A RAILWAY SCHOOL FOR FARMERS

BY H. A. CRAFTS

Demonstration train at a way station in California.

In response to an urgent request from leading dairy interests in Southern California, Prof. Leroy Anderson, head of the dairy department of the California College of Agriculture, has just made an examination of the milk conditions in that part of the State.

Prof. Anderson says that in consultation with the dairymen, it was decided to inaugurate a general policy of education upon the subject. In his opinion, the reform of many conditions now undesirable in the methods of producing milk, can better be reached through the commercial aspect of the business and through the education of the producer and the consumer than through drastic and radical legislation.

He says that he finds the conditions under which milk is produced about Los Angeles are not materially different from conditions in other populous centers, except that nature is possibly kinder in granting more sunshine and less rain and a more porous soil, all of which tend toward an easier cleanliness.

What advice he has to offer, therefore, is applicable to all parts of California. He hopes especially that the man who is producing and selling directly to consumers in the smaller towns and cities, whether he has one cow or more, may receive an incentive to have better cows and keep them in a clean and a healthy condition.

In cities like Los Angeles and San Francisco, he says, where large wholesalers act as distributing agencies between the producer and the consumer and pasteurize all the milk, some of the dangers that might result from disease of the cow and uncleanness are obviated.

"It does not have a pretty sound," continues the professor, "to say that lack of care on the part of the producers is partly the reason for the expensive pasteurization which the wholesalers now give to milk."

"Pasteurization, however, is one of the advance steps toward a healthier race, and some day this process will give way to such clean methods of producing milk that it will not be necessary. That is the goal toward which we are all striving."

"It costs money to produce clean milk, which cost must be met by a higher selling price or by more profitable cows, or both. The cow is especially in our mind just now, and we call the reader's attention to records taken from different sources to show by actual figures how cows vary in returns to their owners from similar outlay for food and care."

Prof. Anderson then refers to the subject of proper stables and corrals for dairy cows, and says:

"The great thing to be desired in either, is that there should be easy means of keeping clean and then keep them clean. This is the chief reason for using concrete in stable floors. It does not decay and then cause foul odors, and it can be hosed down with water and swept

in a few moments, so that no dirt remains. Some dairymen object to cows standing on concrete, but in California, where the cows are in only for feeding and milking, they suffer no injury.

"Occasionally a very good stable is constructed where the cattle stand, which portion is made of plank. This works well from a sanitary point, if the planks are water-tight or are underlaid with a water-tight substance so that the soil under the planks cannot become saturated.

"A milking stable is absolutely essential to the production of clean milk. Milking in the corral is an abomination, either in winter or in summer. In winter, during the rainy season, it is not uncommon to see both cow and milker wading nearly to the knees in mud, when of necessity the milk must become the depository for some of the mud.

"In summer, when the corral dust may be from one to four inches deep, the condition is even worse. The dust is raised with any slight breeze or with every movement of man or beast, and even more dirt finds its way into the milk than during the time of rain and mud. Thus the cows must be provided with some stable which is dry and clean, and where they can be held for milking.

"The stable needs not be expensive. On the contrary, it may be very simple, and the less lumber in it the better, so long as the frame is sufficiently strong. It should permit the entrance of an abundance of direct sunlight and have enough openings to give constant ventilation. Large louvers in the roof are excellent for ventilation and also admit light, but not direct sunrays."

Salol Liniment for Burns.—Salol, 10 parts; olive oil, 60 parts; lime water, 60 parts.

Bread Under the Microscope.

Bread, like milk, is one of the most general articles of food, and as such is subjected to the most frequent adulteration, and unfortunately it happens that such a fraud cannot always be detected with ease. The experts who have given especial attention to this kind of adulteration agree in the statement that under the influence of the preparation of bread the grains of flour undergo certain changes in their outer appearance that render them much less distinguishable. In a most praiseworthy article recently published in *Les Annales de la Chimie Analytique*, Eugène Collin recounts the results of his tireless examination of pure bread and adulterated bread. In the course of his laudable endeavor, it seems, he found himself able to determine with passable exactness the quantity of pure flour in baked bread, whether the bread subjected to microscopical examination was old and hard or fresh. His procedure was to soften a crumb of bread with as little water as possible and knead it persistently with forefinger and thumb over a fine sieve resting on a vessel that should receive the dripping water. The mass is treated in this manner until the water ceases to look darkened. A powdery mass then remains on the sieve, which is deposited on the crystal of a watch, combined with a trifle of glycerine, and is then set aside for further examination. Besides, to the water in the vessel is given an opportunity to clear itself, and it is then decanted so carefully that the sediment is not disturbed. The result of such treatment is that from the deposit on the sieve and that in the vessel the true composition of the bread can be ascertained.

Bread made from pure flour leaves only an imperceptible quantity of starch on the sieve. On the other hand the greater part of the gluten is found on it and forms a net of irregular meshes and shows some resemblance to vegetable tissue. In consequence of the ease with which its presence in the bread is ascertained, the gluten is especially important for microscopical examination. In the same deposit the microscope showed numerous particles of starch which during the preparation of the bread changed their ordinary form or were forced to explosion. Still there is a rather considerable number of them that have escaped this influence and are easily recognized from their size, color, form, and the presence of the navel. These statements regard wheat bread only. The result when rye bread passes under the same procedure is that the deposit on the sieve consists of gluten only, and therefore proportions in a mixture of both kinds of flour can be ascertained with a large degree of exactness under the microscope. Particularly, however, is this done through a test of the precipitate of flour, since the grains of starch of wheat and of rye are distinguished from one another by the shape of the navel, that is, the former point of connection of the

Lecture in agricultural and horticultural demonstration train.

