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THE JOURNAL OF AGRICULTURE AND HORTICULTURE

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THE

Journal of Agriculture and Horticulture

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The Farm.

NOTES BY THE WAY.

"Pease."—A great and commonly made mistake in this province is the practice of sowing pease by hand, broadcast, on the ploughed furrow and covering the seed in with a couple of strokes of the harrow. This is not the way to sow pease.

The proper way to sow all pulse, is to bury the seed from three to four inches deep, after having thoroughly broken up the furrow with the harrow and the grubber. This can be done in two ways. In the first, after the land is completely worked over, by working the implements along and across the furrow, drill in the seed, setting the coulters of the drill so as to deposit the seed at the desired depth. The quantity of seed required depends upon the size of the pea sown; from 2 1-4 to 2 1-2 bushels to the "arpent" will generally suffice. If there is anything certain in the farming practice of this continent, it is that too little seed is invariably used.

The second way of sowing pease, is to prepare the land as before, sow the seed broadcast, by hand or machine, and plough it in with a narrow furrow at the above mentioned depth. Pease need a good depth of earth over the seed, and nine-tenths of the preparation of the land should be completed before sowing.

In drilled pease, the finishing stroke of the harrows is all that is required to perfect the work. In ploughed-in pease, we

prefer leaving the furrow untouched until the young plant has just pushed through the surface, when a stroke or two of the light-harrows will charmingly pulverise the surface, and mould up the stem. Another harrowing, a week or so later, will do no harm, and may, perhaps, eradicate some of the annual weeds—charlock, etc., —that the fineness of the well worked mould has started into life. It would do no harm if all grain and pulse-crops were harrowed once or twice after "brairding." If any one doubts the utility of the practice, their doubts will be resolved on applying for information on the subject to the Sorel people: unless the good Sorelois have lost their memory of the happenings in the years 1884, '85, and '86.

"Spring."—As we write, April 3rd, there does not seem to be the least prospect of an early spring. We had almost said, "no possibility," but such marvellous accelerations of the seasons have occurred during the forty years we have been in the country, that we are rather shy of predicting changes.

At all events, the bells, gongs, etc., of church and station, are making a jolly row (6 a.m.); the wind chopped round to the East last evening; the glass fell .02 during the night: it must rain! And when it gives its mind to raining in Canada, it does rain, and even the persistent snow of this year of grace 1901 cannot stand it without liquefaction. One thing seems very hopeful: the clover plant has been so well "happed-up" all the time, that the prospects of a crop of that invaluable legume are very lively.

Try and "keep the leaf on the stem this year," dear friends, and the only way to do that is to mow early, let the hay make itself as much as possible, only aiding it by a couple of gentle turns, and get it into cock as soon as possible.

In England, where pease are invariably drilled, the seed is often put in with 24 inches between the rows. Just before the plants "shake hands" across the rows, the horse-hoeing, which has been kept up from the time the pease began to show themselves above ground, is stopped, and turnip, or, preferably, rape-seed, is drilled in with a hand-drill between the rows. The rape makes capital feeding for the sheep, after the pease are harvested.

The following extract from the "English Agricultural Gazette" is worth attending to. It will be observed that the Shorthorns—what the Americans call "dual purpose cows"—are not so far from being the best farmers' cattle as some of the agricultural papers would have us believe. Sixty-seven pounds of milk, from which 4 lbs. 2 ½ oz. of butter were made is not bad, and then when dead there is the carcase for sale!

THE TRING (ENG.) SHOW

The excellent one day's show which is held by permission of Lord Rothschild at Tring Park, and which is usually one of the best and most instructive agricultural exhibitions of the year, was on Thursday greatly injured by the deluge of rain. But for this untoward circumstance the show would have been one of the finest of the series, as the entries were large and the quality very superior.

Shire horses took first place in the catalogue, and with entries from H. R. H. the Prince of Wales, Sir J. B. Maple (who took firsts and challenge cups with Grand Duchess and Stanney Commotion), Mr. J. Parnell, Sir Walter Gilbey, Mr. A. P. McMullen, Mr. Flowers, and many others, it is needless to say they formed a splendid collection. The local heavy horse classes were also numerically very strong, and the quality was distinctly good. Hunters were a nice collection, and the hacks and hackneys comprised some very good specimens.

The Shorthorn and cross classes came first in the cattle section, and the quality was very fair. Red Polls and Aberdeen-Angus were excellent. The Jersey section formed the strength of the cattle department, making one of the best displays of

the breed seen this year, most of the noted animals of the season being present. The champion prize went to Mr. Armitage for Melvina, Mrs. McIntosh being reserve with Pearl 4th.

The folowing are the results of the butter test and milking trials :—

BUTTER TEST.

Cows not exceeding 900 lb. live weight, 32 entries.

	Days in milk	Milk yield	Butter yield lb. oz.	Butter ratio	Pints
1st prize, £20, to Col. McCalmonts's Freedom (Jersey)	111	34·14	2 10¼	13·20	49·35
2nd prize, £15, to Dr. Watney's Sharab (Jersey)	177	31·8	2 0¼	15·62	44·25
3rd prize, £10, to Viscount Enfield's Gloaming 4th (Jersey)	94	38·10	2 5½	16.48	42·90
4th prize, £5, to Mrs. McIntosh's Fairy (Jersey)	108	51·11	2 3¼	23.46	42·05

Cows exceeding 900 lb. live weight, 34 entries.

1st prize, £20, to Mr. E Dawes's Cherry (Shorthorn)	41	67 10	4 4½	15·79	68 60
2nd prize, £15, to Dr. Watney's Lady of the Sunny Isles (Jersey)	124	46·12	2 6¾	19.30	47.15
3rd prize, £10, to Viscount Enfield's Musk (Jersey)	194	29·12	2 0¾	14·53	44·75
4th prize, £5, to Mr. C. Bird ey's Florence (Shorthorn)	33	41·14	2 12	16.31	44.00

English Jersey Cattle Society's Prizes for the Three Best Jerseys in the Test.

Gold medal or £10 to Col. McCalmont's Freedom.
Silver medal and £5 to Dr. Watney's Lady of the Sunny Isles.
Bronze medal and £3 to Viscount Enfield's Musk.

MILKING TRIALS.

Cows not Exceeding 900 lb. Live Weight, 32 Entries.

	Days in milk.	Milk yield.
First prize £20 to Mrs. McIntosh's Fairy (Jersey)	108	51·11
Second prize, £15, to the Duke of Marlborough's Water Lily (Jersey)	125	47.6
Third prize, £10, to Lord Braybrooke's Dewberry (Jersey)	114	43.8
Fourth prize, £5, to Hon. Mr. Murray Smith's Lorna (Jeysey)	183	35·12
First prize, £20, to Mr. E. Dawes' Cherry (Shorthorn)	41	67·10
Second prize, £15, to Mr. A. Bones's Milkmaid (Shorthorn)	17	62·4
Third prize, £10, to Mr. Ellingworth's Daisy (Shorthorn)	67	58.0
Fourth prize, £5, to Mr. J. Evans' Judy (Shorthorn).	76	46·14

Some capital pens of Hampshires, Shropshires, and crosses were exhibited, and the Pig section filled very creditably, Mr. Horwood, Mr. Fowler, and Sir H. de Trafford taking the leading prizes.

"Calves."—Pray do not let your calf see the dam after it is born. Take it away as soon as dropped; put it by itself in a warm loose-box; cover it over with soft straw, and do not rub it, as that, gluing the hairs together, makes the drying take longer. The following extract contains some useful hints, but the flax-seed mentioned should be crushed.

