1888

he will see his errors. They have appeared in previous numbers of the JOURNAL, and proof of what I have written and said is at hand when required.

Mr. Wade writes too many incorrect and improper statements to admit of all being taken up and answered in time for this number. I will consider whether I shall show up further ridiculous details of working to fit when it suits him, or to unfit when it does not. He would do well to settle the principles upon which he intends to act cad take someone into his confidence to help him to follow them. He seems to have searched high and low to make capital against me out of the many errors to be found in Mr. ... right's book, made up as his own was, by someone who cooked pedigrees to suit himself. Mr. Wade knows what Mr. Newton wrote of Mr. Wright's dealing with Wright had animals of the same name and different pedigrees passed through his hands, and in some cases the details of one were taken for the other, evidently the result of imperfect keeping of records, and subsequent attempts to record them correctly failed. Mr. Wade goes out of his way, as wrong as he is imprudent, when he calls in question the pedigree of Prince Arthur 325, the breeding of which animal he knows nothing about ; yet he assumes he is right in cooking that pedigree to suit his ends, as he has done of others I have in my possession in his handwriting, Where did he get such information? It is not in Mr. Wright's book, as Mr. Fox bred the bull and sold him to me in Sept., 1869. Mr. Fox's pedigree of him was not full. Mr. Wade admits that and does not give it as he got it, but goes on to make it up and gives his own version without the approval of either breeder or owner, and proceeds to put him in the appendix, for a purpose. Mr. Wade, in his zeal to make a point, overlooks his own admission that the pedigree he got from Mr. Fox's son, said to be given by Mr. Wright, "is not in full, but it shows she is from a different cow." This is just the point to determine-who is right. The cows were the same name, the dams were the same name, but differently bred. Mr. Fox and Mr. Wright together could not furnish correct details of breeding because of there being dif-ferent cows. One was "red with white spots," the other was "dark fawn, white about flanks." The dispute could only be settled by Mr. Hough and others, whose evidence was clear and correct, and thus the proper breeding was determined as to sires and dams Lady of the Lake 1875 was bred from. Mr. Wright had two books; some appeared in both, some in only one book. On looking them over I found several errors in which the wrong dam was There appeared but one Lady of the Lake. taken. As to the other it would seem from the correspond ence that he owned her but a short time, and I can only account for some of his mistakes by oversight in keeping prompt records of occurrences and then got

mixed in his ideas when making pedigrees. Why should Mr. Wade and Mr. McCormick attack me thereon and belittle themselves by descending to produce false impressions? If I had not been satisfied with the bull and there was any doubt about the pedigree, he need not have been taken nor used, for I owned an imp. bull at the time. Furthermore, I informed Mr. Wade "Alfred was imported by the late Mr. Gilmour for Mr. Hutchins," therefore his state-ment is false that there was "no explanation as to whether he was imported or not." I know also, that be (Mr. Wade) the stern in Connet Becord he (Mr. Wade) has seen the entry in Canada Record No. 1874, where Alfred and Butteroup are both noted as imported from records in my possession. He also attempts to cast doubt on Mr. Ewart's importation of Lady Betty. Let him look to his own book ; he will find it page 119. And I have his list of Mr. Ewart's imp. cows with Lady Betty in it. He also questions the use of Dundee 3d, because he was kept elsewhere. Does he not know that persons distant sent their cows to that famous bull when Ayrshires were scarce? Then let him look to his own book ; he will find the names ; and in Canada Book. What will the Agriculture and Arts Association say to their employee for exposing them to heavy damages for his erroneous work and doings in pedigrees? It would take me a a week more to write all I might. I must close this to reach you in time, and resume the demolishing of erroneous statements hercaster.

I feel assured you will kindly admit of my defence in reply to the attacks in your last number. 'Tis a pity officials would not give true copies of minutes and proceedings to the press, and let your readers

judge for themselves. Had our western friends treated us better and published only the truth, it would have been better for Ayrshire interests and for them. WM. RODDEN, Pres. C. A. H. R.

## Roots Against Grain in Milk Production.

BY WM. BROWN, PROFESSOR OF AGRICULTURE.

We have made tests with roots against grain for milk production within the last five years, but never so thoroughly as during the past winter. Our objects were, (1) cheaper production of winter milk; (2) to get milk equal at least to the average Ontario summer records; (3) the use of a large quantity of roots without tasting, and (4) to maintain milk flow and condition of cows without grain. The plan adopted was to feed one week on each

The plan adopted was to feed one week on each ration previous to exact testing during the second week, and thus changing every two weeks through March and April. Ordinary Shorthorn grades were handled, milking twice a day. What are the facts so far?

The root ration daily consisted of 12 lbs. cut hay, timothy and clover, 33 lbs. mangels, 33 lbs. Swede turnips and 15 lbs. white Belgian carrots, all sliced and mixed with the hay. The grain ration was 12 lbs. of similar cut hay, 7 lbs. oats, 7 lbs. pease, and 7 lbs. barley, all ground and mixed dry with the hay. Feeding at 6 a.m., 11.30 a.m. and 5.30 p.m.

The nutritive ratio of the root diet is 1:7 4, and of the grain 1:5.4, thus 27 per cent. higher for the grain ration.

