THE FARMER'S ADVOCATE AND HOME MAGAZINE

PERSEVERE AND SUCCEED

AGRICULTURE, STOCK, DAIRY, POULTRY, HORTICULTURE, VETERINARY, HOME CIRCLE.

REGISTERED IN ACCORDANCE WITH THE COPYRIGHT ACT OF 1875.

VOL. XXXIV. LONDON, ONT., AND WINNIPEG, MAN., APRIL 15, 1899. No. 476

EDITORIAL.

Liquid Air---A Nineteenth Century Wonder.

The closing days of the nineteenth century are being distinguished by brilliant achievements in mechanic arts. The forces and the elements of nature are being put to use for the service of man as never heretofore. The question arises, Why not put to new uses air, the world's cheapest and most abundant material? Cheap power the world is searching for. Air in motion drives the windmill. In any form can it do more? Till some twenty years ago, air, which is composed mainly of oxygen and nitrogen (four-fifths of the latter), was regarded a "permanent" gas; but Prof. Jas. Dewar, of England, liquified it, but by a process so expensive that the first ounce cost $3,000, latterly reduced to $500 a pint. Mr. Chas. E. Tripler, an experimenter of New York City, after eight years' work, has now perfected a plan by which he produces fifty gallons per day, at a cost of about twenty cents per gallon. It is done by means of intense cold and compression, which also causes heat to be given out. In his apparatus, air is compressed to between 2,000 and 3,000 pounds per square inch, and cooled down by water flowing round the pipes. No ice or other cooling substance is used. A proportion of the compressed air is allowed to escape, and flows back over the outside of the coil through which it has come. Pressure is continually maintained by the pump; and the apparatus is packed with felt, to prevent the entrance of heat. The air which escapes expands, is cooled, and cools the inner coil of pipe. Hence there is a continuous fall of temperature of the air within the pipe till it liquifies, at 312 degrees below zero. Mr. Tripler states that he has made about ten gallons of liquid air by the use of three gallons in his engine, so that he has a surplusage of seven gallons produced without expense, and which can be used as power elsewhere. He thinks he can keep on repeating this surplusage indefinitely. The practicability of this process is, however, disputed. In fifteen minutes after starting his engine he has liquid air. But whence the power? the reader asks. One cubic foot of liquid air contains 800 cubic feet of ordinary air which we breathe—a roomful pressed into the size of a small pail! Its expansive power is enormous—100 times greater than steam! When exposed to the air of ordinary temperature, it proceeds to return, as a gray, frosty vapor, to its original form. But it can be regulated, and Mr. Tripler has been driving an engine with it in his laboratory—an engine running without fuel or water, smoke, ashes or steam. And what a revolution in transportation on land and sea if this cheap—yea, almost costless—power be applied in practical machinery! It will not then take one bushel of our No. 1 hard wheat to carry another to market, or over one-quarter the value of a fat steer from Canada to market him in Liverpool. But the subject is of interest in other ways. Liquid air is so cold (312 below zero) that it will freeze alcohol and mercury. In his public exhibitions in New York and Washington, Mr. Tripler has frozen mercury into the shape of a hammer, solid enough to drive nails into a hardwood board. It will make iron and steel as brittle as glass, and boil—or freeze—an egg so hard that when broken by a sharp blow from a hammer it looked like a piece of quartz. It makes lead elastic as steel, and a rubber ball as fragile as an egg-shell. Mixed with other substances, it has tremendous power as an explosive. Still, says the inventor, you can safely do almost anything with it you can with water, except shut it up tight. It will sear the flesh like a white-hot iron, and can be used in surgery to eat out diseased flesh more quickly and safely than caustic potash or nitric acid. A New York physician has already used it in cancer treatment. For hospital use it will be absolutely pure air, and a *vitalizing* air, because the proportion of oxygen is very large. Oxygen liquifies at 300 degrees below zero, and nitrogen at 320, so that when in the form of liquid air the nitrogen evaporates more rapidly. Ice at 32 degrees F. is hot compared with liquid air (344 degrees warmer), so that a kettle of liquid air placed on a block of ice will actually boil violently, throwing off a white vapor. It has a remarkably cooling effect on rooms where a small quantity of it is used, and this suggests its use in refrigeration, where Mr. Tripler foresees another revolution, because the machinery is not expensive, and can be set up in a tenth part of the space occupied by an ammonia-gas refrigerator machine.

He predicts its general utility even in houses, and says in ten years a hotel guest can order a "*cool*" room in summer and be just as sure of getting it as a warm one in winter. Incidentally, a curious test has been made, showing the remarkable vitality of seeds though exposed to frost. Such seeds as barley, oats, peas, cucumbers, and squash, all grown in the temperate zone, were kept in liquid air for 110 hours at 312 degrees below zero and then thawed slowly for 50 hours. Yet after that severe treatment they germinated and grew. Liquid air is the talk of the scientific world, and bids fair to form a fitting finale for the achievements of a wonder-working century and give a great start to the next.