"If milk must be altogether dispensed with, there are several good calf meals and milk substitutes on the market, which are excellent in their way. Where these are called into requisition care should be taken to start with and keep to whichever one is selected. Changing from one to another by way of experiment or for other reasons will only tend to bring on scour and similar troubles, which will have anything but a good effect upon the calf. Where it is intended to continue feeding on milk, the gradual substitution of separated milk for new milk should be effected by the introduction of a pint or so of the former at each meal. Use conjointly with the separated milk a little boiled linseed. This is a favourite with almost all rearers, and its addition to the separated milk goes in part to compensate for the fat which has been removed from it in the process of separation; besides counteracting any tendency to "binding" or constipation, which the use of skimmed milk is in many cases liable to induce. Some rearers use linseed meal instead of the whole seed, and report that it answers equally well, but the whole seed is most in favour. The feeding should take place at a regular hour and at least twice daily. Where it is preferred to feed three times, the midday meal is a small one. The food should be given at the temperature of new milk, or about 90 deg. Fahr. Cold or sour food is a frequent cause of scour; ,these points should, therefore, be guarded against. As one calf will frequently take a larger quantity of food than another, no fixed rule can be laid down as to the exact amount to give. A trifling exercise of judgment will easily determine the quantity required. While surfeit and overfeeding must be guarded against, the necessity to increase the amount will be obvious when each drop is eagerly licked up and more is looked for. At a month old feed a handful of crushed

oats or a little meal and pulped roots, with a little sweet hay to pick at, instead of the milk at mid.day, if this has been given. If not, introduce it as a mid-day meal. Pulped carrots are excellent for young calves, but if these are not at hand, use a few parsnips or swedes. Feed only a small quantity, as a rearing calf must be fed for growth without too much flesh. As spring advances and there is plenty of young grass, they will do well on this with a little cake and meal or corn. Calves should get a little cake or corn daily right through the first year, for this period is of vital importance to them, and either makes or mars them. If allowed to become poor and stunted in growth, it is useless to expect to develop into good and profitable cows.

F. WILSON.

Weston under-Redcastle, near Shrewsbury.

GROWING RAPE.

To the Editor of the "Journal of Agriculture."

Dear Sir,—In your issue of the 15th ult. from Kirkdale, Que., is an enqu,ry by Mr. Herbert Pye about sowing rape. It struck me at once as peculiar, I hardly think there has been rape grown to any extent in the Province of Quebec. In Ontario, it is quite a common crop, and grown quite extensively, to feed sheep and lambs, usually about 12 to 15 acres for say 100 lambs, this if the seed has taken well ought to feed the sheep or lambs from say 1st August until snow flies. I would say to Mr. Pye, that after he has finished all his other seeding, he can prepare his ground for the rape. Unless his field has been run out he would not need to manure it, as the sheep and lambs will manure it for him this season in such a manner that he can grow most any crop the following year.

Try, if possible, and sow the rape not later than 1st July; the first 15 days of June would be better as sometimes early in July there are great droughts. If the soil is inclined to be damp, you need not wait for a shower, but otherwise try and sow your seed before rain. Do not cover very deep. Sowing broadcast, although it takes more seed than in drills, is less trouble usually than any other way. Do not let the lambs on the rape until it is say 3 feet high, and then you will have to be very careful not to let them in too long at first, only a few hours each day for the first week or so.

Later on, by paying attention, after the lambs have been surely weaned, the mothers could be allowed in too by degrees, always bearing in mind that they may hurt themselves by eating too much at first, especially if they have been on a bare pasture. I feel satisfied Mr. Pye can get a good price for his field of rape, his lambs if he bought them, ought to be worth by the end of two months at least a half more than when he put them in, and some years I have known some feeders to just double their money on the lambs. Besides, he has put his field in first class shape for future crops.

In many sections of this Province, very few sheep are kept, owing to not having a separate lot for them, as they do not do well in the same pasture as the milch cows, or rather I should say the cows do not do well with the sheep. Sheep pasture usually is kept very short, and short pastures are not usually very good for cows. A few sheep, if properly cared for, generally return a good interest on the investment. If Mr. Pye sees that his sheep and lambs do not crop the rape down, it will pay him well to invest in a few more, and on the other hand, should the season not be favorable do not by any means allow your lambs to starve, feed them liberally.

The old motto will apply in this case, "if a thing is worth doing, do it well."

I should like Mr. Pye's experience if he should think favorably to try the experiment some time next winter, he could give it. My own opinion is that he will be well satisfied with the results.

If Mr. Pye could not by any means pro-

cure more lambs if they were required, he could turn on steers or dry cattle, to help the lambs if they needed it. I should not advise him to put on the milch cows as the rape would flavor the milk somewhat. I do hope he will give it a fair trial. I shall await the results with great pleasure.

Yours truly,

PETER MACFARLANE.

April 1st, 1901.

Note.—We have written and borrowed so much about rape, that we need only add to Mr. Macfarlane's essay that no one, to my knowledge, who once grew rape, and fed it off with sheep, ever gave it up. Ed.

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

RECIPES.

Aunt Betty's Gingerbread (1776).—Two pounds flour, 1 lb. sugar, 1-2 lb. butter, 1 teaspoon soda; put together with 1-2 pint water, the sugar melted and strained on to the butter. Cool. Bake on tins.

Arrowroot Pudding.—Take 2 teaspoons arrowroot, 1 cup cold milk, 1 teaspoon powdered sugar, yolks of 2 eggs. Mix the arrowroot smooth, add well-beaten eggs and sugar. Bake in an earthen pudding dish or bowl set in a dish of hot water 15 or 20 minutes.

AlmondCake.—Take 3-4 cup of butter, 1 cup sugar, 1-2 cup sweet milk, whites of 3 eggs and the yolks beaten separately, 2 cups flour, 2 level teaspoons baking powder, 1 lb. almonds, blanched and sliced, stirred in last. Save a few whole almonds to put on top of the icing.

Lemon Tarts.—Make shells of rich pastry and for filling take 1 coffee cup sugar, 4 oz. butter, 4 eggs, grated peel of 2 lemons and the juice of one lemon. Put on the stove and stir till it boils; when cold fill the tarts. This will make 16 or 18 tarts.

Creamed Chicken.—To 3 cups of the chicken, cut up into small pieces, take 1 pint thin cream; season with little pepper and salt. Thicken the cream with a heaping tablespoon of flour, wet up with a little cold milk. When hot put in the chicken and serve on slices of toast. Oysters are very nice prepared in the same way.

Apple Sauce.—One cup sugar, 1 cup boiling water and put into the saucepan. Pare, core and quarter the apples, drop into the liquid and let cook till tender. Remove from fire and let stand till cool, then turn out and the apple will be whole.

Caramel Cake.—Two eggs, 1 cup sugar, 1-2 cup butter, 2 cups flour, 2 teaspoons baking powder, 2 squares chocolate. Melt the chocolate and put in the last thing. When baked, spread with icing.

Red Bean Soup.—One large cup beans, soak over night; in the morning pour off the water and add 2 onions, 3 quarts water and cook slowly for 4 hours; then strain and add 1 teaspoon salt, 1 teaspoon cloves, 1-2 teaspoon black pepper, pinch red pepper, 1 tablespoon flour dissolved in a little water, 2 tablespoons butter and serve with slices of lemon.

Loaf Cake.—Three pounds of flour, 1 1-2 lbs. sugar, 1 1-2 lbs. butter; make the flour with sweet milk into a dough and let rise. Then add butter and sugar, raisins as you like and flavor with cinnamon. Raise and bake 1 hour.

Walnut Macaroons.—One cup walnut meats chopped, white of 1 egg (not beaten), 1-2 cup pulverized sugar, little vanilla and little salt. Drop on buttered pans and brown in oven.

Potato Puffs.—Two cups mashed potato, 2 tablespoons melted butter, little salt and beat to a light cream. Beat up 2 eggs, 6 tablespoons cream; add and beat all together. Pile in irregular forms on a dish and bake in quick oven till brown.

"Farm and Home."

MAKE YOUR OWN SOAP.

The old-fashioned leach and caldron kettle in which our mothers made their family soap are largely now things of the past. In the spring of the year soap-mak-

ing was considered just as necessary as house-cleaning. Strong lye was obtained by water draining through hard-wood ashes, pounded compactly into a leach. It required a number of days to obtain sufficient lye to make a barrel of soft soap. As fast as the lye filtered through the leach, which was generally a slow process, it was emptied into the caldron kettle, and when several pailfuls were obtained, all the refuse grease of the household was added, and a fire started beneath the kettle, and the mass boiled until the grease was consumed by the action of the lye, after which the right quantity of lye was added to make it of the right consistency for family use.

Soap-making involved much hard labor, as well as some experience, as the whole process was purely one of luck and chance; but if one happened to combine the correct quantities of fat and lye, the process was less tedious. This made a good soap for many household purposes, and for laundering coarse fabrics it was considered indispensable. The majority of families at the present day buy their soap in bars or by the box, or else manufacture it for family use, which latter is by far the most economical and desirable way, as one then knows just what materials enter into the compound. As inexpensive and cleanly soap, good for all household purposes, can be made from Babbitt's potash, put up in one-pound cans. Any clean fats can be used, such as drippings (if first melted and strained), or lard or tallow, which is generally free from impurities. The purer the fat the whiter the soap, as a matter of course.

