

breaking the grain of butter by grinding in crystals of salt is also obviated by seasoning with brine.

Notwithstanding the many advantages of this mode of treating butter, it will, no doubt, be a very long time before every butter maker will adopt it. The force of habit is so strongly entrenched in the conservative natures of many people, that, no matter what the process is, better or worse, they will keep right on in the old way, pounding their butter into grease in the churn and grinding it into grease in the butter worker, and, very likely, think they are making the best butter in the world, and wondering why they don't get as much for it as some others do. But the new way is so much easier and better that time will fetch them in, and the butter worker and seasoning with dry salt will become a thing of the past.

Future Relations of Stock and Fruit Growing.

Prof. Arnold, in a lecture on "Improved Systems of Dairying," recently delivered in Dublin under the auspices of the Creameries Association of Ireland, made the following remarks:—

"As the means of existence in the world became more and more difficult of acquisition, and as the population of the earth increased, it was necessary that we should be more careful in husbandry—the means of supporting human life. Dairying utilized that which otherwise could not be utilized. In producing beef there was only got about one-tenth of the nutritive quality, the rest being wasted and consumed on the animal. The cow could develop through the means of her udder more than twice as much nutriment out of a given quantity of food as could be obtained by putting it into meat, and there could be got four times as much nutriment by converting the waste products of the earth into milk as could be gained by putting it into beef, or mutton, or pork. This economy must of necessity be used, and that was the reason why there was such a tendency to develop the dairy husbandry. There was no way in which fertilization could be so promoted as by dairy farming; for butter took nothing from the soil that affected its fertilization in the way that wheat and other crops did."

These statements are true enough; but how can they be reconciled with those of the live stock organs who assert that mankind cannot live without meat? As an independent critic, we feel strongly disposed to take an entirely different view of the question. Granting that Prof. Arnold is right so far as he goes, yet he is liable to the imputation that he has not told the whole truth. Suppose we go a step further and say: meat must go, dairy products must go, leaving the human race to subsist on fruits and vegetables. Let us see if this is sound doctrine on the principle introduced by Prof. Arnold—that of economy, omitting the question of dietetic necessity for the present.

An average two-year-old steer will weigh say 1,200 lbs., and its carcass will make, in round numbers, 600 lbs. of meat, the average retail price being about 9c. per pound, or a total of \$54, calculating an average rate of consumption to be 1 lb. of meat per day (which allowance will include about one-fifth of waste in bone), we find that one person will consume three-fifths of a bullock per year, or its equivalent in other animal foods. Under fairly favorable conditions it will require 2½ acres of grass to keep a steer during the summer months, and counting oats at 50 bushels per

acre and hay at 1½ tons to the acre, feeding 10 lbs. of oats and 10 lbs. of hay per day, or their equivalent in other foods, it will require 4½ acres to support a bullock for a year; but as the animal is two years old, we must consider that a yearling and a two-year-old are to be supported for a year before the meat is obtained. During the first year, somewhat more than half will be consumed compared with the second year, so that it will be near enough the mark to say that it takes 6½ acres to produce a two-year-old steer; but as we have supposed that one person consumes only three-fifths of the carcass, it will require, in round numbers, our acres to supply one individual in meat for a year.

Now, Prof. Arnold assumes that "the cow can develop through the means of her udder more than twice as much nutriment out of a given quantity of food as can be obtained by putting it into meat." If butter takes no fertility out of the soil, it certainly affords no nutriment to the human family, and our dairying system must be completely revolutionized before our race is induced to consume in dairy products twice the vegetable nutriment required to turn it into meat. For all practical purposes, it will now be accurate enough to say that it will require two acres per annum to supply one person in dairy products. Let us now see how many acres will be required to supply the same amount of nutriment in fruits and vegetables.