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Dairy exhibit, agricultural demonstration train.

Cereal exhibit, agricultural demonstration train.

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placenta. The most resemblance to these is shown by the grains of barley, the addition of which is ascertained with a satisfactory degree of certainty from the precipitate on the sieve. A quite customary adulteration of bread is effected with rice flour, which always

fails to escape the scrutiny of the microscope when this is invoked, for the grains of starch of rice are always left in great number on the sieve and are more easily recognized because during the preparation of bread they suffer less change. This result of M. Col-

lin's investigation is extraordinarily important, for the addition of rice flour to wheat flour or to rye flour has begun to be a veritable torment. Besides, certain kinds of corn meal have been misused in the same way, though easily detected by the microscope.

A REAPER BOAT

BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN

A French constructor, A. Amiot, has brought out a type of boat combined with a set of cutting blades, which is designed for use in cutting off aquatic growths in ponds or artificial lakes, mill races and various water courses. Such operations are often necessary where the bottom of a pond or water course becomes obstructed by the thick growth of aquatic plants, but where it is required to be carried out by hand labor it becomes a difficult and also an expensive matter, especially where a large area has to be dealt with. M. Amiot's device overcomes the difficulty by using an internal combustion motor mounted on a boat, and the motor serves to drive a set of cutting blades, which are designed somewhat after the fashion of reaper blades and adapted in their form so as to carry out the cutting of the plants under water in the best manner. The boat is rather narrow, and flat-bottomed, being much narrowed at the front and the rear. In the front is carried a paddle wheel, which is run by a gasoline motor, which drives the boat at a slow speed. Its total length is about 20 feet.

The cutting bars are mounted at the lower end of a vertical frame, which is held at the rear end of the boat, and these extend transversely across the bottom of the frame so as to lie at a point near the bottom of the water course or pond and to cut off the plants as the boat advances. Such bars are made in different lengths and also at different curvatures so as to be adapted for flat bottoms or for beds of streams of different forms and sizes. The bars are usually from 6 to 12 feet in length, and are designed to cut off a considerable area at a time. This gives the present system a great advantage in being able to cover a large surface within a short time and at a comparatively small cost. As will be observed in our engraving, the frame, which is made up of two vertical angle irons braced in the proper way, is suspended at the end of the boat, and it hangs in a free position,

being swung upon the end of the lever, which is observed at the upper part, and this lever is pivoted in an upright. By means of the counterweight at the end of the lever, the entire frame can be raised and lowered, and this gives the adjustment of the cutting bars at any desired height in a convenient way. The gasoline motor is placed at the other end of the boat, and there is a belt transmission running to the rear end, which operates the pulley placed in the upper part of the cutting bar frame. This does not interfere with the raising or lowering of the frame, as will be noticed, seeing that the belting and pulleys can work at different angles. On the shaft of the pulley is a crank which drives a rod, and this last passes down along the frame to the lower part, where it connects with a rack and pinion movement. By means of the alternate up and down movement of the rod, and the rack and pinion at the lower part, the cutting blades are given the to and fro movement in the same

way as is seen in the usual blades, and in this way a wide swath is cut under water, and at any desired height above the bottom. The paddle wheel is carried on a frame which is adjustable by means of bolts, so as to give the paddles any desired immersion, and the gasoline motor drives the wheel by gearing and chain device, using two separate countershafts for this purpose so as to give the needed speed reduction. The gasoline motor is operated at the standard speed of 500 revolutions per minute. When it is required to take the boat into shallow water or otherwise to pass over rocks or other obstacles, the cutting frame can be lifted entirely out of the water. In this case the cutting bars are folded up along each side of the frame so as to occupy but little space. In usual practice the cutting is carried out at the rate of $1\frac{1}{2}$ miles an hour, and the cost of operating is estimated at \$0.35 per mile, comprising gasoline, oil, labor, together with depreciation and maintenance. For cutting one acre area, the cost is figured at \$2.70.

The Amiot system is meeting with great success in Europe, and it is now in use on the artificial lakes of the domain of the Institute of France, at Chantilly, and also on the domain of Laeken, belonging to the King of Belgium. It is also used on a number of canals and rivers in France.

According to the Electrical Review and Western Electrician, the Park Building at Pittsburg, Pa., which is 15 stories high and contains 400 offices, was recently lighted by carbon-filament lamps and had its interior decorations painted a deep sea-green color. It is now lighted by tungsten lamps, and has its interior painted a light buff color. On replacing 3,910 carbon lamps (56-watt) by 780 100-watt and 200 25-watt tungsten lamps, and 21,840 watts in 16 and 32 candle-power carbon lamps in the corridors and lifts by 8,400 watts in 40-watt and other tungsten lamps, 149.4 kilowatts is saved.

The upper view shows reaper boat in operation. The lower picture is a plan view showing transmission gearing.

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