To make hard soap, empty the contents of a pound can of Babbitt's potash into a kettle containing one quart of cold water, which will make it boil. Stir it with a stick until dissolved and it becomes cool. Now melt six pounds of clean fat until just lukewarm, and then begin to stir the lye slowly into the grease until well incorporated. The stirring should continue about ten minutes. It is then ready to turn into molds. It will be fit for use in the course of a week, but like all other soaps it improves with age.

We know of no soap or compound that facilitates laundry work more easily or speedily than this. We fill the wash-boiler (on washing day) half full of soft water; to this we add perhaps three square inches of this soap, sliced and dissolved in boiling water, after which we add the least soiled fabrics and boil half an hour; then rub them slightly through a sudsing water and rinse through two waters, the last slightly blued. We now add more cold water to the boiler, and if necessary more soap, and proceed with the second batch as with the first.

THE TREATMENT OF FELONS.

Felons occur most frequently on the last joint of the fingers or thumb of the right hand, says a doctor writing for the "Youth's Companion." They are localized acute inflammations, resulting from the presence beneath the skin of certain poisonous organisms which have gained admission through a wound. This wound is very likely a scratch or a prick so slight and insignificant that abscess. Immediate relief from all suffering follows the emptying of the abscess, and the wound quickly heals if care is taken to keep it absolutely clean.

The Garden and Orchard.

(Conducted by Mr Geo Moore).

THE POTATO.

(Continued).

Diseases of the potato.

The long courses of unnatural methods of propagation have doubtless contributed in no small degree, to the development of disease in the potato. In most countries where it came into use as a general field crop, it soon began to show tendencies to disease, and from about the beginning of

the last century these tendencies developed with increasing power and rapidity, until in 1831 a crisis came, and a still greater one in 1845, when, with the then limited knowledge of bacteria, it became a puzzle to men of science and a terror to cultivators. Previous to the advent of the greatly destructive disease of 1845, four or five other forms of disease of the potato had been noticed; the dry rot, in which the tubers decayed before they had come to their full growth; the curl, which affected the leaf and thus prevented the healthy development of the tuber; a third disease which was a combination of the two former, and a fourth called "taint," which was a malignant form of the dry rot.

Fig. 1

Healthy potato leaf.

Scab is another disease, evidently caused by the action of a fungus; it affects only the skin of the tuber and renders it unsightly, but does not injure it as regards flavour and quality.

From 1831 to 1837 these diseases proved fatal to the crops in the best soils, and excited universal alarm amongst growers. The taint abated its force in 1838, but was, more or less, extensively known during the next seven years when in 1845, Fig. 3 and 4, it was eclipsed by a disease of far greater general violence and destructiveness which seemed to burst into existence with tremendous energy, and, what was curious it appeared at about the same time, wherever the potato was cultivated; sweeping away whole fields, and desolating whole districts. In Ireland, in consequence of its adaptability to small holdings, the potato had bectome a staple article of food amongst the peasantry, and the sudden destruction of the crop entailed a famine upon that country, causing an immense amount of suffering and costing the British Government an enormous amount of money to keep the Irish people from actual starvation. In 1846, it looked as if the potato would be entirely exterminated, and few cultivators were bold enough to risk planting them. The alarm which this disease created in the public mind of those days is curious to look back

Fig. 2

Under surface of diseased potato leaf; black blotches where the disease commences.

upon. Scientific men were bewildered, and all sorts of strange theories as to its cause were advanced ; there was a general ferment among agriculturists, corn-merchants, rulers and economists, and numerous substitutes for the potato were suggested among which was the parsnip, in consequence of which there was a run on par-

Fig. 3

A good potato.

snip seed ; it went up to ten times its previous value, and even then the supply was not equal to the demand. Another remarkable fact was, that the threatened annihilation of a root which had been only popular for a comparatively short time, should have caused so much consternation.

It is curious also to note, with the light we now have, the strange ideas that people entertained as to the cause of this disease, and its rapid spread, some attributing it to degeneracy caused by over cultivation, which was evidently a false theory in some respects, because the most vigorous crops were suddenly attacked ; bad and careless cultivation was blamed, but crops under good culture suffered as much as others ; then the introduction of foreign manure, and lastly, a peculiar electrical condition of the atmosphere were said to be the cause. But at length, the microscope revealed the fact that the disease was due to the presence of a minute fungus or mushroom growth, which for some un-

Fig. 4.

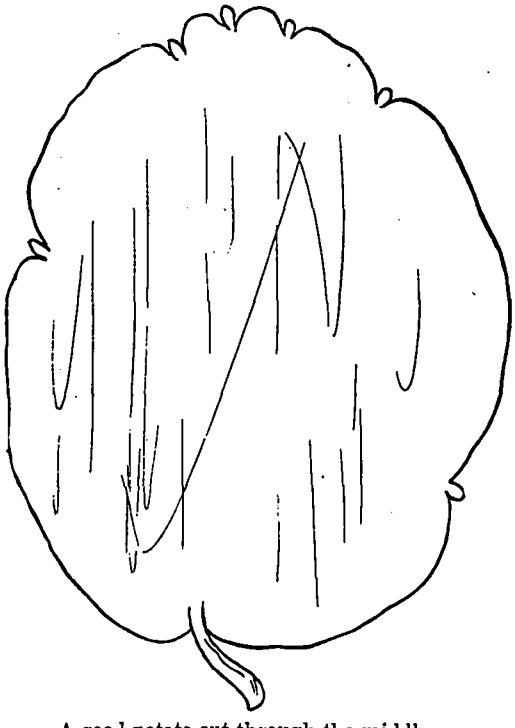
A diseased potato.

accountable reason had not appeared before, but which is a natural parasite of the potato, just as some fungi of a larger growth prey upon, and gradually destroy large trees.

One savant of that time came nearer the truth than his compeers by stating that his opinion was, that the peculiar state and action of the atmosphere favoured the propagation and distribution of the myriads of spores of minute fungi which enter into the pores or stomata which are found on the surface of the leaves of all plants. The real cause of the wholesale, devastating potato disease, which, notwithstanding all the precautions of cultivators has not even yet been overcome, is a fungus.

Fig. 7, the germs of which are egg shaped, and so small that 800 laid in a line, measure only one inch : they are so light that they float about in the air, unperceived, and so numerous are they, and so rapid in their growth that infection is almost miraculous. They settle upon whatever they touch, but germinate only when they strike their natural prey, the potato. This fungus, as before stated, is a " parasite." Parasites are either animal or vegetable ;

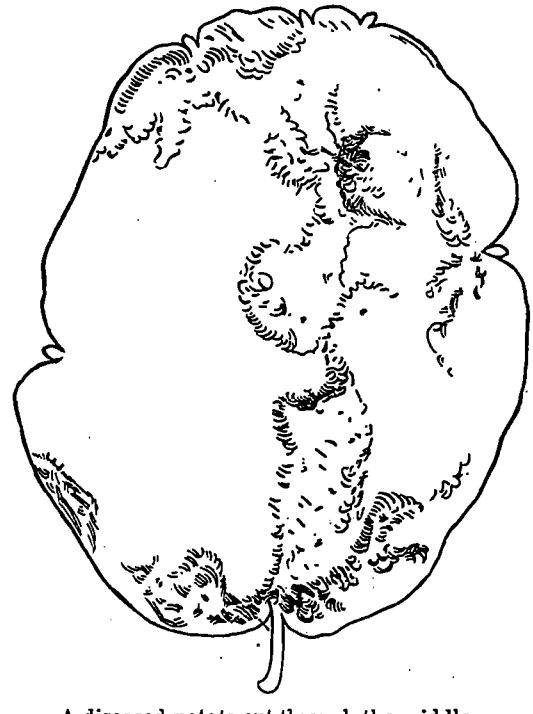
Fig. 5



A good potato cut through the middle.

the animal comprise a number of insects, worms, and multitude of minute and less perfectly organized orders which we call microbes on account of their minuteness ; it is said that they surpass in number all other animals and are productive of all sorts of diseases and discomforts. But the parasites which prey upon vegetables are, many of them, also plants which live upon, or within, other plants, somewhat in the same way as these plants live upon the soil, but with the difference of robbing them of the juices which they had absorbed and elaborated for their own sustenance. Parasites belonging to the cryptogamus fungi, not only live upon the exterior, but nestle and develope in the interior tissues of the plant, and may be likened to those animal parasites which have been found in the intestines, the liver, the kidneys, and even the brain of animals. The methods in which their spores enter the plant on which they feed are different in different species, but they are mostly imbibed by the leaves, Fig. 8, or

Fig. 6.

