

MEN WHO KEEP US FROM STARVING.



How the Food Chemist Is Working to Bank Mother Nature's Prolific Production For Use In Our Days of Need.

By CAMPBELL Mac CULLOCH.

TWO men sat beneath a rug that was suspended upon a pair of crossed sticks on the hot sands of the Sahara desert. The spot was midway between Kasambara and Walata, and they were 800 miles from the western coast of Africa. A little to the right of them in the shelter of twin sand dunes stood six camels, and grouped near were four Touaregs who had accompanied the party from Algiers along the coast into Morocco, where they had struck the path followed by Lenz in 1880, turning off at Arawan.

Ancient Preserving Methods.

No one knows just how many years ago man awoke to the necessity of making some provision in the summer of plenty for lean days of privation or when it was that he awoke to the fact that the devil of starvation had taken him from the first could be partially outwitted by smoke, but it must have been long ago.

He first tried drying his food in the sun, then smoking it, then salting it, and now he adds an infinite pinch of the product of the laboratory to his jar of tomatoes, seals it up and forgets it until he needs it—perhaps five years from then.

It was not fear of reaching the edge of the world and toppling over that caused the mutiny aboard the caravel that Columbus piloted westward. It was the fear of starvation. On almost any day you may go down to the docks of a seaport and watch a great ship being laden with stores for a three months' or three years' voyage—fresh fruits, vegetables and condiments. When Peary outfitted the Roosevelt for his trip to the arctic a few weeks ago he took stores for three years. Had he wished he could have taken them for thirty years and known with an absolute certainty that they would be as fresh and palatable as the day they were picked in the vegetable garden or the orchard.

In the early days of the sea and of exploration it was the dread scurvy that menaced the expedition or the crew, but the modern chemist has driven that scourge into the nothingness from which it emanated. On one of Peary's trips he found a cache among the rocks far to the north. It had been made by an explorer who failed to return for his supplies. There were cans of tomatoes, soups, fruits, meats, and what not. The labels on the cans showed they had been there more than twenty years. He opened a can of the tomatoes for curiosity's sake, and they still had the flavor of the garden from which they had come.

Until within the last forty years no certain preservative method of keeping fruits and vegetables was known. Man depended to a great extent upon such methods of boiling as were known to him, upon such uses of heat as he could apply and upon the more or less imperfect ideas he had formulated upon the subject. In the matter of small foods that were intended for immediate consumption he was a real success, but with the other products that were put up in such size as to make them cheap enough to compare with the natural grown and strictly fresh products he fell far behind.

The Modern Magician Appears.

Then came the modern magician, the chemist, and showed him just what to do. Plain heat and sterilization were all right and effective when applied to things that were to be consumed immediately upon opening, but these things did not act as a preservative against decay when the question of preserves themselves came into play.



They did not have effect when the package was to be opened today and kept open for five or six days or until the contents were consumed. Deterioration set in at once, and the waiting army of bacteria soon found a breach in the walls that they could storm. Hence it became necessary to find some repellent garrison that could be depended upon to guard the walls indefinitely.

The air tight package was all right until it was opened, but after that it was no better than a house with no locks on the door, and the burglar was free to enter as he chose. It was the chemist who sat in his laboratory and found the remedy. It was the chemist who went back to Nature herself and pried open the secret box of her methods. It was the food chemist who found that certain fruits if left to keep indefinitely in that state and who set himself to inquire what means Nature had taken to prevent decay. Cranberries are a staple article of food, and the cranberry will not spoil, no matter how long it may lie neglected in the barrel. The inference was that the cranberry must have some natural preservative, and the chemist set himself to discovering it. Soon he found that the huckleberry had the same power, and it was not long until he discovered that Nature had supplied a preservative of her own.

Found Nature's Own Method.

It was only necessary to analyze the fruit and discover what that preservative was and apply it to other products that Nature had emitted to protect. Once that was done the rest was easy. Today the food chemist supplies the packer of fruits and vegetables that are not intended for immediate consumption with a tasteless, colorless, harmless antidote of Nature's own devising and the thing is done. The housewife may purchase a gallon of peaches preserves, open it and leave it open, using what she wants from day to day, and the peaches are the same as when they were first put together. Why? Because the chemist has come to her assistance.

In the old days of preserving foods for future consumption there were many methods, such as pickling, smoking, drying, salting, embalming, and these required the use of spices, essential oils and what not. But products prepared in this way seemed to fall to satisfy that very curious human quality—taste. As our grandmothers used to say, "They didn't taste the same," and our grandmothers were right, for the addition of vinegar, nutmeg, wintergreen, cloves, etc., certainly did alter the natural flavor, to such an extent that sometimes the original flavor was lost altogether, and the old farmer's definition of squash could be applied with splendid results. It may be remembered that this ancient agriculturist remarked:

"Yes, sir. Squash is a great thing. You cook it and then put on plenty of salt, butter and pepper, and it tastes more like nothing than anything I know."

