

manner of its application, are problems requiring much careful thought. Our scientists have as yet furnished but little exact data on these questions, and perhaps but little more than general principles can be expected, as a practical application will vary with different soils, climates, seasons, and localities. Thus each locality will mainly have to answer these questions for itself, and this calls for careful observation from year to year. In St. George, Washington county, I noticed that four-tenths of an inch of water grew three to four large crops of lucerne each year while in other places three or four times this amount is used. In not a few places the crop showed evidences of having too much water.

With the hoed crop we have, in addition to the above, the question of cultivation to consider. It does not pay to merely plant the corn, the potatoes or roots, or the garden vegetables, and then let them take their chances, as I frequently noticed to be the case. I think fully 50 per cent of the gardens in many of the settlements visited during the summer would not produce a fourth of what they were capable of doing, and in not a few the weeds had full possession. The crop was nil, and the time and money spent in planting the seed was worse than wasted. The wastefulness of this carelessness was apparent when we had the pleasure of seeing the crop growing in a garden properly handled. A surprisingly small piece of land will grow all the vegetables used by a family for a year (and they need not be limited in kind) and in addition all the small fruits needed for eating or canning. It was noticed that in Utah as elsewhere it was the exception rather than the rule to find the farmer's table provided with that variety of diet which the opportunities of his calling afforded.

There are many points in the harvesting and handling of the crops that might call for extended notice, but there was one point that struck me forcibly, and that was the apparent carelessness in gathering and curing the crop. I say apparent, because having grown up in a humid region the contrast was marked. Perhaps in such a climate as Utah possesses there is not the same need for care, though a season like 1896 would seem to point a lesson in that direction. I believe, however, there is much room for improvement. Take for instance lucerne; the usual method is to cut it and let it weather in the field till thoroughly dry, then rake it up and draw it in. Usually it gets considerable handling before it gets to the stock, and not unfrequently the most that is left by that time is stalks.

Carefully made experiments at this station and also in Colorado, indicate that the leaves are the most valuable part of the lucerne crop, forming from 40 to 50 per cent of the total. Weight for weight the leaves contain much the largest proportion of valuable food material, and besides a much larger proportion is digestible, or may be utilized by the animals.

Experiments made in Colorado and reported in bulletin 35, indicate that with careless handling nearly one-half of the crop of lucerne may be lost due to the falling of the leaves and small stems. They place a minimum loss at 15 to 20 per cent. From many observations made I fear the maximum is all too frequently approached on the Utah farms, certainly a very serious loss. I believe this loss may be very largely, if not altogether, prevented by following in a measure, the method practised in the East in handling clover.

If the lucerne were raked up as soon as it is well wilted and put into small cocks, say a good forkful, in each and then allowed to dry out in the cock, the loss would be largely avoided. When raked up as soon as wilted the small heaps will dry well in our climate. When put up in this way, too, leaves do not fall to any extent and the a slight shower of rain but spoils the outside whereas spread out in the field the whole crop would be injured. Then again the lucerne can be pitched upon the wagon with a minimum of effort and a minimum of loss. I have talked with a few who have practiced this method with entirely satisfactory results.

The farmer's occupation is a business that calls for a large amount of labor both of men and teams. The proper handling, management and disposal of this labor calls for much careful planning, if it is to accomplish the largest amount of work. "Time is money," and yet on too many farms large amounts of it are fooled away or wasted through bad management.

Modern farming calls for a large quantity and a great variety of machinery. A successful farmer has to be a good mechanic. It has frequently occurred to me that the Utah farmers are doing their level best to give the machine agents of the State a good living; first, because of the amount of machinery purchased to do the work required, and second, because of the care or rather lack of care given to the machinery. The most common implement shed was a public one with the blue canopy of heaven above. I am fully persuaded that one year of weathering outside will do a machine, such as a mower or binder, more harm than two seasons of work cutting one hundred acres a year if the machine was properly cared for. A little more co-operation among the farmers of the settlements would save thousands of dollars on farm implements.

The kind of crops to grow on the farm will in a measure depend on the market for those crops, or in other words, the manner of disposing of the crops. If the grain, fodders and roots are all to be sold off the farm, two dangers will have to be guarded against; first, impoverishment of the soil, as every crop sold carries off some of the farmers' working capital, the plant food of the farm, and thus reduces the possibility of continued large crops in the future. In the second place it cuts down the farmers' productive season to six months of the year and thus lessens his income to a greater or less extent. This practice which is followed quite largely in the State seems also to dwarf the intellect and contract the horizon of the farmer. His work seems to be merely mechanical and thus does not call for the exercise of the intellect. I have in mind a community where the introduction of a new line of work for the farmers has had, or appeared to have, a most remarkable effect in awakening the mind. At this place I have given three talks on agricultural topics in as many years. At the first two meetings scarcely any questions could be elicited. During the past two years a cheese and butter factory has started in the neighborhood, and at a recent meeting I was surprised at the change, at the number, breadth and quality of the questions asked, and at the very great interest and attention shown.

Another drawback to the above method of disposing of the crops is that the variety of produce is limited, and therefore many of the counties of the State sending outside their borders for food products that could and should be produced in their midst, and that with decided advantage. The production of dairy products afforded a striking illus-

tration of this, and I was really surprised at the number of places that were not supplying themselves with butter and cheese; in fact, in some places even the milk supply was limited. In many places too, the quality of the product offered was not such as to tempt a large consumption. This is not due to any lack or the quality of the soil or the climate, as I saw no place from Cache county to Kane where butter and cheese of the best quality might be produced. When we consider, too, that dairy products furnish the cheapest animal foods we can put upon our tables, the loss becomes more apparent. Some may doubt the comparative cheapness of dairy products, but the following table, compiled from the reports of the U. S. department of agriculture, answers the point:

TWENTY-FIVE CENTS WILL BUY:								
FOOD MATERIALS.	Price per lb.	Total Food Material	NUTRIENTS					Calories of Energy.
			Total.	Protein.	Fat.	Carbohydrates.	D.S.	
Milk (4c per qt.)	2	12.5	1.63	.45	.50	.59	4045	
Butter	25	1.00	1.00	.01	.85	.01	3625	
Cheese	15	1.67	1.17	.47	.69	.04	3430	
Skin milk	5	50.00	5.00	.00	.00	2.40	12300 about	
Beef (stirled)	18	1.39	.45	.21	.53		1360	
Beef (round)	10	2.50	.62	.35	.15		1285	
Pork (rib roast)	10	2.50	1.06	.34	.70		3585	
Chicken	16	1.56	.27	.24	.62		530	
Macaroni (whole)	10	2.50	.87	.25	.11		690	
Eggs (15c doz.)	10	2.27	.53	.28	.23		1490	

This table will repay studying. Prices will vary up and down in different places, but from the facts given, any person can apply it to their local conditions. The calories of energy, or fuel value of the various foods than can be purchased for 25 cents is the readiest method of comparison. Milk, butter, or cheese, at the prices given, furnish from two to three times as much food as beef or eggs, about the same as pork and four to seven times as much as fish or chicken.

As far as I have been able to learn, only five or six counties in the State produce any butter and cheese beyond their requirements. In many of the other counties the people purchase a supply from their neighbors or else philosophically do without it. It seemed to me that several of the southern and central counties which are distant from the railroads, and some of the valleys which have a high altitude, could much more profitably turn their crops into dairy products than to sell the grain as is now done; a dollar's worth of butter or cheese could be marketed much cheaper than a dollar's worth of grain. If we will take all the counties on the western border of the State, from Washington to Utah, not enough dairy goods are produced to supply the market in their midst. I was very much