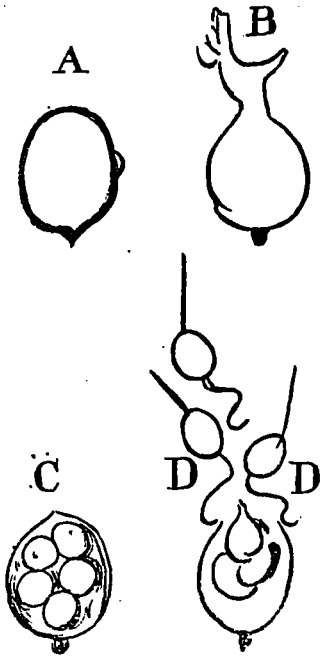


A diseased potato cut through the middle.

absorbed by the fine spongioles of the roots, their development is the most rapid in dark, warm, moist weather. After considerable observation and research, the particular parasitic fungus which attacked the potato has been found to be " Phytophtora infestans " a plant belonging to the mushroom family ; the reason why it cannot continue to live, even although it might sprout, is because it is peculiar to the potato, for as some plants grow only in water, others in marshes, and others in dry land, so parasites grow on particular plants: one live son clover, and another on wheat, and the one causing this form of

the potato disease, on the potato. The germ, once settled on the leaf, waits for the necessary supply of warmth and moisture, and then sends out very fine roots

Fig. 7

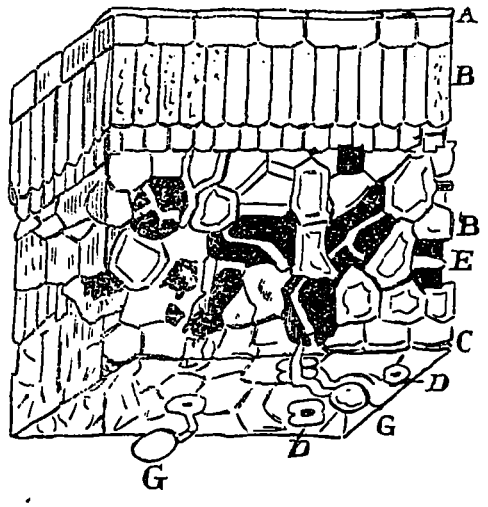


GERMS.

A, Ripe germ.
B, Germ beginning to sprout.
C, Contents of germ formed into spores.
D, Spores escaping.
Magnified 400 times.

which find their way into the interior of the leaf, as above stated. As soon as the root has entered the leaf, it finds there plenty of food, and rapidly grows and spreads in every direction. (Fig. 5 and 6) It attacks the underside of the leaf, blackens the part attached, and makes it look as if it had been frost bitten. (Fig. 1 and 2) The disease may be known by the dark blotches which first appear at the tips of the leaves, (Fig. 2) having a white border next to the yet healthy leaf. If this white edge or border were examined with a microscope of sufficient power, it would be found to consist of very fine threads bearing the egg shaped germs, before alluded to; these germs or mould on the outside of the leaf are scattering in the air, (Fig. 9) while the roots are pushing their way all through the potato plant, passing down the stem into the tuber. It now consumes the starch, breaks up the substance of the potato, and causes decay.

Fig. 8



Square piece cut out of a potato leaf, magnified 200 times, showing two germs which have sprouted and pushed their roots into the leaf through two of the breathing pores of the leaf.
A, Skin of the upper surface of the leaf. B, the green cells of the interior of the leaf. C, skin of the under surface of the leaf. D, breathing pores on the under surface of the leaf. E, roots of the fungus. G G, germs sprouting.

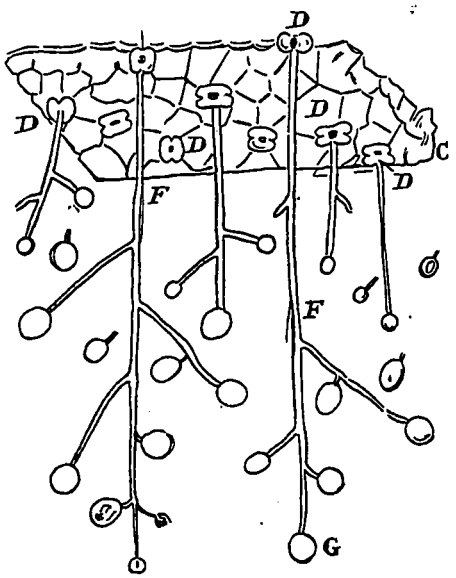
The thick skin of the tuber prevents the fungus from sending out its germ-bearing mould, but as the growth of the plant does not depend upon access of air, it is vigorous within the potato, until it has used up all the food it contained, and changed it into a mass of corrupt pulp. (Fig. 10 and 11)

Another way the disease is propagated is by planting tubers which are partially diseased; in that case the contagion spreads throughout the plant of the succeeding crop and destroys it in the same manner as if it had been communicated through the leaves.

This destructive potato disease, although not yet overcome, has been very much modified in its frequency and devastating effects by various means; one, is by raising new varieties, some of which, especially the "Early Rose," and all its family, have proved less liable to contagion;

being very particular, never to use diseased potatoes for seed, nor to leave any on the ground or put them, or the tops, into

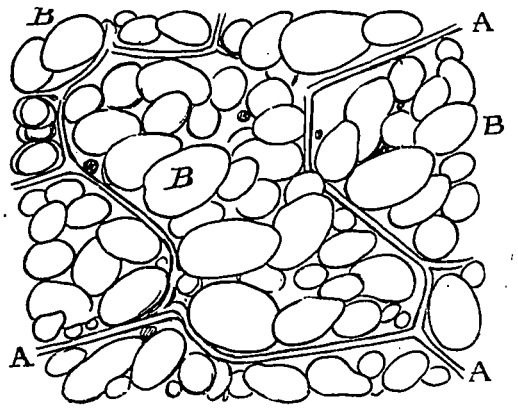
Fig. 9



Square piece of lower surface of potato leaf, showing the mould or germ having branches (F) growing through the breathing pores. Magnified 200 times. C, skin of the under surface of the leaf. D, breathing pores. G, germs.

the manure heap, but to destroy them by burying them deeply or by burning; to use those kinds which are the most disease-proof; to cultivate carefully in rows,

Fig. 10

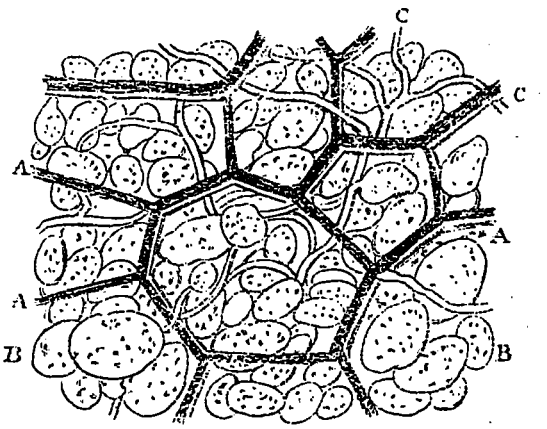


Minute piece of a healthy potato with its starch, magnified 200 times. A, the cell wall. B, the grains of the starch contained within the cell walls.

wide apart, so that light and air can get freely among the plants.

When the disease first made its appearance in England, it was noticed that a field exposed to the fumes of a copper smelting furnace was entirely free from it, and it has since been found that a weak solution of copper-sulfate, blue stone, or

Fig 11



Small piece of deceased potato with the roots of the fungus feeding on the starch, magnified 200 times. (A), the cell wall (B), the starch blackened and injured by (C), the roots of the fungus.

blue vitriol, modified with quick lime called "Bordeaux mixture," if applied in time, will kill the germs of the fungus and effectually arrest the spread of the disease, by keeping the foliage free from its ravages.

GEO. MOORE.

PRINCIPLES ON WHICH HORTICULTURE IS FOUNDED.

Man has appropriated to his own use certain plants and fruits, and Horticulture is the art of increasing their product and improving their qualities by cultivation.

