for developing colonies. These land areas are valuable, and there is every reason why outdoor occupation, so well adapted to the middle and high grade feeble-minded, under proper supervision, should be made as efficient a business proposition as the labor conditions will permit; and the inefficient labor proposition can be largely compensated for by highly efficient methods applied to these departments.

I have found our department heads eager for technical knowledge and willing to adopt any reasonable suggestions for improving the service, and yet they have not been able always to justify their recommendations by results. They are too easily d.istracted and diverted for the working out of the essential problems of their department, either by lack of a thoroughly grounded technical knowledge, or by lack of the proper grasping of the relative values of their activities.

For instance, I feel that we are not getting the proper results from our stock feeding, especially in the dairy, though the latter is above the average in the community as to both quantity and quality of product. By proper feeding and the elimination of the inferior animals, we ought to at least double the output; not necessarily from the same outlay, but without any very great increase in the latter. The adoption of an approved system of records and reports, their frequent inspection by an expert in dairying, and a study of individual animals in relation to feed and milk products, under the tutorage of an expert, ought to readily determine the proper method to pursue in each case; namely, extermination or cultivation.

Finally, therefore, the need in general, it seems to me, is the introduction of both technical instruction and professional enthusiasm; the latter as a stimulator of interest, and the former to secure effectively directed effort.

The working out of a detailed plan of co-operation can safely be left, for further consideration. The following, in a general way, seems to me feasible and desirable:

1. The services of a competent representative of the agricultural college-, to complete or extend the survey already made by Mr. Corniea, until a detailed cropping scheme is devised for the whole farm,

2. Resident service of the representative, for at least two weeks of each quarter, for checking up methods, study of reports, and giving such instruction as may be indicated in crop and land treatment, seed selection, feeding, care and breeding of stock, and methods of handling products, etc.

3. An arrangement by which any problem of the farm, dairy, garden, poultry department, or live stock interest, can be referred to the proper department of the farm school, and expert counsel obtained. This, of course, could be handled through the representative of that school. I see no objection to having these departments open for the use of the agricultural school for a 'demonstration to students, and it might possibly be to the interest of both institutions to have students reside for a time on the place, to assist' in conducting certain defined operations.

Executive control of all operations should not obviously be changed, and it should always be borne in mind that our problems are definite and clear,

and it would be in bad taste and against public policy to exploit the institution in any sensational manner.

Whether there would be any particular necessity for similar supervision at the other state institutions, the discussion to follow this and Mr. Corniea's more complete and elaborate report will doubtless disclose.

ORGANIZATION OF STATE FARMS.

F. A. Corniea, University Farm.

Before presenting any plan for the organization of state institution farms, an attempt will be made to show where the present system is at fault. As a thorough investigation was made of the Faribault farm only, the report will necessarily deal largely with that farm and its present system of management. The discussion will center about those projects or enterprises in which the most improvement can be made. Any statement concerning the present management of the farm should not be taken as a personal criticism of anyone connected with the instutition, because those in charge of the farm are doing the work to the best of their ability under the present system.

The investigation was started at the request of Dr. Rogers, and he and his helpers have co-operated in every way to make the investigation and its results a success. Much credit is due Dr. Rogers for the stand he has taken, because it shows that he has the welfare of the inmates of the institution and of the state at heart, and that he is doing all in his power to make conditions better.

The facts and figures given In the following discussion were nearly all gathered first-hand. Wherever they were not, note will be made to that effect. The discussion will come under the following heads:

1. Cropping System.
2. Feeding.
3. Records.
4. Location of Farmsteads and Buildings.
5. Supervision of the Farm.

1. Cropping System.

No definite cropping system is followed on either farm, and consequently there is no systematic rotation. On the north farm it has been necessary to grow the same crops continuously on some of the fields. For example, it is practically necessary to grow silage corn in the field in front of the dairy. Any other field would necessitate too long a haul in filling the silos. Likewise, under present conditions, the garden must be kept in the same place year after year. This is not conducive to high yields or to maintenance of soil fertility.

The crops grown, likewise, are not always the best. For example, the corn for silage has always been a large variety of southern corn, which does not mature and in 'many cases does not produce ears. A better grade of silage could be had by growing corn adapted to Minnesota conditions; for example, Minnesota No. 13. This corn would mature under ordinary conditions and produce silage that would be higher in feeding value, con-

tain less water, and he less bulky. The reason given for growing southern corn is that they have always found it necessary to buy seed, as they never picked enough for their own use. In buying, apparently it was found cheaper to get the large southern corn, which grows largely to stalk and leaves in this climate. The result is that the silage is of a poorer feeding quality than it would be if Minnesota corn were used.

