

wheat, Velvet Chaff, Invincible Club; oats, nearly all the black varieties are more subject to rust than any of the white varieties.

Then, again, in sowing the seed, much depends on how it is done. If sown broadcast, it should be evenly distributed over the ground, avoiding crowding the plants, which is a cause of disease, causing weakness of the plants by not admitting the sun, on account of the thick foliage, and disease is sure to follow.

If sown in drills, they should always run from north to south. This admits the rays of the sun, that which strengthens the spores so as to prevent them bursting, and also quickly dries the dew and moisture which gather in the bottom of the plants, and which, if allowed to remain, make a hot-bed for the growth of fungus.

(To be concluded in our next issue.)

Our Government and its Confederates Preach False Doctrines in the Methods of Restoring the Fertility of the Soil.

To the Editor of the Advocate:

SIR,—Prof. Robertson, of the Model Farm, Guelph, and Mr. Shaw, of Hamilton, have recently been down east attending "Farmers' Conventions" and lecturing, the former on the "Model Dairy Cow," and the latter on "Robbing the Land." Among the places visited was Huntingdon, P. Q., and I have been reading the report of the meeting there as given in the "Gleaner," published in that town. As both of these gentlemen at that meeting, and most likely at others also, expressed and reiterated opinions which are erroneous and misleading, I request the use of a small space in your widely circulated journal to point out to farmers (and the lecturers) where they are in error.

Mr. S., in his paper, makes some very good points. He says: "A man who crops continually and puts back nothing will leave his children a farm on which they cannot make a living. No soil is so rich that it cannot be exhausted, etc." But when he goes on to say that an exhausted farm can be restored to fertility from its own resources while selling off beef, he is grievously in error. Yet, in answer to a question, he repeats it thus: "I deny that a farmer cannot sell off a certain quantity of produce without impoverishing his soil. The fertility can even be increased while doing so." He had doubled the fertility of his farm in eight years, all the while exporting beef. Does any one really believe that a farmer can take the hay, grain, roots or whatever it may be that he grows, feed that to cattle, sell off the beef, putting back only the manure, and by so doing increase the fertility of the farm? The thing is absurd. It is true that cattle raising or dairy farming will not run down a farm as quickly as grain growing, but the exhaustion will come just as surely, if not so rapidly. He confutes himself, however, because he says: "A day is coming for artificial manures, but there is no use buying them while we are wasting the manure we have." Now, why mention artificial manures at all, if farmers can double the fertility of their farms in 8 years, at the same time exporting beef (and making money at it, I suppose) as he says he did.

He also says: "Artificial manures ought not to be used unless the farmer knows what his land lacks and how to apply them. Ashes are better than phosphates or guano." The first

part of this piece of advice is like that of the fond mother who advised her boy not to go into the water till he learned to swim, and he might as well say that salt is better than sugar, as say "ashes are better than phosphates or guano." How is a farmer to find out what his land needs unless by trying different things. If land needs ammonia, 1,000 bushels of ashes per acre would not supply a particle of it, but a small quantity of guano would.

A member who stated that he had a poor farm and wanted to increase its fertility, said "he did not believe land would grow richer while exporting cheese."

Prof. Robertson, in reply, said: "Certain properties of the soil leave the farm in cheese; part are restored by the atmosphere, and part can be replaced by barn-yard manure and by plowing in green crops. The mineral constituents cannot be so replaced, but they are minute, say 1½ lbs. per cow a year." This answer did not satisfy the enquirer, and he again asked: "Will my farm grow richer by receiving all the barn-yard manure made on it while employed in dairying?" Professor R. replied: "I am sure of it—poor farms can be improved by dairying."