Gardening, or Horticulture (a word derived from the Latin, hortus a garden and colo, I till), is a branch of Agriculture at once important and interesting; it depends in the first place, on the bountiful provisions of nature, with which the Creator has supplied vegetable substances for the sustenance of animal life.

The constitution of the different kinds of plants indicates the uses for which they are intended; their variety is pleasing, and calculated to contribute to health and

comfort, and their beauty, flavour, and perfume are continual sources of enjoyment.

But there is a merciful provision in the ordering of mundane affairs, that to obtain the most good resulting from natural productions, mental and physical exertion is necessary, and the latent powers and faculties of mankind are aroused and stimulated by this necessity. The herbs, fruit trees and flowers which form the delight and profit of the horticulturist are scattered, but sparingly, over many regions of the earth ; they exist in just sufficient quantities to attract the attention of man, and to preserve their species until he shall have discovered and appropriated them, but usually they do not grow in such abundance or quality as to form important articles of food, until they come under the skill of the cultivator.

Of course, these remarks apply only to the esculent vegetables, fruits, flowers, and ornamental trees and shrubs, and not to the plants which are adapted to the wants of the lower animals, such as the grasses with which the pastures and meadows are covered ; although these may be improved by cultivation ; nor to the trees of the forest, the uses of which are so varied and extensive for both man and beast. The brute creation, when in a wild state, are provided for, because they are deficient in the intellectual powers of man, nevertheless he has the advantage in being compelled to adopt, and cultivate the food necessary to his existence, for by this means his mental and bodily endowments are exercised, cultivated, and unfolded. These advantages are further enhanced by the power of culture to improve the natural products of the soil when subject to its influence. The flowers, the fruits, and the eatable vegetables which come under the care of the skilful horticulturist, gain new and important qualities, or at least, the properties they already possess, acquire additional value. Of one class, the symetry, colour, or perfume are improved, of another its increased fruitfulness, size or flavour ; so that plants, which in their natural state may almost be considered worthless weeds, are converted, by judicious culture and management, into useful garden vegetables, delicious fruits, or beautiful flowers.

Such are the principles impressed by the vegetable world, which gave origin in the gardeners skill and raised his profession to the dignity of a science.

We have so far alluded only to the ethical principles upon which the science is founded, we will now examine them from a practical standpoint. These principles are borrowed from other sciences, such as, botany, chemistry, geology, meteorology, to botany he is indebted for the knowledge of the physical structure and uses of the different organs of plants ; to chemistry, to the nature of manures, natural and artificial ; to geology, for his knowledge of soils, and to meteorology, changes of climate.

In ancient times, gardeners were not supposed to be acquainted with any of these, and based their practice upon observation, legend, or the experience of others, hence their work was of a superficial nature, but now horticulture rests on a scientific basis and has progressed during the last century as rapidly and satisfactorily as any other science, so that the improved fruit, flowers, and vegetables would astonish our forefathers, as would the superior manner in which they are cultivated.

The art of the gardener has increased in importance with the wonderful advance of society, and the progress of commerce throughout the world ; easy communication, rapid and safe traveling, have been great helps to horticulture ; there is now a continual interchange of products between different countries, with corresponding advantages to each, as the field has widened a new class of men have sprung up, who are both scientific and practical gardeners, and have elevated horticulture into its proper place among the industrial arts. In the cities, where the population has become dense and the demand for luxuries and conveniences has become more eager, this improvement in horticulture is

of great importance ; by it the families of the opulent are well supplied with luxuries, and those of the poorer classes with wholesale products of the soil. The industrious, conscientious, well educated gardener who prosecutes his avocation with zeal and intelligence, not only for the profit he can make, but for the love of it, occupies an enviable position in society.

The Dairy.

ONE WAY TO DEVELOP A DAIRY COW.

(Paper by Mrs. Ada F. Howie, at the Wisconsin Dairymen's Convention).

If it were necessary for me to apologize for a woman speaking on the subject, "One Way to Develop a Dairy Cow," I should without hesitation point to the renown already won by women in this field of labor.

Women of all ranks and conditions in life, from the hapless Queen, Marie Antonette, who found relief from the nerve-taxing etiquette and political intrigues of a corrupt French court, in the simple task and peaceful atmosphere of her beloved dairy, to the peasant of lowly birth and humble aspirations who willingly permits herself to be yoked to the family cow and patiently trudges along the furrow beside this dual-purpose beast, while her husband contentedly holds the handles of a primitive plow, and all along the line for centuries, in a meagre history of one of the greatest and most ennobling occupations, may be traced the indelible imprint of women's work and influences.

In the year 1734, one Philip Falle, was so impressed by the beauty and meritorious qualities of a breed of cattle found on a small island in the English Channel, near the coast of France, that he considered them worthy of especial comment, and we are told by this able historian that "centuries of gentle care under the management of women" had wrought this marvel of excellence.

A little later, this same writer mentions, in a calm, matter of fact way, without even a suggestion of a desire to wink or smile at the maudlin sentiment of these simple minded managers, that "at the time of calving the cows are regaled with toast and cider to which has been added a little powdered ginger."

Surely this is but a brief description of the care accorded these little bovine mothers, and yet one may read between the lines, and the entire secret of a remarkable record of successful breeding stands out strong and clear, unaffected by time or change ; and by this sign we of a later day may infer that the women of this now famous isle instead of placing their affections upon an unremunerative parrot or poodle, being of a more practical term of mind, had expended their best energies in the development of the finest breed of dairy cattle in the world.

In their devotion to this cause they had given more than gold and silver and precious jewels ; they had poured out upon the altar of advancement the wealth of loving hearts and kindly natures.

They guarded their cattle with the tender impulse of a true friendship.

Some of a more stern and less refined organization may have laughed loud and heartily at the mere suggestion of offering a cow toast and spiced cider, and yet the alert, shrewd dairyman of this day might quickly recognize a practical value in this unusual diet, for who can deny that spiced cider at such a time might not stimulate the enfeebled action of the stomach and thereby tend to ward off that to-be- feared monster, milk fever.

At any rate, whether or not this mode of treatment meets the approval of persons versed in cattle ailments, one can but admire and respect the sympathetic qualities that would prompt an owner to provide her pet with what, no doubt, was the rarest delicacyof her own liking.

More than a century has passed away since that dim insight into the methods

employed in the development of the renowned breed was noted in a world's history and blazed upon sturdy trees bordering the faint trail that has steadily led onward to a type of almost perfection.

And yet the words carved by these womanly hands may still be read clearly defined beneath the prominent ridges of a many years' growth of the bark of progress.

We look back with a feeling of awe, not unmingled with envy, at the wondrous skill of breeders long since passed away, and yet it is simply the " old, old story," handed down with accumulated experience from generation to generation, ano all successful dairymen and women of the present time may trace their prosperity to certain gentle methods that are in part but a repetition of the means employed in bygone centuries.

In order to attain eminence in any calling, one must not only apply the lessons ,earned from others but strive to profit by observation and personal experience, as well. With this borne in mind and a love, either natural or acquired, combined with the earnest desire to excel in his chosen vocation, no dairyman or breeder need write in connection with his name the word failure, and the limit of his success may be bounded only by the extent of his energy and amount of intelligence brought to bear upon the management of his stock.

The first step to be taken to the improvement of any breed should be to

In order to do this, one in the least familiar with the rudiments of a breeder's knowledge has but to run a finger down the index of a bygone period until he comes to the magical words, " centuries of gentle care," containing a manifold meaning—for wisdom, steadfast purpose, pride and affection are all blended and condensed into those four expressive words—and then fall into line to do his share of a life's span of improvement.

The dairy papers have chanted that refrain " gentle care—gentle care " week after week and year aftet year, and yet, from a number of cases I could cite, it will still bear a constant repetition, for it is the key note to the entire harmony of dairying.

A man may be endowed with skill, intelligence and perseverance, — yes, and there may yet be added that most convenient commodity, wealth,—still, if in management of his stock the all important requisite—gentle care—be lacking, his efforts can but result in disaster of a more or less serious nature.

Some of the many abandoned farms of the east and the hand to mouth existence of numerous western farmers might doubtless be quoted as an eloquent sequel of a total disregard of this oft repeated admonition.

Domestic animals are affected by surrounding in the same proportion as humans.