The cropping system of the south farm, however, can be improved more than the one on the north farm. A glance at the farm plan shows a large number of small fields, irregularly shaped. The main crops on the farm are -corn, potatoes, oats and hay. To grow these farm crops there are twenty-two distinct fields.

There are 3 corn fields for 62 acres.
There are 5 potato fields for 87 acres.
There are 6 oat fields for 123 acres.
There are 3 clover fields for 69 acres.
There are 5 meadows for 88 acres.

There is a big waste of time in working fields such as these, not to say anything about the loss of time in going to and from the fields, moving machinery and equipment from one field to another. It would he possible to grow the same number of crops on eight fields at the most, two for each crop. This would be a big saving of time in working the fields and in going from one field to another.

The cost and maintenance of fencing on the north farm could be appreciably reduced by a rearrangement of lanes, fields and pastures. By actual measurement there was found to be 2,892 rods (9% miles) of fencing for 227 acres of pasture. If this pasture were square, 'only 760 rods (2% miles) of fencing would be required. At the present price of material, about the cheapest fence that could be built would cost 30c a rod for material only. This would allow for a three-strand barbed wire fence, posts one rod apart. A 7-foot cedar post four inches in diameter would cost about 16c untreated. The wire would be about 4c a rod for a single strand. This makes 28c a rod, not counting braces, staples, corner posts, etc. The average life of a fence of this kind would be about fifteen years. Taking these figures into consideration, the necessity of getting fencing down to a minimum becomes apparent.

2. Feeding.

In the feeding of livestock, attention should be called to the methods of feeding as well as to the amounts fed. During the winter of 1912-13 the cows were fed wholly on corn silage, hay and bran. According to Mr. Christie, the cows were getting daily 60 pounds silage, 20 pounds hay and 9 pounds bran. This is a very heavy feed and one very high in protein. According to Haecker's feeding standards it would furnish 3.24 pounds protein, 19.86 pounds CH., and 1 pound fat. A very liberal estimate would put the average cow in the herd as weighing about 1,350 pounds, and giving about 25 pounds of 3.5 per cent milk daily. Referring again to Haecker's feeding standard, we find that the average cow in the herd requires 2.175 pounds protein, 14.97 CH., and .602 of fat. In other words, the cows were each getting 1.066 protein, 4.99 CH., and .403 fat more than they could use. This

surplus was wasted because the cow had no use for it. Besides, the continued heavy feed of protein, often results disastrously. At the present prices of feed stuffs, the cows were getting 24.6c worth of feed every day. A ration consisting of 40 pounds silage, 14 clover, 2 corn, 2 barley, and 2 bran, would give the cows the required feed, and would cost 16.846c per cow per day. This would be a saving of 7.754c per day per cow. On a herd of approximately 100 cows the saving in feed alone would be nearly $8 per day. Besides the saving in feed, there would be an additional gain due to an increase in production. The greater variety of feeds would be more palatable to the cows and they would be getting a ration much more nearly adapted to their needs.

The hogs are fed principally kitchen waste and garbage. An attempt is made to keep enough hogs on hand to consume all the waste. The feeding house is 72x24 but is inadequate for the present requirements. Preference in its use is given to the brood sows, and there is considerable feeding in the yards, and at times the whole herd except brood sows are fed there.'

The water for the hogs is furnished by a pond supplied by the overflow from the springs. The discharge from the septic tank is also received by this pond but at the opposite side from the one accessible to the herd. In winter the only moisture the hogs receive is from the garbage and snow.

Not much can be said about the feeding of the poultry except that the feeds given were not conducive to egg production. In looking over the list of feeds given, there is a noticeable lack of green feeds and of animal food. As a result there were not many eggs produced for the amount of feed consumed.

3. Records.

The matter of record-keeping was carefully looked into, as that is a very important item in the management of any farm. Probably first in importance are the dairy records. At the present time it is impossible for any one to get the individual production of any cow. Up to this year no testing was 'done, so there are no records for butterfat production. The milk was weighed at every milking, the weights being kept on weekly sheets which were large enough for all the cows. Unfortunately the weekly sheets were never summarized, and some of them were lost, so all the work of weighing at every milking was practically for nothing. Tne total amount produced by the herd is known because the milk is weighed in bulk by the steward whenever it is delivered to him.

Neither is there a good record of breeding on the place. The head dairyman tends to the breeding of cows, but the only record he keeps is a memorandum book which he carries around with him. The record is necessarily incomplete and very unsatisfactory. There is no regular form of keeping this record, and mistakes are bound to occur.

Along with the breeding record there should be a record of the disposal of calves. Unfortunately there is no such record. The books of the institution show whenever a sale was made or whenever any calves were butchered and used as veal. No records show how many calves are kept and raised for future herd. This had to be found by going out and counting the calves in the pens and yards. The institution books were looked over and the growing calves counted, but this accounted for only about

three-fourths of the calves the herd should have produced. Upon inquiry, the head dairyman replied that the rest of them were killed at birth because it didn't pay to raise them.

