causes a loss of 48 per cent of their Vitamin C. Sprouted soy beans lose 70 per cent of their original content of C. Thiamin and caroline are also lost in the processing and cooking of soy beans.
The antiscorbutic qualities of milk are more or less completely lost if the milk is pasteurized, boiled, condensed or dried. Dried quickly at a high temperature milk seems not to lose its antiscorbutic qualities, but it loses in food value in other ways. When it is boiled its antineuritic powers are destroyed even more rapidly than its growth-promoting powers. Barnes and Hume showed that the drying of milk reduces its antiscorbutic efficiency to about two-fifths the original. The impairment of the antiscorbutic qualities of milk by the condensing process is great enough that young monkeys, fed on a diet of condensed milk, develop infantile scurvy. Typicail scurvy is produced in adult monkeys and guinea pigs by this same diet.
Hess and Unger found that the most actively antiscorbutic vegetables lose their efficacy upon drying. The excess of bases and the water soluble antiscorbutic vitamin C are leached out of the vegetables by the bleaching process. Soldiers fed on preserved vegetables develop scurvy. An outbreak of scurvy in a Rummelsburg orphanage was referred by Muller to the use of dried vegetables and pasteurized milk. Fresh vegetables resulted in recovery. When soup. tablets and dried vegetables predominate in the diet, malnutritional cedema develops. Canned or preserved fruits and vegetables lose their antiscorbutic qualities.
Heating white cabbage impairs its antiscorbutic quality while twenty minutes of boiling the juice of cabbage notably reduces this quality; an hour's boiling completely destroying it.
According to Givens and McClugage, finely minced raw potatoes may be boiled for fifteen minutes without appreciably affecting their antiscorbutic qualities, but these are greatly impaired by one hour's boiling. Quick cooking of foods at a high temperature brings about less damage to the food than prolonged cooking at a low temperature.
In the case of seeds, such as nuts, beans, peas, grains, etc., the germinating principle is destroyed so that cooked seed will not germinate.
The following account of some experiments with raw and roasted corn was published during World War I: "In order to find out the place of maize in war bread two French physicians carried on extensive feeding experiments with pigeons. They reached the conclusion that highly milled maize is responsible for at least three deficiency diseases.
"Weil and Mouriquand published the results of some experiments on the

practicability of maize as the chief constituent of bread and the possible relations between maize diet and pellagra. The authors had already shown that decorticated (hulled) cereals, grain and legumes when fed to pigeons and fowls as an exclusive diet lead to paraplegia, paralysis and death. The cause of the latter is believed to be the depreciation of a ferment contained in the cortex of the grains, which is as essential to nutrition as sufficient calories, protein and mineral matter.
"The authors fed whole maize to a pigeon aged six months as the sole diet for a period of 240 days. The bird, shut up in its cage showed great activity and vigor. Control pigeons living exclusively on entire wheat, barley, rice and oat grains were well nourished and vigorous.
"When a mixture of whole grains was heat sterilized (120 degrees Centigrade), the birds survived ninety days and died paralyzed, but a certain addition of raw grains prevented beriberism. One-third part of raw grains appears to give perfect protection.
"Pigeons were now fed on decorticated, highly milled maize. The latter was refused and the birds were artificially crammed with it. After a period of sluggishness flight became impossible (thirty-third day) and death, preceded by paralysis, soon followed. Emaciation had also taken place. Hence, both cooking and decortication deprive the grains of vitamins or ferments."

Berg points out that a mixture of equal parts of soy bean, wheat, wheaten bran, sun-flower seeds, hemp seeds, and rye meal (a mixture which is perfectly adequate in the crude state), proves conspicuously inadequate after it has been made into a paste with water and then baked.
In his experiments with monkeys McCarrison showed that cooked foods, the same as deficient and ill-balanced foods, produce, within a short time, diarrhea, or actual dysentery. The monkeys so fed lost appetite, developed anemia, unhealthy skin, loss of body weight and all the vital organs began to atrophy. He pointed out that "among the pathologic processes resulting from deficient and ill balanced food are the impairment of the protective resources of the digestive tract against infection," and added that there is good reason to believe that the prolonged use of moderately faulty food will lead to these results as certainly as the less prolonged use of more faulty food."

(7) Cooking drives off part of the food into the air as gasses.
That the cooking of milk, even pasteurizing it, greatly impairs its food value is well known. Eggs and vegetables, like cabbage, cauliflower, onions, etc., rich in sulphur, have their sulphur oxidized. They should never be cooked. Phosphorus is also oxidized. The iron in food is ruined as food.
Iodine and manganese are oxidized at low temperatures.
Cooking produces changes in the sulphur content of eggs that cause it to form gas in the intestine of many who eat them. This gas is not only offensive, it is harmful.
(8) Cooking changes the flavor and odor of foods and renders them less palatable.

It is often argued that cooking adds to the palatability of food. This is, at least, not

true with most foods and we have noticed that the others are not palatable after being cooked unless they have been flavored, spiced, sweetened, peppered, salted, etc., or have had mustard, catsup, horseradish, or some form of dressing added. The fact is we are always kidding ourselves into believing that the things we are in the habit of doing are the very things we should do; that the things we have learned to like are the things that are best for us, and we consciously or unconsciously resist any proposed change, even, if there are plenty of evidences that the change would be for the better.