No matter how well born a person may be, if compelled from birth to occupy filthy quarters, with no opportunity or incentive for moral or intellectual improvement, subjected to indifferent care,— we will not touch on the extreme by saying rough and ofttimes cruel treatment,— no one in the course of a few years would be able to note even a semblance of aristocratic lineage ; while, on the other hand, should a child be taken from the hovel of commonplace parents and put under refined and loving conditions, it will not be unreasonable to expect an evolution out of all keeping with the slow strides of the natural progress of civilization.

Therefore, when one has sworn allegiance to the goddess agriculture, it is his duty to protect the animals under his care whether a calf be scrub or pure-bred ; to at least make an honest effort to conscientiously develop every good quality that animal may possess.

Clean, dry and comfortable quarters should be provided for the dependent creature that in a short time will doubtless return ample recompense for all care and labor expended in her behalf. A few months of careful feeding and judicious

exercise will begin to shape the little frame and from then on the practiced eye of an experienced breeder will enable him to form conclusions, as the outlines quickly develop into a more or less perfect type of his ideal standard.

And right here I would caution one whose chosen motto reads, "Handsome is that handsome does," and who cares little for symmetrical beauty, not to lay too much stress on the set rules that govern the decisions of a show ring, for while one may judge of the shape and size of a country from a well drawn map, the mere outlines will offer no explanation as to the character of the climate or soil, and as the disposition and temperament of a dairy cow have quite as much to do with her ability to produce milk and cream as thin withers, dished face, small incurving horns and fashion-markings, it would be well to make a careful study of these important characteristics.

Experience has led me to believe that early breeding does not affect the growth of an animal and while one should use his best efforts to obtain symmetrical forms, a far more weighty consideration than size or shape is the developing of the creaming and milking qualities of a dairy cow.

In order to do this to the best advantage too great care cannot be exercised in the selection of food, for it would be unwise to impair her digestion by over-feeding or to allow her to live upon her vital forces through parsimony or heed-lessness to provide sufficient nourishment.

I have known herdsmen who believed that food,—quantities of food,—was the all-essential stimulant to production. I am as firmly convinced, however, that regularity in feeding and watering, together with a daily grooming, may be considered quite as desirable factors in profitable dairying as a carefully balanced ration. A too liberal allowance of grain I believe to be harmful in the extreme.

While looking over my cattle, a noted breeder once remarked: "I have heard it was a good idea to mix your ration with one-third enthusiasm." I heartily agreed with him and, moreover, experience has enabled me to say that by adding a large pinch of love, a generous measure of common sense (the common sense in our case was taken from the overflowing bins of our State University), and an unlimited vocabulary of sentimental terms of endearment, one may even scrimp a trifle on the more substantial elements of a ration and still be able to make a most creditable showing; for it is truly wonderful how the honest, unsuspecting little tows by a few sweet wordt and affectionate pats may be fairly wheedled into contributing a generous sum to swell their owner's bank account.

To obtain the best results, the every day life of a cow should be reduced to a system bordering on utter monotony; she should go in and out at the same door, invariably occupy the same stall, should be fed, watered and milked at regular intervals. In short, her entire existence should be as placid and uneventful as possible, for anything tending to disturb her sufficiently to cause an interruption of the peaceful occupation of cud-chewing will, to a greater or less degree, affect both the quality and quantity of her product.

There is one most essential point in building up a useful as well as an attractive herd of dairy cows that is too often overlooked even by some of the most prominent breeders of fancy stock, and that is the shaping of the udder. There is an old saying: "No foot, no horse," and dairy lore would as appropriately adopt one that would read: "No udder, no cow," for where there may be rare exceptions to a case in point of usefulness, a cow with a defective or ill-proportioned udder, for a number of reasons, should not be tolerated in a herd owned by one whose worthy ambition is for the improvement of the breed in which he is interested.

As the milker or herdsman has it largely within his power to either mar or mould this important feature of a dairy animal, there is little doubt that if taken at the

proper time, by the exercise of care and judgment, many an unsightly udder might be coaxed into a semblance closely approaching the highest standard.

In case of the unevenly shaped udder of a heifer, it would be well to first draw the milk from the quarters best developed, for the reason that would throw all the weight of the undrawn milk into the smaller quarters, thus helping to distend the inferior parts. A still further advantage would be gained by a daily half-hour's gentle rubbing of the undeveloped quarters, moistening the hand from time to time with a few drops of sweet oil.

A cow from the time of dropping her first calf on through life should be milked three times daily for a period extending from five weeks to as many months, according to conditions directly after freshening. I have been told that this was the usual custom on some, or rather, on most of the best dairy farms in England, Scotland, Germany and France, and other countries where profitable dairying has reached a point near the limit of possibility. A five years' experience has given me a firm confidence in the value of this practice, for while it certainly assists materially in developing the milking qualities of a heifer, it is no less useful in enriching the quality and stimulating the flow of milk in an older cow.

These are the main points in the course I have endeavored to follow in my efforts to improve the cows of my herd, and I shall continue in this way until I am advised of a better method which, after a trial, should it prove superior to the one now in use, I shall adopt at once.

In conclusion I would say my career has not been one unbroken course of triumph. At times it has been marked by deep ruts of discouragement, and blocked by heavy crosses of disappointment. Still, although I am now far, far from my set standard of achievement, I have demonstrated to my own satisfaction that dairy farming conducted on business principles may be made not only one of the most delightful and interesting occupations, but a source of gratifying profit as well. And while one is using his best efforts to enhance the beauty and worth of a creature that seldom fails to respond most generously to gentle care and intelligent management, they are at the same time nobly expanding the best qualities of heart and brain and physical strength, and their conscientious labor will meet a speedy and cordial recognition.

From "Hoard."

CHEDDAR-CHEESE.

(Continued).

Unfortunately, we know really very little about the composition of milk-fat. Most of the work which has been done has been with butter. It does not appear that this butter was made with separated cream, probably it was not, so that the fats exist separately, or how far they exist which at a low estimate would represent at least one-sixth of the whole, has apparently been entirely neglected. Further, although it is evident that butter-fat contains several different fatty acids, and therefore different fats, yet how far these fat exist separately, or how far they exist as compounds, appears to be uncertain. The preceding results point to the possibility of their existing separately under certain conditions. Otherwise, fats must at times be present in the milk which are not present at other times. The whole subject is one which requires further study.

The ultimate distribution of the constituents of the milk.

What becomes of the constituents of the milk during the manufacture of a cheese? Take the figures for July, 1895. The average volume of milk upon the days on which analyses were made amounted to 143 gallons, which would weigh 1,473 pounds. This milk contained 12.68 per cent of solid matter, or an average daily amount of 186.77 pounds of solids. By a simple calculation, it will be found that of this only 90.21 pounds are recovered in the curd, while 93.08 pounds pass off in the whey, and 3.48 pounds are lost in the liquids

from the cooler and press. Hence, in the process of cheese-making, less than half the total solids of the milk are recovered in the cheese. Perhaps it is not beside the mark to ask whether sufficient attention has yet been given to the other half ?

The total weight of casein in the milk amounted to about 39 pounds per diem, while the solids in the curd, deducting the fat and mineral matter, amounted to about 40 pounds, showing that the curd contained about one pound of sugar. The remainder of the sugar and the albumin passed into the whey.

Composition of Whey. — The principal loss of constituents is in the whey, the average composition of which for each month of every year will be found in the Appendix (Table 3).

The average composition for the whole period is solids 7.04, fat .32, mineral matter .50. The principal constituent of the solids is sugar. The results of 20 analyses show the average percentage of albumin in whey to be .50, and to vary from .38 to .60.

The following analyses of the whey, taken during the various stages of the manufacture of a cheese, are interesting, as giving some idea of the chemical changes which are taking place. They indicate also the stages in the manufacture when fat is most likely to be lost : —

Percentage of	August 5th, 1892.				August 27th, 1892.			
	Solids.	Fat.	Sugar, Albumin, &c.	Ash.	Solids.	Fat.	Sugar, Albumin, &c.	Ash.
Whey before breaking	6·87	·25	6·09	·53	6·74	·20	6·00	·54
Whey after breaking	7·10	·44*	6·08	·58	6·98	·35	6 12	. .
Whey when drawn	6·95	·29	6·12	·54	6·83	·27	6·13	·53
Drainings from piled Curd	6·66	·04	5·89	.73	6·65	·07	5.93	·65
Whey from Curd taken to cooler	7·73	1.13	5.58	1·02	7·67	1·07	5·64	·96
Whey after 1st cutting	8·22	1·30	5·56	1·36	7·78	1·12	5·51	1·15
Whey after 2nd cutting	8·60	1·32	5·64	1·64	7·81	·95	5·55	1·31
Whey after 1st turning	..	..	..	..	7·96	·94	5·55	1·47
Drainings from press	13·90	1·03	3·89	8·98†	13·46	·78	3·78	8·90†

* This result is probably too high, as the Curd was allowed to settle before the sample was taken, and probably a portion of the fat has risen to the surface during this time.