Must Preserve Natural Flavor.

That was the trouble with the early preserved foods. They tasted like anything but what they were originally, or, more properly perhaps, like "nothing at all." It was all over again the ancient proverb about the man who used great quantities of perfume and of whom Queen Elizabeth remarked—But it is well known, so why repeat it? By the time the vinegar and the spice and the nutmeg and the clove had been added to the tomato that estimable delicacy might as well have been described as plum pudding or mince meat or strawberry mixture, for the taste of the tomato itself had disappeared in the resulting war of the spices. True they preserved the fruit or the vegetable or whatever it was, but so did the same things preserve our old friends, the antiluvian inhabitants of the Nile territory, so that we can put them on exhibition in the British Museum, the Louvre or the Metropolitan Museum of Art.

When the chemist had come into his own he put those things aside to great extent and realized that what the people really wanted when they bought canned peaches was some semi-spherical yellow globes that looked and tasted like peaches and less like Indian chutney. It is important also to remember that the resulting product of the packer must look like the original fruits as well as taste like them. Every housewife knows what happens to the peaches when she stews them too long. They resemble in appearance oatmeal mush, but they don't look like the peaches she bought from the grocer or picked from the tree. Of course she knows they are peaches, but the lady in the next block who never saw them in their natural state has to take her word for it. So the manufacturer of preserves is forced to the humiliating conclusion that, being a manufacturer, his word is discounted before he begins, and he has to keep those fruits looking like peaches so there can be no question as to their genuineness.

If he is to do this he must not cook them too long, and if he does not cook them long enough the cloves and the nutmeg won't permeate the structure of the peaches, and it is to use a homely phrase, "works." So when the manufacturer—the reputable gentleman who wants to give a good article for the money, and there are a few of him—begins his operations he is forced to one or two conclusions. He must follow the old usage and put out an article that has to depend upon the label for identification or to adopt the modern chemist's method and preserve his output scientifically with Nature's own device.

It is all a question of decay, and decay means bacteria. Not long ago Professor E. E. Smith of the Fordham University School of Medicine picked some tomatoes in his own garden and cooked them in the usual housewife manner, then sealed them up and put them away. Three months or so after he opened them and found that not one bacterial presence was observable. The next day he says he found 8,450 bacteria in one cubic centimeter, and five days later he discovered 244,546,000 to the cubic centimeter. At the same time he had put away a jar of the same tomatoes, but put up according to the chemist's mode of procedure, and on the twelfth day found not a trace of the minute organisms that breed disease in this jar.

How often has the housewife cast her severe eye along the long line of her homemade preserves and pounced upon one with the remark:

"That jar of plums is 'working.' We must eat it at once," and has thereupon put it upon the table for family consumption. Unfortunately for her economical sense, the damage had already been done, and the bacteria were already in full possession.

Were it not for the modern chemist such conditions as this would confront the manufacturer of food products, and he would be forced to adopt the "home" or Egyptian method of mummifying in place of the cleanly chemical methods. And we should not shy at the use of the word "chemical," for cooking itself is chemistry, inasmuch as it changes the competent parts of any food and renders them fit for consumption, so if your cook demands a raise of wages remember that she is one of the chemical fraternity and do not cry her.

Cooking Is Chemistry.

Chemistry as applied to the preservation of any food is simply an application of the great principle discovered by the eminent Scotch surgeon, Sir John Lister. To be precise, it is the process of antisepsis, and it is upon this great principle of antisepsis that the modern food chemist is working. Spices, oils and vinegar are all antiseptics in a greater or less degree, and vinegar itself, the homely vinegar, is really a powerful acetic acid that is warranted to bite the living out of the stomach of an ox if given a chance. Perhaps in your salad dressing you have found the cook made a mistake and put in too much vinegar. Do you recall the tears that came to your eyes and the manner in which you reached for the glass of water to allay that stomachic strangulation? Of course you do.

It was the province and the task of the chemist to find something that would be tasteless, colorless and effective as well as innocent to take the place of the dangerous vinegar. It had to be tasteless or it would be no better than the old embalming method and would thereby disguise the natural taste of the fruit or vegetable. It had to be effective or we should not build us a new popular highway, smooth and easy riding, to health. Within the past three years eminent investigators have insisted that if the people of this country should make one whole-hearted, concerted effort to eat only fresh and clean food, the population—could be absolutely eradicated in five years' time.