Now, if Professor R., or any farmer who reads this, will procure a copy of Tanner's "First Principles of Agriculture," and turn to section 60, page 32, he will find it stated that "the first step towards the use of artificial manures was the use of bones on dairy farms where the pasture lands were exhausted of phosphoric acid by the formation of milk and for the growth of the young calf, very little being returned to the soil in the excrement." There could not be a more direct contradiction of Prof. R's statement than this well known historical fact. In the same section of Tanner's book, he states that there is 1 lb. of phosphate of lime in every 25 or 30 gallons of milk. Now, a "Model Dairy Cow," such as Professor R. describes, should give at least 400 gallons per year, and that quantity would contain 16 lbs. of phosphate of lime, besides about 7 lbs. of potash, and both of these constituents came only from the soil. If the milk were made into cheese on the farm and the whey fed to hogs, the loss would be ¼ less, say 17 lbs. per cow per year of mineral ingredients, instead of 1½ lbs. as stated by Prof. Robertson. Nor would the 25 lbs. of nitrogen in the milk be nearly all replaced by the green crops plowed in or absorbed by the soil from the air. It is quite evident that however good an authority the Professor may be on practical dairying, he is uninformed in the chemical or practical aspect of the matter as affecting the exhaustion of the soil.

Here we have two gentlemen (one of them holding an official position) teaching our young farmers the most illusory doctrines—doctrines that are contrary to science, experience and common sense.

The most extraordinary statement of all, however, was made by a member in corroboration of the assertion of Prof. Robertson, that a farm would increase in fertility while dairying was carried on. This farmer stated that he had bought 150 acres so run down that it would support only 5 cows, and he had brought it up so that it now carried 35 cows and 3 horses, by the use of farm-yard manure and a little plaster and ashes. This gentleman, according to his own statement, has accomplished more than all the great agriculturists that have ever lived. Liebig, Ville, Lawes and all such men, have only been

wasting time and money trying to find out a way to accomplish what this farmer has done by the most simple means. The farmers in the old country have been throwing away millions of dollars every year on guano and such things to maintain their lands, when it could all be done by using their own manure and a little plaster and ashes. It has generally been supposed that farmers in the old country know all about making and saving manure, but they apparently do not know as much about it as this gentleman. He is far ahead of either Professor Shaw or Robertson—quite a phenomenon in fact—and I would suggest that he be engaged to deliver a course of lectures to instruct his brother farmers just how he did this thing. Our young men may go west, but it is quite evident that the wise men still live in the east, as in ancient times.

Seriously, Mr. Editor, it is an unfortunate thing for our country that, at the present time, when our farmers are feeling the need of a change from the old style of farming, such delusive teachings as I have criticised should be spread over the land and be accepted and believed by so many farmers. It certainly has been by no such means as the gentlemen referred to advocate, that the farmers in Great Britain have made their land so productive as it is, and it would surely be a wise course to study out and follow, as far as practicable, the practice which has been so successful there and in other countries. I have given one illustration to show that the best authorities there hold opinions quite different from those who fill the position of instructors in this country.

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Bumblebees and Clover Blossoms.

An inquiring friend would know "why the first crop of clover has no seed; whether it is possible to distinguish the difference, if any, between the blossoms of the plant bearing the seed and that which contains the fertilizing quality; and has the bumblebee anything to do with it." So far as examined—and many flowers have been examined—the blossoms of the first crop of red clover have good pistils throughout, and good stamens, with plenty of what we should call good pollen. In other words, we cannot see why they are not just as capable of fertilization as those which come later. Experiments, repeated on the second crop for six years, give varying results, but in all cases they show that bumblebees in Central Michigan increased the crop from 100 to 400 percent. Other insects may also help in this matter. In Kansas they tell me bumblebees are scarce, but clover seeds freely. Honey-bees at Michigan Agricultural College, without any question, increase the yield of seeds of white clover enormously, in one case as 236 exceeds 5. I am satisfied that in some locations at least bumblebees should be encouraged for the good they do to red clover. Now the problem is this: How can the entomologists rear and keep over winter large numbers of fertile queens? It seems to me not improbable that the time may come when bumblebee queens will be reared, bought and sold for their benefit to the crop of clover seed.—[Professor W. J. Beal.

Prof. Roberts, Cornell University, found by direct experiment on a clover plot, that the tops of the clover, when dried, yielded 3,295 lbs. per acre, and the dried roots gave 4,896 lbs. per acre. Who would think that the roots of the clover are more valuable than the tops?