† Mainly salt.

The above figures show how, with the development of acidity, there is a constant abstraction of the mineral matter from the curd, and that the chief loss of fat is during the first and second cutting of the curd. Hence the necessity of care in performing this operation.

I am inclined to think the above results throw some light upon one or two questions of scientific and popular interest.

First, we cannot possibly account for the uniform proportion of sugar and albumin in these liquids, and the irregular amounts of ash, without coming to the conclusion that these bodies do not exist in the curd in a similar state.

There is no reason to suppose that the sugar and albumin, which are in solution in the milk, have been rendered insoluble by the processes of cheese-making. And there is good reason to believe that gt least a portion of the lime in the milk, if no other ash constituent, is in an insoluble form combined with the casein. If this is

so, the above results are easily explained. The acid, as it is formed, combines with this lime, and withdraws it from the casein, forming calcium lactate.

Loss of Fat in Cheese-making.—To what extent the fat originally present in the milk is ordinarily lost during the manufacture of a cheese is well shown by the following figures :—

Fat present in	Weight of Fat in pounds.		
	Aug. 5th, 1892.	Aug. 27th, 1892.	July, 1895.
Milk	39·66	33·11	53·02
Curd	37·07	30·60	48·51
Whey	2·79	2·14	3·61
Drainings from cooler	·12	·15	·90
Total found	39·98	32·89	53·02
Error of Analysis	·32	·22	....
Fat in liquid from press	·11	·06	....

There are, however, times when an exceptional amount of fat is lost in the whey, and the cause of this has received my attention.

The time which is required to make a cheese.

The principal fault to be found with the method of manufacture adopted at the School is the uncertainty, and sometimes great length, of the time required to make the cheese. Practical cheese-makers appear to be totally unable to explain why the time before the curd is fit for vatting varies so greatly.

It is evident that it would be a great advantage if the curd could be vatted by 4 p.m., which frequently happens without any loss of quality ; for some of the best cheeses made have been vatted earlier than this, but at times the curd has not been vatted until 10.17 p.m., and even then the acidity of the last drainings has only reached .87 per cent of lactic acid. I have therefore paid considerable attention to this question, and find many causes which undoubtedly operate to this end.

1. The time will depend partly upon the number of bacteria originally present in the milk, especially the evening's milk. This, at present, the cheese-maker cannot altogether control though he can do so to a large extent by proper treatment, i.e., keeping the evening's milk warm. The use of stale whey is mainly to increase the number of bacteria, and consequently we find that when no stale whey is used, owing to a taint in the previous day's cheese, the cheeses take longer in making. Frequently, although no stale whey was used, the curd was vatted early. The explanation is that the acidity of the evening's milk had sufficiently risen by the morning because it had been kept warm. In other words, the growth of the bacteria present in the evening's milk had been promoted and kept up during the night, so that the number present in the morning in the mixed milk was probably greater than when, under ordinary conditions, stale whey was employed.

2. The quantity, or rather the proportion of rennet used, will, for reasons already mentioned, considerably affect the time of vatting. This is a well shown in the following table :—

INFLUENCE OF RENNET ON TIME OF VATTING.

High Proportion of Rennet.		Low Proportion of Rennet.	
DATE.	Time of Vatting	DATE.	Time of Vatting
	P.M.		P.M.
August 11	5.55	August 14	4.10
" 4	6.15	" 19	3.30
" 8	8.30	" 18	3.15
September 26	5.45	September 12	3.35
" 1	5.5	" 11	2.58
" 23	5.15	" 13	3.25
October 21	7.5	October 16	5.50
" 7	7.0	" 15	5.15
" 8	6.30	" 22	7.20
Average time	6.9	Average time	4.39

It will thus be seen that the average daily gain in time by using the smaller proportion of rennet was 1 hour 30 minutes.

3. The development of sufficient acidity in the whey during the second scald, prior to drawing the whey off, exercises considerable effect upon the time when the curd will be fit to grind.

If the acidity of the whey when drawn is less than that of the mixed milk before renneting, the subsequent development of acidity in the curd will be slow, so that the curd will not be vatted until late, while if the acidity developed in the whey before drawing off be high, compared with that of the mixed milk, the time of vatting will be early.

The following instances will illustrate these facts : —

DATE.	Acid in Milk.	Acid in Whey.	Time of Vatting.
	per cent.	per cent.	P.M.
August 28	.24	.26	2.50
" 21	.25	.32	5.30
September 20	.32	.25	3.38
" 10	.23	.19	7.55
October 29	.21	.24	6.20
" 26	.24	.20	8.55

As these results were obtained solely in the autumn it was deemed desirable to see whether the same principle was true in the early months of the year. The following table shows the results in the month of May of six early and six late vatted cheeses.

INFLUENCE OF ACIDITY OF WHEY ON TIME OF VATTING.

DATE.	Acidity in Milk.	Acidity in Whey.	Time of Vatting.	DATE.	Acidity in Milk.	Acidity in Whey.	Time of Vatting.
			P.M.				P.M.
May 6	.21	.25	4.10	May 17	.23	.17	10.0
" 18	.32	.20	4.40	" 10	.22	.19	9.57
" 21	.32	.21	5.0	" 13	.25	.18	9.50
" 19	.21	.20	5.15	" 5	.21	.18	9.70
" 15	.32	.19	5.25	" 21	.24	.18	9.45
" 12	.72	.22	5.30	" 22	.24	.20	9.35
Average	.21	.21	5.0	Average	.23	.19	9.70

Besides the saving in time and trouble, there is a distinct advantage gained by so working as to ensure a fairly rapid development of acidity in the curd.

During the early part of the cheese-making season there is frequently considerable difficulty in obtaining this acidity in the whey before drawing off. In such cases it is not desirable to keep the curd stirred during the whole period, but when it has been brought to a proper state of division, it should be allowed to settle and left in the whey for such a period as may be necessary.

(To be continued).

The Horse.

DISEASES OF THE BREATHING ORGANS OF THE ANIMALS.

Congestion of the Lungs

Congestion of the lungs is one of the most common forms of disorder among horses, especially in those which are used for real hard work ; for very violent exercise must be followed by periods, sometimes long ones, of rest—if to be left standing, exposed to all sorts of weather, can be called rest, and on returning home the exhausted animal is often kept outside the stable until the mud has been removed from the legs and body by washing and scraping.

During the process of grooming, it is most likely that the horse's condition escapes notice ; but when he gets into his stable, it will probably be observed that he is shivering and that the surface of his body is covered with cold perspiration. There is no difficulty in detecting these symptoms, and the rapid breathing, amounting to panting, is also evident, even to the unprofessional lookers on. The state of the pulse, although very characteristic, may not be appreciated by the tyro, but the distended artery with the small feeble beat indicates that the circulation is obstructed.

Congestion of the lungs is certainly a form of disease which the horseman ought to be able to recognize and to treat properly at once, as the chances of success are small if much delay occurs.

Fortunately, the first steps in the treatment of congestion of the lungs are well defined and easily taken. Bleeding was, years ago, the remedy which was at once resorted to, and usually with most marked effects. At the present time, very few attendants on horses have acquired the once universal accomplishment in surgery, the art of bleeding. Bleeding has long been out of fashion, and the practitioner who still persists in the use of the lancet is

looked upon as a disciple of the old school.

Nevertheless the removal of a large quantity of blood from the system of an animal suffering from excessive determination of that fluid to a particular organ, and more particularly when the circulation in the part is retarded, or, perhaps is quite arrested in some portions, is the most direct way of reducing the volume of the circulatind fluid and causing a general reaction. The practitioner who was accustomed to bleed in all cases of severe congestion of lungs in horses may remember how the scarcely detectable pulse became full and bounding, while the blood was flowing, and, by the time that five or six quarts had been drawn, the congested mucous membrane had become pale and the horse showed signs of faintness, at which stage the flow was stopped.

No half measures were tolerated in urgent cases, and bleeding was always continued until a decided impression had been made on the system.

