

may easily be canned and sold advantageously in that form.

The second objection I think can also be gracefully dismissed; for if men can make the culture of small fruits profitable, and observation proves that they do, why should not women do the same? The fruit season is, of course, very short, but the vines must be carefully attended to that they may produce more abundantly the coming season, and why should not young plants be grown for sale, thereby increasing the profits? Besides, in the very objection itself may be discerned a virtue. Owing to the long hours of many employments, women are compelled to neglect their mental faculties, and frequently to pay others for what they could easily do themselves, if they had time, in the matter of clothing, etc. Time is money to the industrious, and leisure during the winter months could be profitably used, thus proving no drain on the profits arising from the work of summer months.

I make the second specification *moderately laborious*, because there are many women dependent upon their own exertions who are not sufficiently strong to bear a great strain on their constitution. I consider it a strong argument in favor of small fruit culture as an occupation for women that it does not require extreme physical labor. The ground once prepared, with vines and bushes set, the heaviest of the work is done. A day laborer could be employed to do this and other occasional heavy work, as manuring, digging, etc., at a comparatively small cost. Pruning, fighting the insect pests, marketing the fruit, seeking out customers, etc., require earnest attention—hand-craft and head work rather than great strength. Protected by thick-soled shoes and a sensible sunshade, I see no reason why a woman could not do this work as efficiently as a man.

Lastly, I would inquire the effect of outdoor work upon the health. I believe it is not an over estimate when I say that at least three-fourths of the women who are confined for many hours in close rooms, inhaling tainted air, in summer oppressed with extreme heat, and in winter shivering with intense cold, have not even a moderate degree of health. The listless movements, the fretful face, and the sallow complexion, tell the horrible tale of dyspepsia, liver-complaint, lung disorders, and many other ills, the heritage of woman. Physicians recommend out-door exercises as a panacea for many of these woes, and out-door exercises I take to mean walking, driving, boating, lawn-tennis, etc. Now, if these are prescribed for one who is really ill, a moderate amount of out-door work cannot be other than beneficial to those already blessed with a degree of strength. Working in the open air, pure as God created it, bathed with the sunshine that re-invigorates all Nature in whose midst we dwell, drinking pleasure from the same fountain as the birds, and blessed with the divinely-gifted instinct which finds, as Shakespeare says, "Tongues in trees; books in the running brooks; sermons in stones, and good in everything," women would surely find, in a measure at least, garden culture conducive to health and good spirits; and, if to the recuperation of the physical and the mental we add the refining of the purse, it surely establishes the fact that small fruit culture is a profitable and enjoyable occupation for women.

The Dairy.

The Best Methods of Making Butter.

In reply to many inquirers with reference to the establishment of creameries, we answered that the question was one of vast magnitude and importance, which we could not satisfactorily answer in a single article; but we promised to furnish information from time to time through our columns. We described the principles and practice of butter-making in our April issue, which was a valuable guide to makers, both in family and co-operative dairies; but this article is more especially written for operators on a somewhat extensive scale.

WHO ARE OUR DAIRY AUTHORITIES?

In agricultural questions there is one thing noticeable, viz., no factious schools exist, as is the case in other professions, and this unanimity is more especially marked in the science and practice of cheese-making. With regard to butter-making, however, there is a splitting tendency. The Danes have long taken the lead both in the science and the art of butter-making, and the famous Danish investigator, Prof. Fjord, has been regarded as the leading authority. His experiments have been numerous, accurate, and exhaustive, and the reputation which Danish butter has in the world's markets is chiefly due to his instrumentality. The Swartz, or low cooling method, adopted in Denmark, is too well known to require explanation here, its chief advantages residing in the facts that a larger percentage of butter can be obtained in a shorter space of time than by the ordinary shallow setting method at 50 or 60 degrees Fahr. It was therefore quite natural that other countries should adopt the Danish system.

Within the last few years, however, a set of American experimenters have pushed their way to the front. It is remarkable that these authorities seem to take no cognizance of Danish methods, although American investigators do not hesitate to acknowledge the Germans as their antérieurs and superiors in other departments of agricultural investigation. In the same manner the authorities in Canada repudiate the researches of the American experimenters. The *ADVOCATE*, however, has no prejudices; it draws its information from the most reliable authorities, not condescending to stoop to the trifles of nationality or spheres of operation. While still conceding Prof. Fjord to be the leading authority in the range of butter-making as a whole, both with regard to his ability and experience, yet there are some points in the American investigations which are of so great practical importance that they cannot be overlooked by any impartial writer.

Let us take Prof. Arnold's late experiments in the ripening of cream. He set milk for 48 hours in oxygen gas at 63°, and set another sample of the same milk in carbonic acid gas. The cream of both soured alike, but that obtained from the setting in oxygen gas churned in two-thirds of the time required by the other; the butter was more highly flavored, more delicious, and kept longer than that obtained from the cream enveloped in carbonic acid. This proves that there is a material difference between ripening and souring. Now if cream is kept stirred for

a while before churning, so as to receive the influence of atmospheric oxygen, it will soon ripen; but if kept in the ordinary way it will sour; that is, carbonic acid gas will develop, and a decomposing of the elements of the cream will take place, producing a bitterness which is relished by the peculiar tastes of some people; but this is a very unnatural condition. The beneficial changes which should take place are produced by oxygen and not by carbonic or other acids; and it is well known that oxygen gas will but feebly effect these changes at a low temperature—about 60° being the preferable quantity of heat. It may still be asserted that the cream may be raised in ice water at a temperature of 33° or 34°, and ripened afterwards; but there are serious objections to this method. In the first place, any sudden or extreme changes in the temperature of the milk, cream or butter must act injuriously to the fat globules, the caseinous sacs not being so susceptible of sudden change as the oils and fats which they contain, and are therefore liable to burst, producing a greasy, white, flavorless and short-lived quality of butter. Secondly, all the processes of butter-making should be carried on as rapidly as possible, otherwise the butter rapidly deteriorates in quality. Butter composed of large fat-globules, such as those of the Jersey and the Shorthorn, are specially susceptible of these changes. These investigations have been substantiated by Mr. J. N. Muncy, at the Iowa Agricultural College, and other experimenters. Unless these conclusions are proved to be erroneous by future investigations, the Danish system of butter-making will be revolutionized. Granting that 10 or 12 per cent. more butter can be obtained by setting in ice, this fact, considering also the inferior quality of the skim-milk for raising stock or other purposes, will not compensate the farmer for the expense of securing ice for the dairy. With regard to the keeping qualities of butter made under the different systems, the most exhaustive experiments have recently been published in the *Milch Zeitung*, a dairy paper published in Germany, which we regard to be the best dairy authority in the world. It was found that the butter from the centrifugal separator retained its fine qualities longer than that made by any other system, which proves the accuracy of Prof. Arnold's experiments. He estimates that cream produced by the centrifugal separator produces more flavor in a minute than it will do in a whole day by being placed in ice water excluded from the air. This effect is produced by the enormous amount of airing caused by the rapid revolution of the machine. Another cause of the inferior quality of butter made on the souring system is that the acidity is not evenly distributed throughout the whole mass, whereby one portion of the cream requires a different temperature and a different length of time in churning, the former ranging from 52° to 65°, while oxygen has a strong tendency to penetrate all parts of the cream uniformly.

WHAT IS THE BEST METHOD?

The conclusions drawn from what we have said prove the vast superiority of the system of separating the cream by centrifugal force; and the advantages are great both with reference to the quantity and the quality of the butter obtainable from the milk. Some tests have