This calculation cannot be so accurately made, but judging from the reports of various institutions, it requires about one-fifth of an acre to supply the necessary quantity of fruits and vegetables for one consumer; and we will make the liberal allowance of three-tenths of an acre for grains to supply bread, etc., making a total of one-half of an acre to supply all the nutriment required for one person for a year, without speaking about intensive farming. But the beef-eater, or milk-drinker, must also have at least one-half as much of grains, fruits, and vegetables as the consumer who subsists entirely upon a vegetable diet. The account now stands thus:—

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| No. of acres required for the meat-eater | 4.25 |
| vegetarian | .50 |
| Balance in favor of the latter | 3.75 |

We thus see it requires 3¾ acres more land per citizen to support the human race on a meat than on a vegetable diet, and under the present system of dairying, 1½ acres more land to effect the same results on a dairy bill of fare.

How, now, are we to get over the theory raised by live-stock and dairy authorities that mankind cannot live without animal food? If animal food possesses any advantage over vegetable, neither the chemist nor the physiologist can see it. A leading authority on physiology says that he will not condemn animal food as being positively injurious to the human race, but, he contends, its consumption is, to say the least, a disgusting practice.

The upholders of animal food make one unpardonable blunder in discussing this question. They go on the presumption that if meat is abolished, our existing system of preparing fruits and vegetables for consumption is to continue. For example, we convert fruits into dainties and nibble at them occasionally as a sort of luxury, whereas they can be preserved in their natural state, and consumed in large

quantities all the year round as a cheap, nutritious and wholesome article of diet. Of the grains, we feed the most nutritive parts to our domestic animals. We grow mainly such vegetables as possess little nutritive value, and their feeding value becomes reduced in their mode of preparation for the table. We admit that man is not yet prepared for an exclusive vegetable diet; it will take a generation or two to prepare him for it—although there are already many noble specimens of our race who repudiate animal foods.

It is untrue that meats can make stronger and healthier specimens of humanity than vegetable foods. Meat and dairy products are capable of bearing disease germs which may prove injurious to man, and the risk is becoming greater every year. Milk is specially liable to infection, and the slightest change from the healthy condition of the cow, such as indigestion, over-feeding, the consumption of unnatural foods or those tainted with odors, a heated or excited state of the system, all act prejudicially to the value of milk or its products as an article for human consumption. To these objections add the fact that the expense is enormously increased by veterinaries' bills, the appointment of health inspectors, chemists, microscopists, etc., with the view of preventing adulterations—none of which objections apply in the use of fruits, grains, and vegetables. Vegetarianism, and not dairymism, is the manifest destiny of our race.

Butter, Cheese, and Milch Cows.

The war of the breeds seems to have got beyond the question of "Beef and Milk in one Cow." The "general purpose" cow usually signifies that the same animal can profitably produce milk and beef, but there are so many facts and figures against this theory that it seems to lapse into the question, Can the same cow produce milk, butter, and cheese with maximum profit in each? If so, this will be the "general purpose" cow of the future. We believe that, with the advance of investigation and intelligence, the milk, butter, and cheese cow will be as much of a myth as the "beef and milk" cow of to-day, and the time is approaching when necessity will be the greatest educator in this respect.

Chemists are wasting a great deal of their valuable time and energy in their attempts to establish milk "standards." This is strikingly illustrated in the bitter Jersey-Holstein controversy. The usual standard for milk is three percent of fat, and the Jersey authorities maintain that Holstein milk, being usually below this standard, should be regarded as adulterated, while the Holstein authorities assert that any deficiency in this respect is more than counterbalanced by the extra yield of milk, so that the total amount of fat, as well as other solids, obtained in a given period of time, is greater than that obtained from Jersey milk. This argument of the Holstein men is a sound one, and forcibly exemplifies the folly of standards.

Let us suppose that standards are abolished and that all milks are valued according to the percentage of nutritive constituents which they contain. The principle of valuation would then be the same as that of commercial fertilizers, each valuable constituent being paid for according to the market price. Nobody