Stimulants are useful in cases of congestion of the lungs, and, as a domestic remedy, a glass of whiskey or brandy in half a pint of water, may be given while the arrangements for bleeding are being made, and if some time is likely to elapse before veterinary aid can be obtained, some stimulating liniment may be applied to the front and sides of the chest. Mustard mixed with nearly boiling vinegar to the consistency of the cream, will answer very well, and the parts to which it is applied may be washed clean with warm water in half an hour after the mixture has been used, so that no loss of hair need be feared. The whole surface of the body should be rubbed thoroughly with a wisp of straw or a stiff brush, and the legs, after being hand rubbed, should be bandaged with dry flannel bandages.

In many cases the great difficulty of breathing and the accompanying distress which the animal suffers are relieved by the treatment. If, however, they should continue, the question of the repetition of the bleeding and the use of stronger counter irritants will arise; but by this time the veterinary surgeon will probably have arrived to answer it. There is no risk of any harm being done by one bleeding at the commencement of the attack, nor is counter-irritation likely to prove objectionable so long as there is no sign of acute inflammation. While the lungs remain congested, there is no desire on the part of the animal for food, and the practice of placing a little mash in the manger, or tempting the animal with pieces of carrot or newly mown grass, is to be deprecated.

No good can possibly arise from the consumption of food in the active stage of disease, and no harm is to be anticipated from total abstinence for some hours, until in fact, the appetite has in some degree returned. Later on, when debility has followed an acute attack, it may be necessary to tempt the feeble appetite, or even give by force the nutriment which the patient refuses to take.

A good stable, well ventilated, is very desirable for a sick horse and the animal should be so placed, that he may get as much fresh air as possible. It is curious that in the matter of fresh air, the animal's instinct is not a safe guide.

It will be noticed that a horse suffering from any serious disorder of the breathing organs is in the habit of selecting a corner of the stable remote from the door or window, and breathing in such a position, that he must inhale the same air over and over again. Most probably the entrance of cold air, into the lung tubes is rather irritating to the mucous membrane, and the animal in consequence seeks to avoid any part of the stable where cold air can enter. To overcome this difficulty, it may be necessary to tie the horse's head by an open door or window several times during the day.

One very successful practitioner, always adopted this plan as a matter of course, without waiting to see what position the horse would assume if left to itself, his experience having taught him, that the animal would inevitably take the wrong one.

As in all matters connected with the

management of sick animals, tact and judgment are necessary. It would not, for instance, be good practice to lie a horse's head by an open door while a strong north east wind was blowing ; but fresh air is even more essential for a sick animal than for a healthy one, always, however with the proviso that draughts are excluded, and that nothing shall be done to expose the extremities, or any part of the surface of the body to cold.

W. R. GILBERT.

The Poultry-Yard.

CONSTRUCTION OF HOUSES.

The material to be used in the construction and the manner of building will necessarily be governed largely by the climatic conditions. In general, it may be said that the house should provide warm, dry, well lighted, and well ventilated quarters for the fowls.

In order to meet these requirements it will be necessary to provide a good roof with side walls more or less impervious to moisture and cold, suitable arrangements for lighting and ventilating, and some means for excluding the moisture from beneath. Where permanent buildings are to be erected, some provision should be made to exclude rats and mice, and for this reason, if for no other, the structure should be placed on cement walls with foundation below the frost line. Cheap, efficient walls may be made of small field stones in the following mgnner : Dig trenches for the walls below the frost line; drive two rows of stakes in the trenches, one row at each side of the trench, and board inside of the stakes. The boards simply hold the stones and cement in place until the cement hardens. Rough and uneven boards will answer every purpose except for the top ones, which should have the upper edge straight and be placed level to determine the top of the wall. Place two or three layers of stone in the bottom of the trench, put on cement mixed rather thin, and pound down ; repeat this operation until the desired height is obtained. The top of the wall can be smoothed off with a trowel or ditching spade and left until the cement becomes hard, when it will be ready for the building.

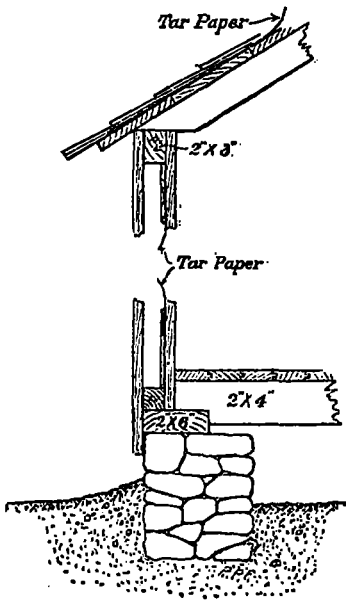


Fig. 1.—Method of building a poultry house with hollow side-walls.

The boards at the sides may be removed, if desirable, at any time after the cement becomes hard.

For the colder latitudes, a house with hollow or double side walls is to be preferred on many accounts, although a solid wall may prove quite satisfactory, particularly if the building is in the hands of a skilled poultryman. Imperfect buildings and appliances, when under the management of skilled and experienced men, are not the hindrances that they would be to the amateur. Buildings with hollow side walls are warmer in winter and cooler in summer, with less frost in severe weather, and less resulting moisture when the temperature moderates sufficiently to melt the frost from the walls and roof of the house.

In constructing a roof for such a house one or two courses must be pursued, either to ceil the inside with some materi-

al to exclude drafts or to place the roof boards close together and cover thoroughly with tarred paper before shingling. The ordinary shingle roof is too open for windy weather when the mercury is at or below the zero mark. The fowls will endure severe weather without suffering from frosted combs or wattles if there are no drafts of air. Hens will lay well during the winter months if the houses are warm enough so that the single-comb varieties do not suffer from frost bite. Whenever the combs or wattles are frozen, the loss in decreased egg production cannot be other than serious.

Figure 1 represents a cheap and efficient method of building a poultry house with a hallow side wall. The sill may be a 2 by 6 or 2 by 8 scanthing, laid flat on the wall or foundation ; a 2 by 2 strip is nailed at the other edge to give the size of the space between the boards which constitute the side walls. A 2 by 3 scantling set edgewise forms the plate, and to this the boards of the side walls are nailed. These boards may be of rough lumber if economy in building is desired. If so, the inner boarding should be nailed on first and covered with tarred building paper on the side that will come within the hollow wall when the building is completed. This building paper is to be held in place with laths or strips of thin boards. If only small nails or tacks are used, the paper will tear around the nail heads when damp and will not stay in place. The cracks between the boards of the outside boarding may be covered with inexpensive battens if they are nailed at frequent intervals with small nails. Ordinary building lath will answer this purpose admirably, and will last many years, although it is not so durable as heavier and more expensive strips. The tarred paper on the inside boarding and the battens on the outside make two walls, each impervious to wind, with an air space between them.

In preparing plans for a building, one of the first questions to be decided upon is the size and form of the house. If the buildings are made with the corners right angles, there no form so economical as a square building. This form will enclose more square feet of floor space for a given amount of lumber than any other, but for some reasons a square building is not so well adapted for fowls as one that is much longer than wide. It is essential to have the different pens or divisions in the house so arranged that each one will receive as much sunlight as possible, and to secure this, some sacrifice in economy of building must be made.

We prefer a building one story high, and not less than 10 or more than 14 feet wide, and as long as circumstances require. In most cases a building from 30 to 60 feet long meets all requirements. If this does not give room enough, it is better to construct other buildings than to extend one building for more than 60 feet. It must be remembered that each pen in the building should have separate yard or run, and that a pen should not be made to accomodate more than fifty fowls, or, better, 30 to 40.

The building should extend nearly east and west in order that as much sunshine as possible may be admitted through windows on the south side. The windows should not be large nor more than one to every 8 or 10 feet in length for a house 12 feet wide, and about 17 inches from the floor, or at such height that as much sunshine as possible shall be thrown on the floor. The size and form of the windows will determine quite largely their location. In all poultry houses in cold latitudes the windows should be placed in such a position that they will give the most sunshine on the floor during the severe winter months. One of the common mistakes is in putting in too many windows, while a building that admits plenty of sunlight in the winter time is desirable, a cold one is equally undesirable, and windows are a source of radiation at night unless shuthers or curtains are provided. Sliding windows are preferred on many accounts. They can be partially opened for ventilation on warm days. The base or rail on which the window slides should be made of several pieces fastened an inch or so apart, through which openings the dirt which is sure to accumulate in poultry houses may drop and insure free movements of the window.