The Beef Cattle Industry.

The acknowledged scarcity of well-bred and well-formed beef cattle in the country at the present time doubtless accounts in a large measure for the improved prices being paid by dealers and shippers for the class of cattle suitable for the export trade. This fact also accounts in a great measure for the active demand for pure-bred bulls of the beef breeds, and the higher prices which are being obtained for such animals. It is gratifying to know that the farmers of Canada are waking up to a realization of the situation and of the needs of the times, and are, in increasing numbers, acting on their convictions and putting themselves in line with the requirements of our markets, as they apply to not only beef cattle, but also to dairy products, pork, and poultry. There is, however, yet much room for improvement and expansion in all these lines, and we need have no fear of overstocking the market, if we are only careful to produce the best quality. The live stock market reports furnish interesting reading for farmers and feeders, and the startling differences between the prices of well-bred cattle for beef and those paid for ill-bred animals should lead all who read to cherish the ambition to improve their stock, and thus to share in the best prices going. It is not at all uncommon to note a difference of 75 cents to $1 per 100 lbs. between the prices paid for a bunch of ordinary ill-bred butchers' cattle averaging 1,000 lbs., and that of a well-bred and well-finished lot of export cattle averaging 1,350 lbs., and a little figuring will serve to show that, rating the former at say $4.25 and the latter at $5 per cwt., the difference in the value is just $25 per head; $250 on ten head of cattle, or $500 on a carload of twenty head. And this may fairly be reckoned as the profit on one class over the other, as the scrub cattle have cost nearly if not quite as much to raise and fatten as have the well-bred ones, to say nothing of the pleasure and satisfaction which comes to all concerned in handling the better class. It is our entire confidence in the soundness of the doctrine that well-bred cattle are infinitely the most profitable to raise and to feed that prompts us to so persistently preach the gospel of good blood to our farmer readers throughout our vast constituency, feeling assured, as we do, that the general adoption and practice of these precepts would in a very short time add many millions of dollars to the value of our farm stock, and to the wealth of our farmers individually.

Entertaining this view, we offer no apology for devoting a considerable amount of space in this issue to an illustrated review of the prizewinning records at the Royal Agricultural Show of England of outstanding animals in a breed of cattle that has played, perhaps, a more prominent part than any other in improving the beef stock of not only the Old Land, but also of this continent, and which from its proved cosmopolitan character is doubtless destined to extend its leavening influence in all parts of the world where beef is produced. While we say this in perfect sincerity, we would not for a moment reflect upon the other useful beef breeds which have each made themselves an enviable reputation, have their enthusiastic friends and admirers, and have made splendid records in the Fat Stock Show competitions in Britain and America, both in the pure-bred and grade cattle classes, and frequently top the markets in the great live stock emporiums in both continents for quality and price. If there is room for all these to be profitably raised in the limited territory of the British Islands, as they undoubtedly are, there is surely room for them all in the vast domain of the Dominion of Canada, and we would advise no man who has a herd of any of the beef breeds to give up what is giving him satisfaction, but rather to seek to improve them and extend their sphere of influence in improving the common stock of the country, which any pure breed, if judiciously handled, will certainly do.

Evolution of Farm Machinery.

Farm work has in the last quarter of a century been greatly lightened by the invention and introduction of machinery calculated to economize time and labor. These inventions have been made to apply to nearly all the hardest jobs on the farm, and have contributed vastly towards the removal of the principal complaint against rural life. When we reflect that it is quite within the recollection of many living men that all the harvesting of the hay and grain crops in Canada was necessarily done by hand—mainly with scythe and sickle, involving untold aches and pains of muscle and spine—we may well be thankful that the inventive genius of mechanics and the enterprising spirit of manufacturers have brought within our reach the means of mitigating the hardest labor of the farm and making it so much more generally a pleasant and profitable occupation.

Necessity is said to be the mother of invention; and, no doubt, it was the increasing difficulty in securing hired help to harvest the crops when so many of the early immigrants had secured homestead farms for themselves that led the way, as fields were cleared of stumps and stones, for the introduction of horse-power machinery for harvesting purposes as well as for cultivation of the land. The help question has continued to grow a more serious one as the years have gone by—so much so, indeed, that without the aid of labor-saving machinery it would have been simply impossible to have handled the ever-increasing bulk of the products of our farms. Then, again, with the progress of time, and the growing of new classes of crops, the tilled portion of the land in Eastern Canada began to require drainage, and very different methods of cultivation, which necessitated new types of implements—a process of change which is still going on. The opening up of the prairie lands of the West, and wheat-growing on a large scale, soon brought about improvements needed to suit these new conditions. The development of dairying has brought with it revolutionary changes in apparatus, the most noteworthy being the centrifugal cream separator and the Babcock test for determining the quality of milk. Remarkable advances, too, have been made in the production of