AN UNUSUAL METEOR

WHILE riding in the fields about two miles east of Wolf, Wyoming, post office, on August 20, we observed a very interesting and unusual meteor. It entered the atmosphere about northwest of the point of observation, and about 60° above the horizon. Its illuminated path was perhaps seven degrees when it disappeared without reaching the earth. After the brilliant ball of light had disappeared an illuminated spiral remained and continued stationary in the sky for at least five minutes. This spiral was about one and a half turns and extended for about three degrees. The effect was much like a fiery serpent, the head being a ball more brilliant than the rest of the spiral, and the last part to disappear. The light from the meteor proper was the usual white, and almost sufficient to cast a shadow. It probably would have cast a shadow if it had been later in the evening (time 7:30 P.M., mountain time). The spiral was at first a light orange and very distinct in the twilight sky and gradually changed to a red, perhaps a little lighter than cherry, when it gradually disappeared. The spiral remained distinct for at least five minutes.

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SCIENTIFIC BOOKS

Food Products. By HENRY C. SHERMAN, Ph.D., Sc.D., professor of food chemistry, Columbia University. Second Edition Revised and Enlarged.

THIS valuable contribution to the knowledge of our foods has been rewritten in view of the great progress made in the knowledge of nutrition during the past ten years. In his preface he says:

> In order to put the user of the book in touch with recent advances in all phases of knowledge of food products without making the descriptive text unduly voluminous, many of the publications of the past ten years which are chiefly significant as extending our descriptive knowledge or as developing certain topics more fully than is feasible in a book of this size, are included by title in the lists of references at the ends of the chapters, so that by selection from these the teacher may develop the course, or the individual reader may extend his reading, as fully and in such direction as may be desired in each case.

As a result of this principle the references are inclusive and contain citations to all literature which any one wishing to secure further information may need to consult. This feature of the book is extremely valuable.

The book is descriptively chemical. It, however, is not written for the chemist alone but for the general reader as well. It particularly contains most valuable information which will be extremely helpful to the housewife in all her problems connected with the feeding of her family. As food is the most insistent need of humanity it should receive first consideration at the hands of those interested in human welfare and particularly the women who direct the domestic affairs in this country. It is a book, therefore, that can be read by every intelligent person and with great advantage to those who are seeking further knowledge as to the character of our foods and what they do to us.

I will not take time to describe the book in detail, but will mention only those important features which appeal to me as being of the greatest interest and value. First of all, of course, the housewife will read the articles on milk and its products. Butter is not considered in this article, but has first place in the chapters on edible oils. As milk is the most important of our foods, I want to call particular attention to the fine way in which the subject is presented and to the stress that is laid upon its importance in our dietary.

The feature which is most striking to me is the description of the use of sour milk, which is so palatable and has such wonderful helpful effects in many of the diseases of the digestive system. The new lactic acid ferment, bacillus acidophilous, is described, and the methods by which it does its work is set out in detail. The use of milk sugar in connection with the milk soured by the above ferment is explained in detail, and some hope is offered to those who wish to change to a certain extent the bacterial flora of the lower intestinal digestive organs. The importance of adding milk to bread, taking the place of water in the dough, is properly stressed. The importance of sanitation in the milk supply is duly pointed out.

The article on butter is full of valuable information. The progress in the manufacture of butter has resulted in the gradual increase of water in butter in the last few years, and particularly since the advent of the creamery. A few years ago the average content of butter fat in butter in 221 samples from fifty-five creameries in different parts of Iowa was 84 per cent. and the average content of moisture 12.73 per cent. In 1902 the United States Department of Agriculture analyzed eight hundred samples of butter from four hundred creameries in eighteen states, and the average of all the samples in moisture was 11.78 per cent. Gradually, under the insistent demands of the creameries, the standard for butter fat has been finally reduced to 80 per cent., a loss of 4 per cent. in the course of twenty or twenty-five years.