Another thing which it was impossible to find out is the amount of any particular feed used by any class of livestock. For example, the institution books show how much bran is bought during the year, but that is all. There are no records to show how much of this was fed to the cows, how much to the horses, or how much to the poultry. It .is known, in a general way, that most of it went for feeding the cows, but some was fed to ,the horses and some to the poultry. The amounts used by the different classes of live stock can be arrived at only by estimates which at best are very unreliable.

In the management of the poultry industry, daily records were kept of the number of eggs collected, and these were summarized at the end of each month. There was a change in the poultry manager near the end of the year, however, and the new manager did not complete the records as well as might have been done. The feed records were rather poorly kept, and nothing could be learned of daily rations. There were no records whatever as to the time of putting eggs in the incubators, the number of eggs put in, or the number of hatchings from the incubators. Consequently no one knows just what degree of success was attained in this department.

4. Location of Farmsteads and Buildings.

One thing which should not be overlooked in the planning and developing of a farm of this kind is the location of buildings and farmsteads. A mistake is being made at the present time on the south farm. The farmstead which is being developed is down in the southeast corner, as far away, from the main campus as it is possible to get it. On this same farm is another old, unused farmstead on the west side, a half mile from the southern border. Work is now being done on a building to house a -colony of inmates at the second farmstead. This is the logical place to have the main farmstead from which the work on this farm is to be directed. It is nearer to the main campus and more centrally located for work on the farm. The only building that is worth very much on the east site is the building housing the inmates. Plans are under way at the present time for extensive improvements on this place, even though it is not centrally located and is farther away from the main campus. The topography of the land is also much better on the west site, and there is an unusually good opportunity to put up a model farmstead. In the present place the buildings are much too close together, and there is not much room for expanding without doing a lot of grading. The thing to do in this case is to gradually build up a model farmstead on the west site, and have that as center of operations for the south farm. A public institution of this kind is something permanent, and all planning and building should be done with the future in mind. Undoubtedly the land now owned and operated in connection with the institution will be in the same hands a hundred years from now, and even more. This is not true of the privately owned farm. All improvements should be made with the idea of permanence in mind. Now is the time to begin building on the west site. It is the logical place

to build on account of position with regard to fields, distance from the main campus, and topography. The only argument for the east site is the fact that there are already buildings on the place. These buildings, however, are old and badly in need of repair. The serious mistake should not, be made of making expensive improvements on the east site when there is such a splendid opportunity for building a model farmstead in the logical place for having it.

5. Supervision of the Farm.

To some the preceding discussion may seem a severe arraignment of the .people in charge of the farm. It should not be considered as such, however, but as a criticism of the present system of management. The farm as a whole is a paying one, and has many commendable features, ,but the institution has outgrown the system of management which was in operation ten or fifteen years ago. There are at present over 1,000 acres of land connected with the institution, over 950 of which are in the farm proper. There are in the neighborhood of 1,500 inmates and 250 attendants in the institution. All of this is under one superintendent. The task is more than any one man can do and do properly. The management of a thousand-acre farm, specialized as this one necessarily is, is a big enough task for a trained agriculturist. Dr. Rogers himself admits that his duties in looking after the welfare of the inmates prevent the close attention to the details of the management of the farm which is necessary if the greatest farm efficiency is attained. Many of the criticisms in the above discussion were made by him, and he knows that many of the farm enterprises are not handled in the best possible manner, yet he cannot give the time to personally supervise the small details in each department and bring about the proper co-ordination. When the institution was small, the men hired for the farm were chosen more for their ability to handle inmates than for their knowledge or experience in farm work. Dr. Rogers then had the time to personally inspect and direct the farm operations, but the institution has kept on growing and the farm kept on increasing in size until he is unable to do the things which he formerly did. The men hired for the. farm, however, even at the present time, have not the training or the preparation to take up the work dropped by Dr. Rogers, with the consequent result that as there has been an increase in size there has been a decrease in efficiency of the different farm enterprises.

The time has come when something must be done to make the farm and its different departments more efficient than they are at present. This cannot be done with the present system of organization, however. There are two remedies which suggest themselves. One is that the farm foreman and his helpers should have special training along agricultural lines. The head dairyman, for example, should have a good preparation in dairying so that he could figure rations, know how to keep records, and realize the necessity of keeping records. The same should be true of the poultryman. In order to do this, however, higher salaries would have to be paid, because men with special training along these lines cannot be hired for the wages now being paid. To do this at every institution would mean a big additional yearly expense on each farm. Besides, it would not. relieve the present superintendent of much responsibility or work. It would still be

his task to inspect records and bring co-ordination between the different departments, and to see that the farm as a whole is run in the most efficient way.

