

RECENT INVESTIGATIONS

Conducted by "ENQUIRER."

A Milking Machine.

An engine placed outside a dairy barn for the purpose of milking cows is a somewhat novel sight, and the idea of milking cows by machinery may cause some of the knowing ones to smile. Be that as it may, the Thistle Mechanical Milking Machine, invented by Dr. Alexander Shiels, of Glasgow, underwent a pretty thorough test at the Ontario Agricultural College a short time ago, and, to all appearances, performed its work in a most satisfactory and business-like manner.

The milking is accomplished by creating a vacuum varying from five to fifteen inches of mercury, and causing an external pressure of from two and a half to seven and a half pounds. Pulsating rubber teat cups are attached to the cow's udder, and are held in position by the atmospheric pressure mentioned above. The teat cups are connected by rubber tubes to an air-tight pail, which, in turn, is attached by a rubber tube to an iron pipe leading from the large air-pump which creates the vacuum.

In starting the machine, there is first created in a reservoir a vacuum of nineteen inches (of mercury), or any pressure above what is required for milking. The air is then withdrawn from the teat cups until there is a vacuum of fifteen inches, the pressure being prevented from going above this by means of a reducing valve attached to the machine. While the air is being withdrawn from the teat cups they begin to collapse, first at the top, then gradually towards the bottom, extracting all the milk from the teats. There is, then, air admitted to the cups until the vacuum is reduced to five inches. This allows the cups to expand, and releases the teat until it is filled, when it is emptied again, as described above. The motion resembles that of a calf sucking, or the beat of the heart. The pail which receives the milk is fitted with a glass top, which shows when the cow is dry, and, everything being perfectly air-tight, all dirt, is excluded from the milk. A three horse-power engine is sufficient to milk ten cows at once, and the milk is removed from a cow in from four to six minutes.

A question arises as to how many cows a dairyman should have in order to make such a machine profitable. No doubt that in the future it will be manufactured more cheaply

than is possible at present, but as yet it is out of the reach of any but the more extensive dairymen. To say the least, it certainly looks as if the problem of milking cows by machinery were nearing a solution. The invention is apparently safe as well as scientific, and approaches more closely to nature's plan than anything of the kind before offered to the public.

Fixation of Free Nitrogen.

For more than half a century, investigators have been at work upon the question: Can plants assimilate the free nitrogen of the atmosphere? And, though it has been proved that some plants, under certain conditions, possess this power, there are still many things to learn regarding the matter.

When we recollect that nearly four-fifths of the atmosphere is composed of nitrogen, while, at the same time, nitrogen is the most easily exhausted element of plant food in the soil, as well as the most expensive fertilizer to purchase, we can realize the importance to agriculturists of this question of the fixation of free nitrogen by plants. We see one class of plants perishing, or, at best, producing a very inferior crop, from want of nitrogen, though they are surrounded by an atmosphere containing an unlimited quantity of this important element. On the other hand, we see another class of plants growing upon the same kind of soil flourishing, and producing more nitrogenous material than is produced by the class of plants previously mentioned. This being the case, the question naturally arises, Why does one plant starve from want of nitrogen, while another, under the same conditions, apparently has enough and to spare? Investigators started work upon this question many years ago, and the answer given is: One plant can make use of the free nitrogen of the atmosphere, and the other can not. But another and more difficult question follows: Why, and how, can one plant assimilate free nitrogen, while another can not? This question has received the attention of the ablest investigators of our day, and, as yet, it is only partially answered.

It may be well to mention just here that the term "uncombined nitrogen" means the