There is one feature of butter manufacture, however, that Sherman fails to mention. At the present time at least 75 per cent. of the creameries of the United States use what is known as the neutralizing process of making butter. This "neutralizing" is euphemistic for treating cream, which is so far decayed as to be unfit, in such a way as to make it usable. Neutralizing consists in adding some kind of alkali, usually lime, to reduce the acidity and thus make cream workable which otherwise would be unfit for manufacture.

In addition to this, under the influence of the creameries the Congress of the United States has passed a bill in which the moisture requirement of not to exceed 16 per cent. has been abolished, so that it is possible to make butter now legally which contains no salt and yet may contain almost or quite 19 per cent. of moisture. Thus, it is seen that one feature of progress in butter-making has really been a progress in selling more water and less butter to the consumer. This is not good for the reputation of the dairy industry and is a fraud on the consumer. Inasmuch as economy is almost as important in our food supply as purity and excellence, this omission is regrettable.

Sherman stresses the point that cereal grains are, as far as economy is concerned, the most important factors in our food supply. He dwells at length on the damage done to our grains by the milling process and touches briefly upon the additional factor of bleaching an already much too white product. He quotes the old data issued many years ago by the Department of Agriculture as to the higher digestibility of white flour as compared with whole wheat flour. These data show that the digestibility of protein in standard patent flour is 88.6 and in graham flour 79.4 per cent. As regards the starch or carbohydrate element, the digestibility of standard patent flour is 97.7 per cent. and of graham flour 89.2 per cent.

In another part of the book, however, he calls attention to the fact that recent work indicates that the difference in digestibility between properly prepared whole wheat bread and that made from patent flour is less than formerly supposed. He says:

> Probably for much the same reasons that they are more efficient in nutrition, whole wheat products when not properly kept are more susceptible to the ravages of insects and microorganisms than is patent flour, so that the latter can much more readily be kept for long periods without special care. This is a practical point of considerable importance but should not be over-emphasized, for the marketing of whole grain products is a large and apparently growing industry. It now appears that the difference in completeness of digestion is much more than compensated by the superiority of the whole wheat product in its mineral and vitamin content and in the nature of its proteins. In the amount of protein actually absorbed from the digestive tract, and in energy value, the difference between equal weights of whole wheat and patent flours is practically negligible. But a bushel of grain will make more pounds of the actual, or even of the so-called, whole wheat flour than of patent flour, so that, even from the standpoint of protein and energy, the best economy demands the milling of as high a percentage as seems practicable of the whole wheat kernel into human food, and from the vitamin standpoint this is also true and in much more striking degree.

Further on, Sherman pays his respects to the very common practice of those who are promoting the white flour industry in referring to those who, like Sherman, believe in the whole wheat industry, as "faddists," in the following language:

> Some writers and teachers treat the losses incurred in the ordinary milling processes as a matter of indifference or even object to any serious discussion of the problem, calling it a "fad" on the ground that with the mixed dietary prevalent in the United States there is no danger of "deficiency disease" from any mode of milling the grains. This is probably true as regards the pronounced diseases such as beriberi, but it is also true that many American family dietaries show little margin of safety as regards iron, phosphorus and calcium, which makes it only reasonable that we should wish to include in the products used for human food as much as is practicable of those parts of the grain which are rich in these elements.

Sherman calls attention to the fact that the body probably absorbs from a pound of genuine whole wheat bread at least twice as much phosphorus, iron and calcium compounds as from a pound of white bread. He also calls attention to the experiments with rats Bunge made as long ago as 1898. The rats receiving the whole wheat bread grew much better than those fed on white bread and were found to contain at the end of the experiment both a larger number of red corpuscles and a higher percentage of hemoglobin.

He need not have gone so far afield for an illustration, as only a few years ago the scientists in the Public Health Service made a very striking experiment in feeding fowls on whole wheat and white flour bread. Fowls are much more sensitive to beriberi than rats. In thirty-five days all the fowls that were fed white flour had died of or were suffering from beriberi, while those that had been eating whole wheat bread were apparently in perfect health and vigor and were growing normally.