The other plan is that there should be some one to whom the people in charge of the different farm departments could go for advice and "or help. This person could be known as the farm supervisor or inspector. It would be his business, besides acting as information man, to go around to the different institution farms to see that his instructions were carried out and help the people in charge of the different farm departments. Whenever necessary, he could go out and help to plan cropping systems, locate building sites, farmsteads, and act as general advisor for the farms of these institutions. He could work up a uniform system of record keeping for the different farms, and call for reports at stated times, to see that the records were kept up as they should be. Whenever necessary, for some of the larger farms he could hire as farm foreman a trained agriculturist to take charge of the farm. This would greatly lessen the amount of work and responsibility for the superintendent, as the matter of record-keeping, hiring of farm foreman, planning crops, etc., would fall upon the state farm supervisor.

Besides being a direct benefit to each farm, the farm supervisor could do much other valuable work in the line of co-operation between the different farms. In fact, this probably would be his most useful line of work. There is an unusually good opportunity for co-operation in the breeding of dairy cattle. Practically all the farms have a large dairy herd of Holstein cows, many of them registered. The state could make no better investment than to purchase a number of the best Holstein bulls in the. country for use in these herds. Each bull, by a system of exchange, could be made useful for eight or ten years in the state herds. These bulls could be used in breeding the cows of highest production, and thus gradually build up the herd to a state of highest production and quality. In this way each one of these farms would become a central breeding place, from which the surrounding farmers could secure high-class dairy cows and sires for breeding purposes. If the buying of these bulls were put in the hands of a good judge, he could select them for uniformity of type, and each institution would be breeding along the. same line instead of different lines. Then and only then is there much advantage in exchanging sires. The same policy could be followed in breeding other lines of livestock.

Besides this, the farm supervisor could work out systems of trying out and improving field crops, exchanging farm products, etc. He would be in a position to know the special wants and adaptations of each farm, and could plan each farm according to its peculiar needs. For example, one farm may be especially adapted to potato growing, another for feed crops, another for vegetables and small fruits. Each farm could be planned for its particular crop, and an exchange of products take place later on.

The farm supervisor would also keep in close touch with the agricultural college, and co-operate with them whenever possible. The different departments of the college have already agreed to give help wherever and whenever needed, if the matter were brought to their attention. Specialists along different lines could be called out from time to time, whenever any

special problem came up. They would be more than willing to give the benefit, of their years of experience and study. Unless there is someone to call on them, however, and someone through whom they can act, they will be of no more use in the future than they have been in the past. It is safe to say that some of these institutions have very seldom, if ever, been visited by anyone from the agricultural college.

No attempt has been made to give the working details of the preceding plans, because it is impossible to tell just how far it can be worked. It will have to be tried out and gradually developed and worked out by those in charge. An attempt has been made, however, to show some of the benefits to be derived from such a system of management. The farms would be put in charge of a man who is specially trained in agriculture. They would become more efficient, due to bigger and better crops, better management and more co-operation. A conservative estimate would put the Faribault farm income at least $5,000 per year more than it is at present. Besides this, the people connected with the farm would get much more satisfaction out of their work because they could feel that they were doing things in the proper way, and had some one to go to in case of trouble.

One beneficial result of the investigation is shown already from the fact that they are feeding differently this year. During the fall of 1913 Mr. Christie made a trip to St. Paul and incidentally to the university farm. While there, some of the essential principles of feeding were explained to him and he was shown how heavy a ration he was feeding. A few rations were figured for him to show how it was done. In a recent letter from Mr. Christie, he states that they are now feeding daily to each cow 3S pounds silage, 8 pounds hay, 5 pounds corn fodder, and 10 pounds grain which is a mixture of ground oats, corn and bran. It is impossible to figure just what this ration supplies as the proportion of the grains in the mixture is not known. Nevertheless, this ration is a big saving on the one fed last year, and undoubtedly gives just as good results or they would not be using it. The wholesome spirit of co-operation and willingness to learn, shown by this little incident, is an indication of what could be done if there were some one to keep them in touch with specialists along these lines.

As to the possibilities of using these farms as demonstration farms, or experimental farms, by the university, that will have to be left to those who have that work in charge. Some discussion has been started advocating the use of these farms as places on which to give advanced students of the school and college of agriculture practical experience. There is some objection to this because these farms are specialized and are not like the ordinary farm. This objection could be overcome, however, and the beads of the different departments might be willing to send students to these farms if they felt that the students could get valuable and instructive experience. The students who would be sent out to these farms would necessarily be those who had had little, if any, practical experience in farm work and took this as a means of getting it, and unless these farms were put under proper systems of management they would not profit very much by their experience.