The daily milk per head from ronts averaged 20.9 lbs. over the whole period, and 22<sup>1</sup>/<sub>3</sub> lbs. from grain. The daily cost of food per head was 19<sup>1</sup>/<sub>2</sub> cents for

The daily cost of food per head was 19½ cents for the root and 31 cents for the grain ration, thus being 9¼ mills for the one and 13 9 mills for the other per pound on the milk produced, or 9½ cents and 14 cents per gallon respectively, charging the average prices of the province during the last twelve years. On roots the animal weight was reduced 14 lbs.,

On roots the animal weight was reduced 14 lbs., and on the grain 12½ lbs. over the period—practically nothing in the scaling of cows; nor had we to credit any left food after each feeding; neither was milk spoiled by root taste.

Now, what are the practical and scientific deductions from these simple tacts ?

1. That 81 lbs. of a mixture of roots, an unusually large quantity per head per day, with 12 lbs. hay gave almost as much milk as did the unusually large quantity of 21 lbs. of a mixture of grain and 12 lbs. hay.

2. That this result was accomplished—(1) without spoiling the milk; (2) without reducing animal weight; (3) at thirty per cent. less cost, and (4) even though the root ration was scientifically 37 per cent. lower in nutritive value.

3. Thus, food of a *succulent* character, four times more *bulky* and much less value proportionately than dry grain, demands a very high place in winter dairying.

4. The root ration was pitted against an unusually large quantity of ground grain, enough to fatten two store cattle, which also represents with hay the acknowledged scientific and practical standard (1:5.4) of a ration for the best results in animal growth and their productions. But, even though the roots were four times more in bulk, the cow had nearly twice as much *digestable* materials per day from grain.

5. The large relative percentage of water in roots seems to possess an influence in the production of milk, which, if not exactly understood, yet seems to depend for its effect upon the fact that the natural food of milch cows contains a larger proportion of water than is found in the more highly nutritious grains.

6. Thirty-three pounds of Swede turnips per day if fed whole and separately will taste milk, but when sliced and mixed with an equal quantity of mangels, or when pulped and mixed with hay, will not give a bad flavor.

7. The manure values scientifically resulting from the consumption of these rations are about four cents for roots and nine cents for grain per cow daily; thus, in balancing all the points in this experiment, that of manure must not be lost sight of.

8. Take two such cows as we have had in this test over a winter of 180 days, one upon each of these rations, and all other conditions being alike, we obtain the following comparison :

	Milk, 16.	Value of milk.	Cost of food	Manure value.	Net gain.
ets	3762 4020	\$47 50	835 56	\$7 16	\$19 10

Roc Gra

9. Accordingly the dairy world has yet to be taught that the extensive use of grain is or is not correct economically; that a large quantity of a mixture of roots with hay fodder is both economical and safe for milch cows, and that possibly there is better health with roots, though a slightly inferior quality of milk -remembering at the same time that we have to wait further tests as this is only our first systematically conducted one.—Bulletin XXX, Ont. Ag. Col., Guelph.

[We think it would have increased the value of this very interesting experiment had a moderate ration of grain and roots combined been fed to another lot of milch cows and the results noted. Perhaps our professor of agriculture may see fit to make this addition in future experiments to which the bulletin makes reference.—ED.]

## Care of Milk for Cheese-Making.

BY JAMES W. ROHERISON, PROFESSOR OF DAIRYING AT THE ONT. AGRICULTURAL COLLEGE, GUELPH. (Continued from June.)

The milk should be strained *immediately* after milking. Some foulness may have fallen into it and the sooner it is removed the less likelihood is there of its being made soluble in the milk.

After the straining is attended to, the milk should be acrated. Too often it is poured into one large can and left there just as the cows have given it. That neglect implies three things that are very injurious to its quality for cheese-making. (1) The peculiar odor which the cow imparts to the milk will be left in it until it becomes fixed in the flavor. (2) The germs of fermentation that come in the milk and from the air have the best conditions for growth and action when the milk is left undisturbed. (3) Then the milk will become almost unfit for cosgulation by rennet. Hence it is needful and advantageous to aerate milk for three reasons:

1. By either pouring, stirrring or dipping, or by trickling it over an exposed surface of tin we try by evaporation to eliminate from the milk any objectionable volatile element that may be in it.

2. It has already been stated that milk contains germs of fermentation. Some of these we call vibriones. A strange peculiarity about these vibriones is that they become active only in the absence of free oxygen. When warm milk is left undisturbed, carbonic gas is generated, and that furnishes the best condition for the commencement of action by these microbes. After they get started they can keep up their decomposing work even in the presence of oxygen. It is impossible to coagulate such milk so as to yield a fine quality of keeping cheese. Coagulation by rennet can never be perfect unless the milk has been thoroughly aerated immediately after it is taken from the cow. Neglect of aeration will increase the average number of pounds of milk required for a pound of cheeze.

3. The airing seems to give vigor to the germs of fermentation that bring about an acid condition of the milk without producing the acid. So much is this so that it has been found impracticable to make strictly first-class cheese from milk that has not been aerated, or from milk that has not sufficient age before the operation of making is commenced. The subsequent cooling of milk retards the process

The subsequent cooling of milk retards the process by which it is turned sour. A certain kind of germ or fermentation exists in milk, which in the act of multiplying itself, splits one molecule of sugar-of-milk into four molecules of lactic acid. Thus by delaying that operation the milk is kept sweet longer. The *cooling* of the milk should never precede the aeration ; it should always follow it. A temperature of from 65<sup>5</sup> to 70° Fahr. will be found cold enough for the keeping of milk over night.

ing of milk over night. Moreover the milk requires special protection against any foulness in the air. Everyone has observed that if a pitcher of cold water stand in a warm room, drops of water from the air will immediately begin to condense upon the outside surface. The colder the pitcher and the warmer the air, the greater will be the condensation. In the same way the colder the milk becomes as compared with the temperature of the air

.