The vitamins of cereals reside chiefly in the germ, while the minerals reside chiefly in the bran; thus, both bran and germ, in the proportions in which they

exist naturally in cereals, should be conserved for economic and health purposes in the preparation of human food. In this way, the cheapest foods will give their maximum of nutrition and health while with the use of milk or leaf vegetables they will also be for all except infants a complete food. The importance of these observations by Sherman is particularly pertinent at the present time. There is a very large percentage of our people who, on account of financial straits, are unable to buy as much milk and as many vegetables, particularly the leaf vegetables, as are required to properly supplement the use of refined cereals. The well-to-do may succeed in this endeavor without feeling the financial burden, but not so those with limited incomes. It is immensely important to this class of our people that the cereal foods which they use should be as nature intended them.

The very worthy endeavor among many of the bakers at the present time to use milk instead of water in the making of the dough should receive wide support. Sherman says in this matter that when milk constitutes one third of the total solids of the food intake, almost equally good growth results, whether the remainder of the diet is whole wheat or patent flour. Even when patent flour is replaced by starch, very good nutritive results follow. When, however, the proportion of milk decreases to one sixth of the total dry weight of food, the superiority of whole wheat to patent flour and patent flour to starch both become strikingly apparent. It is not at all likely, therefore, that the bakers will be able to provide a sufficient quantity of milk to constitute one third of the total solids of the food intake.

The author occasionally makes an error in his discussion. This is notably shown in his remark on sweetened condensed milk. He assumes that condensed milk is always regarded by the food authorities as sweetened condensed milk. This is a mistake. Condensed milk, as he quotes it on page 135, is a synonym for evaporated milk or concentrated milk. If he had looked a little further along he would have found a discussion in the government standards for sweetened condensed milk, and this would have avoided the comment which he made at the foot of page 135 in assuming that the condensed milk that he was discussing was the sweetened variety. The sweetened condensed milk is one which is largely used in this country for infant feeding and with very unsatisfactory results. To feed an infant a food which has a percentage of added sugar as high as ordinary preserves is little less than a crime against infancy. Particularly also it should be remembered that sweetened condensed milk is not sterilized and that, for this reason, it may contain very undesirable bacterial flora. There is no assurance even that the milk from which sweetened condensed milk is prepared is from tuberculin-tested cows. The author is somewhat in error, I think, in assuming that greater care is exercised in securing the raw material from which sweetened condensed milk is made than is exercised for the ordinary evaporated milks of commerce.

The author in discussing the ice-cream standards seems to take the side of the manufacturers rather than the consumer. In this he doubtless followed the recommendation of the committee on milk standards who adopted a very low standard, which was asked for by the ice-cream manufacturers without considering properly the rights of the consumers. The standard adopted by the committee appointed under authority of Congress to make standards for the guidance of the officials of the Department of Agriculture and for the information of the courts set the minimum requirements for ordinary ice cream at 14 per cent. and when flavored with fruits at 12 per cent.

In commenting on the federal standard the author says that it would make ice cream a fat rich food which many health authorities do not deem desirable, and adds that some authorities hold that since it is largely consumed between meals or at the end of a meal already sufficiently abundant, it should better remain as custom has so largely made it, a frozen beverage rather than a fat, rich food. I never have heard these sentiments expressed by any authorities other than those who were promoting the interests of the manufacturer in securing a low percentage of fat. I have never heard health authorities object to butter, although it is a much more concentrated fat food than ice cream. In point of fact, the author has inadvertently fallen into a plea for the lowest grade of so-called ice cream that the manufacturers wish to produce. Those who are familiar with the genesis of the food law all recognize that it was largely "common practices," such as the debasement of articles of diet, that the food law was intended to prevent.

In discussing the function of sugar in diet, the author very properly points out the danger which attends the enormous increase in its consumption in this country. It seems to me, nevertheless, that he does not quite properly point out its nutritive functions. On page 509 he says that the cheapening of this article of food by improvements in manufacture would be a source of great satisfaction but for the fact that refined sugar constituted an extreme case of a one-sided food, its sole nutritive function being to serve as fuel. I think, on the other hand, it is a very widespread feeling among students of nutrition that sugar has another function of almost equal significance, namely, that it is largely a source of fat. Not only, therefore, does the increase in refined sugar, as

the author says, make the diet deficient in some of the substances which are needed for the building and repair of body tissue, but also it has a tendency to produce an unnecessary and burdensome degree of fat.