Three Forces at Work.

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FACTS AND FIGURES IN AMERICAN FOOD PREPARATION.

	1877.	1907.
Capital invested in food preserving plants	\$108,000	\$210,000,000
Tons of preserved foods prepared	50,000	5,500,000
Approximate acreage of tomatoes alone used	100	14,000
Firms engaged in food preparation	12	1,000
Farmers who sold entire product to food preserving firms	10	5,000

Average increase in volume of business from 1877 to 1907, 5,000 per cent.

NOTE.—These figures do not include the vast meat packing firms of east and west.



Helped Out Fishermen.

Were it not for the chemist and his work there would be very little distribution of the fish of the sea, and that only within the limited area of a few miles. Up in Gloucester, Mass., where fishing is the chief industry and where, incidentally, more fish are brought and thence shipped, the work of the chemist is fully appreciated. The facts of the great fish industry are that if sea food is left to itself it rapidly deteriorates; a red growth appears within a very short time after the fish has left the water, and it becomes wholly unfit for consumption. A preservative of some harmless nature is necessary, and it was to the chemist that the hardy fishermen turned in their need. Now a small quantity of the tasteless and colorless material is sprinkled over the fish, and the process of decay becomes an impossibility. It not only stops it, but it absolutely prevents the beginning of deterioration. Those who live in inland towns and cities would have little sea food had the chemist never turned his attention to the matter; those who find their ways upon the sea would seldom see a fresh fruit or vegetable had this same chemist not buckled down in hard earnest to find the way to follow Dame Nature in her sly preservative methods.

The importance of the food supply upon the national health is one that cannot be too deeply impressed upon us. There is possibly no more prolific source of bodily disorder than the things we take into our stomach, and consequently, if we are, as many hope, eventually to win our lifelong battle against the evils that beset us on every hand, we must take active measures.

Too long has mankind merely accepted conditions as they seem to exist. Because an intolerable condition is apparent we have been prone to regard it as irreparable and to bow our heads beneath its yoke. Slowly, very slowly, the human race is learning that much can be done, and while the way is long and the path a rough one, there is no good reason why we should not build us a new popular highway, smooth and easy riding, to health. Within the past three years eminent investigators have insisted that if the people of this country should make one whole-hearted, concerted effort to eat only fresh and clean food, the population—could be absolutely eradicated in five years' time.

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horrible fear that amounts to a paralyzing obsession that we normal human beings with a heritage of health must submit to the dictates of a condition that has no real basis of fact. At the present time there are at least three national associations that are doing their utmost to awaken the people to the danger of this careless attitude. Two are aiming directly at the root of the evil by striving for the establishment of a national department of health. One is battling mightily with streams of water, and it would be enabled to do this because of federal control of waterways. Again, it would have in its hands the whole problem of the immigrant who arrives at these shores. If the new citizen is not up to the requisite physical standard in point of health he could not enter to spread disease. It would hold within its grasp every element of control over places where food for human consumption is prepared, and proper inspection of processes and materials would be one of the first subjects dealt with.

Perhaps this process or that process of food preparation is doubtful. It is the province of the national department to take it up at once and prove it good or bad. If bad, the process is eliminated. Possibly the process itself is good, but the materials are inferior. The inspectors are there to see that they are good and wholesome. It may be the public condition in some locality are such as to interfere with the well being of the people and that through chicanery or inert incompetence the proper local officer takes no action. It is a case for the federal inspector who makes his report to Washington and thereby sets in motion machinery that will travel backward through the state itself down to the local official who was at fault.

What Platemines Did in 1908.

Few persons appreciate the vast importance of good food that is well cared for. In the year 1908 there were 13,708 cases of ptomaine poisoning reported in the newspapers of the country, and these resulted in close to 500 deaths that occurred as a direct result within twenty-four hours. How many deaths occurred after that period there is no means of showing. Every one of those cases would have been unnecessary if proper precautions had been observed. Had the persons who prepared or handled these foods known that decay in foods means microbial infection and that microbial infection spells ptomaines and that these are the avenue to illness, paralysis and death they would have been more careful. But unfortunately they did not know, and therefore it is the mission of these health associations to spread broadcast the knowledge of the evils of ignorance.

The housewife is largely to blame, for her methods do not include a knowledge of antisepsis. She takes the best fruit and condiments and prepares a preserve, but she does not know that it will not keep after it is opened. She is unaware that food may be thoroughly impregnated with evil and decay and still show no signs of it on the surface. She believes that when she has opened a can of sardines she has done her full duty in removing them from the can, not knowing that it is not the can that causes poisoning, but the ptomaines that begin to appear after that can is opened.