The relish for food is often a mere matter of habit. Those accustomed to eating cooked foods find they do not relish certain foods in their uncooked state. This calls for a reeducation of the sense of taste.

(9) Cooking food wastes much of its food elements and renders it less nutritious. This is quite contrary to the popular notion. However, as we have just seen, cooking robs food of much of its value and adds nothing to it. It does not increase, but in most cases decreases, its digestibility.

The United States Department of Agriculture's Bulletin, No. 22, says: "Ladd, while connected with the New York State Station, reported analysis of cooked and uncooked clover, hay and corn meal and determination of digestibility of the same. These showed that the percentage of albuminoids and fat and the relative digestibility of the albuminoids were more or less diminished by cooking. The experiments made by our experiment stations in preparing food have been mostly with pigs. At least thirteen separate series of experiments in different parts of this country have been reported on the value of cooking or steaming food for pigs. In these cooked or steamed barley meal, corn-meal, and shorts; whole corn, potatoes, and a mixture of peas, barley and rye have been compared with the same food uncooked (usually dry). In ten of these trials there has not only been no gam from cooking, but there has been a positive loss, i. e., the amount of food required to produce a pound of gain was larger when the food was cooked than when it was fed raw, and in some cases the difference has been considerable."

Was not Dr. Oswald right, then, when he declared: "For even the most approved modes of grinding, bolting, leavening, cooking, spicing, heating and freezing our food are, strictly speaking, abuses of our digestive organs." And not of our digestive organ only, but of the whole body. Cooking is the oldest and most widely used method of denaturing our foods.

TARS

Tars are complex heterogeneous substances that are derived from a variety of sources. Any organic compound that is subjected to great heat, as in frying or roasting, undergoes decomposition with the formation of highly complex black tar. Most people are familiar with the tar formed in the burning of tobacco in cigarette, pipe and cigar. The bowl of the pipe and the pipe stem become clogged with the sticky, and foul smelling stuff.

Tar forms in coffee while it is being roasted; it forms in the cereals, beans and fruits

when these are roasted in making coffee substitutes. Coffee drinkers and drinkers of coffee substitutes daily take tar into their bodies just as the smoker gets tar into his mouth, throat, lungs and blood.

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If potatoes, beans, peas, etc., become dry in cooking and get scorched, tar forms. Scorched toast has tar in it. In frying potatoes, eggs, meat and other foods tar is often formed unless great care is exercised not to overheat these foods. Meats roasted in an oven that is too hot get black on the outside. Tar is formed.

Tar is an irritant. It is one of the irritants that is known to result in the formation of tumors and cancers. It would be profitable to know what percentage of the tumors and cancers that exist today owe their origin to the tars taken into the bodies of almost everyone who eats cooked foods and drinks coffee or coffee substitutes. Living in smoky cities and inhaling the smoke takes tar into the lungs. This as much as tobacco smoke, may contribute to the production of cancer of the lungs.

COOKING AND DIGESTIBILITY

The manner in which foods are cooked alters their digestibility. Cabbage, for example, cooked in one way is easily digested; cooked in another manner is almost indigestible.

Much of the indigestibility of cooked foods results not so much from the cooking, per se, as from the mixtures that are jumbled together to cook. Take the Southern practice of cooking beans, greens, cabbage, etc., with a large piece of fat, salt bacon, as a example of concocting indigestible mixtures; or the method of frying potatoes (starches) in fat.

COOKERS

The waterless cooker is the best cooker that has been devised. This should not be confused with the pressure cooker. Rapidly growing in popularity, this expensive and dangerous (they some times explode) pressure cooker is the worst cooker ever invented. Cooking foods under high pressure rapidly destroys their vitamins. The old fireless cooker that cooked foods at a low temperature over a long period, was a very destructive cooker. Frying pans and boilers are among the worst cooking utensils. Several different types of waterless cooker are available. The reader may choose his own. I have no prejudices against the aluminum cookers, but if the reader is afraid of this form of cooker, the stainless steel cooker is very efficient.

FROZEN FOODS

Frozen foods are new but are rapidly becoming very popular. The deep-freeze refrigerator that enables people to freeze their foods in their own homes, is also becoming popular. Is this the great boon to mankind that the promoters of the frozen food industry claim?

Some foods are completely ruined by being frozen. Frozen lettuce, frozen bananas, frozen oranges and many frozen greens are completely unfitted for use as food. It is inevitable that all foods shall be more or less damaged by the freezing process, despite the claims to the contrary. Quick freezing does cause loss of some of the

vitamins. Although it is common to deny that freezing causes a loss of vitamins, it is readily admitted by the defenders of the process that the process of thawing out the foods before using them causes considerable vitamin losses. If, then, they are cooked, there are greater losses. Frozen foods should be used when fresh foods are not available, yet I see people buying frozen corn or frozen strawberries, etc., while these foods are in season.