The author quite naturally falls into a grave error in discussing the legal status of certain sweetening agents and so-called chemical preservatives. He properly recognizes the fact that those clauses of the food law which forbid the addition of poisonous or other added deleterious ingredients which may render such article injurious to health have given rise to more discussion than any other part of the law. It has done a great deal more than this. This discussion has led to an entire subversion of the purpose of the food law as enacted by Congress and to the practical elimination of the Bureau of Chemistry from passing judgment upon such added poisonous or other added deleterious ingredients. The author's discussion on this point is based upon a misunderstanding of the situation. On page 46 he makes the statement that the preservation of food by the so-called non-condimental preservatives is necessary. This is entirely erroneous. There is not a single article of food which contains an added preservative which can not be satisfactorily and perfectly manufactured without any addition of preservative at all. In point of fact, although under the wrongful interpretation of the statute to which I have just alluded certain preservatives are permitted, the number of manufacturers availing themselves of this privilege is extremely small. All the manufactured articles to which preservatives have been added are distinctly inferior in character and quality to those which are made without preservatives. Therefore, there is no justification whatever for this statement, which I quote verbatim:

> It is true that by drying, by heating and canning, and to a certain extent by refrigeration, foods may be preserved from the season of abundance to the season of scarcity without the addition of any preservative substance, but restriction to these methods of preservation would often be unnecessarily burdensome and costly and would in many cases involve a loss of the flavor for which the food is chiefly prized. The prohibition of all preservative substances would be as unsatisfactory to the consumer as to the producer and has never been seriously contemplated.

It is a matter of great regret that a book so full of excellent statements and so useful in the household as "Food Products" should convey so misleading and unwarranted a statement. I never yet have found any consumer who had requested that his foods be artificially preserved with non-condimental preservatives.

The purpose of the Referee Board of Consulting Scientific Experts, on which the author bases these statements, was not for the protection of the consumer at all. It was openly and devotedly a body which served as experts for the lowest grade of manufacturers in the country. Nearly $300,000 of money which was appropriated by Congress to secure the enforcement of the pure food law were diverted to pay the expense of this body of men working solely in the interest of food adulterators. Due regard for the eminent scientists who composed the board requires the statement that they were wholly innocent of any such purpose. They were asked to do scientific investigation. They learned afterwards the interests they were unwittingly serving. This board was investigated by the committee on expenditures in the Department of Agriculture during the months of July and August of 1911. The committee unanimously reached the decision that there was no warrant in law for the appointment of this board. It was merely a body appointed to advise the secretary of agriculture in certain matters over which he had no control. The law placed the investigation of these matters in the hands of the Bureau of Chemistry for the purpose of determining whether or not in any given case a food was adulterated or misbranded. In all but one instance the referee board of consulting scientific experts reversed the decisions of the Bureau of Chemistry, the organization which by law was authorized to make these decisions. The findings of this board were adopted by the secretary of agriculture in plain violation of the law.

The committee reported the curious circumstance of a board appointed as the personal advisors of the secretary of agriculture overthrowing the conclusions of the legalized body under the law and thus protecting food adulteration instead of eliminating it. Had I been permitted to enforce the law as Congress passed it there would not to-day be a single article of food in this wide country of ours that contained any non-condimental preservative of any description.

In addition to this, this body of consulting scientific experts authorized the use of alum in foods. Unfortunately, all these violations of the law are still in force, and the Bureau of Chemistry is to-day partly paralyzed in any effort to protect the foods of this country against any added deleterious or poisonous substance permitted by its decisions. Thus, one of the greatest purposes of the food law has been completely subverted. If our manufacturers were inclined to do so there is no reason why we should not have the worst adulterated foods of any country in the world. It is due to the high public spirit and honesty of the American food manufacturers that we have been saved from such a disaster.

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