Fortunately President Taft is fully alive to the menace of impure foods, and it is his expressed intention to include the necessity for the establishment of a national health department in his next message to congress. It would be the policy of this department

and as extensive as the department of agriculture has done—the distribution of reports, the indication of danger points, the searching out and labeling of precarious or unsatisfactory food products, the furnishing of information as to the proper mode of preparing foods, accurate information as to how long food may be kept with safety, full information as to the precautions to take to prevent disease gaining a foothold in home, town or state and the prompt co-operation with local authorities in case of epidemic.

It is the hope and belief that with the progress now made the dawn of another year will see this department in working shape, and then will be taken the first great step in the national battle to free us from the various scourges.

Two Thousand Deaths a Day.

Perhaps few of us have realized the number of fatalities occurring in our land that are absolutely preventable. An eminent scientific authority who recently appeared before a senatorial committee in Washington stated that there were each day in the year no less than 2,000 preventable deaths. In other words, the nation loses each year close to three-quarters of a million persons whose deaths are not only preventable, but a direct loss to the country in point of production of an equivalent of \$6,000,000. This vast sum would represent the interest on government bonds to the value of \$180,000,000, a sum 30 per cent in excess of what the Spanish-American war cost us and nine times the value we paid Spain for the Philippine Islands. Startling figures these and yet they represent what we sacrifice every year so lightly and unnecessarily.

There have been sporadic attempts at sanitation and the destruction of disease, and at the present time San Francisco is warring mightily against the rat as a carrier of the bubonic plague, while New York has in the past year been watching her food supply with such vigilance that she has condemned and destroyed \$6,000,000 worth of unfit edibles. New Orleans has been during three years making a war on the yellow fever mosquito, while Philadelphia's chief concern at this time is her water supply. Chicago is gravely considering a plan for the extermination of the house fly, and so it goes with the cities. The crying need, however, is national movement, not sporadic skirmishes, for the enemy of disease is firmly entrenched, and while the chemist and the physician may recommend, they cannot force results. Those can only come through education.

Too much damage has already been done by lulling the nation into a sense of false security as to the things they eat and the places in which they live, and while conservatism is a good thing in the average, little progress would have been made were it not for the radicals.

In connection with the movement to establish a national health department there has recently been developed a plan that will undoubtedly have an excellent effect upon the food supply of the country at large. This is nothing less than the adoption of a set of standards in food preparation. Manufacturers themselves have in the course of their business found certain methods to be advantageous, and the government experts attached to the health department, it is proposed, shall take up these methods, analyze them and bring them up to a point where their safety and desirableness are assured.

Uniform Health Laws Wanted.

In addition, it has been planned that a yearly congress of state health officials be held in Washington for purposes of comparison and elucidation of legal interpretation and that the aim shall be to strive for a uniform health law in the various states. That this is desirable has been universally agreed, and the federal government is fully alive to the importance of it from an interstate commerce point of view. The curious situation in this respect was pointed out a short time ago by the action of one of the states that sought legislation along pure food lines. It had been proposed to pass a law in opposition to the federal law of 1906, and it was then shown that should this be done manufacturers within the state would be forced to suspend the preparation of a product legalized under federal law after a year's investigation, while manufacturers outside the state were at liberty under interstate commerce law to bring in their same product and retail it freely. The legislation, being manifestly absurd under those conditions, did not pass.

In the meantime hardly a month goes by that does not witness some marked progress in the direction of improvement in manufacturing. Whether this be steel or wood or pig iron or engineering or food improvement, it is still progress. We are prone to pride ourselves upon our alert progression, but at heart we are all conservatives, and the man or woman who voices a new method of doing the old things is looked upon, either as a dreamer or an anarchist. Some one has said that every new thing of value undergoes three processes—first alarm, then ridicule and finally acceptance. Just now the chemist is in the limelight and undergoing the alarm period. Within a few months he will be ridiculed, and in a few more months, if any one refers to the subject, he will be met with looks of blank astonishment at his lack of progressive knowledge.

Some of these days, when the Hall of Fame has been cleared of some of the lumber the lumber that now utters the various niches, a space will be found for the humble chemist who, bent over his test tubes and microscopes, wrested the mighty secret from the sealed book of the world. If it were not for the food chemist few of us would be able to live as well as we do, and in times of stress many would starve. When the great blizzard of 1888 cut New York off from the sources of its supply, starvation was only averted, and that by a narrow margin, by the preserved foods that were stored in the warehouse shelves. Truly the food chemist is the man who keeps us from starving in all sorts of queer places and queerer