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(Illustrated articles are marked with an asterisk.)

DOUBLE PLOWS.

Considerable attention has been recently given in England to the use of double plows, the advantages gained being claimed to be considerable as compared with those of single plows. As inventors are ever on the alert to improve agricultural implements, it may not be amiss to place before them some facts connected with this subject, from which they may possibly derive useful hints.

The idea of using double plows is not new. In a lecture delivered before the Framlingham Farmers' Club (England), Mr. J. E. Ransome stated that he had found in a book entitled "England's Improvement," written by Captain Walter Blith in the time of Cromwell, the first account of such a plow. In Arthur Young's "Tour to the North," published in 1771, is also found the account of a double plow fitted with two wheels, then in use in Worcestershire; this plow was afterwards improved by Mr. Berney, of Bracon Ash, Norfolk. Mr. Ransome referred to the plow patented by Lord Somerville in 1802, and also to the first adjustable double plow made by a Leicestershire plow wright, Mr. Handford, of Hathern; and to show what was actually accomplished at that early date with double furrow plows, he quoted from an article on the subject, given in Rees's "Encyclopædia," in which it is stated that at a trial which took place on the Royal farm at Windsor, 17½ acres of unstirred land were plowed with four Devon oxen, one man and a boy, in six days and a few hours, and that the oxen were in better condition after the trial than at the beginning. This is close upon 3 acres a day, which Mr. Ransome thought was not bad work. In the same article, a letter from an Essex farmer occurred, in which it was stated that Lord Somerville's double plow effected a saving of 5s. a day while in use. Various trials of double plows were conducted by the Bath and West of England Agricultural Society at the beginning of this century, and so thoroughly did they then consider it a standard implement that it was engraved at the head of their printed forms used when giving diplomas in connection with the Society.

Various reasons may be assigned why, notwithstanding these attempts, the single plows still retained their supremacy in popular esteem. They were lighter, easier to handle, and did not require so much power to draw them; while the double plows were so constructed as not to offer the advantages claimed for the new double plow known as the Pirie plow, and improved by the Messrs. Fowler, of Leeds. This plow may be described as follows:

It consists of two plow bodies, carried on a wrought iron frame work, entirely supported on wheels, two of which run in the furrows, one in front, the other behind, and a third wheel runs on the land a considerable distance from the furrow, about midway between the other two, so that the plow is supported on three points at the corners of a triangle. The leading furrow wheel is steered by a lever leading to the back part of the plow, and handles are dispensed with. The plow is turned at the headlands by depressing the land wheel and steering the leading furrow wheel. An improvement made by Mr. Jeffries enables the plow to be lifted bodily, its weight resting upon two wheels in turning the headlands.

Instead of the ordinary slade or land slide, these plows are each fitted with a friction wheel which runs along the cut edge of the plowed land and greatly reduces the friction. In this way, a saving of fifty per cent of the power is claimed to be made in moist land, in which the friction against the slade is very great. In very dry clay land, the saving is not so great. It is maintained that in moist land a team of horses will do one third more plowing per day, with the same labor, with this plow than with the ordinary single plow, a claim which challenges attention and which, if demonstrated to be founded in fact, ought to revolutionize the present system of plowing. We are not prepared to admit so much, but there are still other advantages worthy of consideration. The double plow is as easily managed by one man as the single plow, so that if three or four horses were required to draw the former, the wages of one plowman would still be saved. It is also claimed that the work is done better, the plow working steadily and turning its furrows better than the single plow. The pan or furrow will evidently not be so much trodden if two horses can do the work of three. The bottom and the land side of the furrow are not glazed by the friction of the bottom and slade, as with ordinary plows. The double plow is also claimed to possess peculiar advantages for subsoiling and hillside plowing. Without conceding all these claims, they are sufficient to awaken thought, and perhaps to suggest some improvements upon the present system of plowing in this country, which constitutes so large a portion of agricultural labor. To reduce this one third is a result worthy the efforts of any inventor, and one that would bring a sure reward.

THE UTILIZATION OF WATER IN ITS RELATION TO PUBLIC HEALTH.

It is needless to say that in regions the products of which are largely increased in value by manufacturing them into articles of utility or luxury, the possession of unlimited water power is an advantage scarcely to be overrated. Yet it seems undeniable that the utilization of water power is attended with certain disadvantages. The latter, while not sufficient to induce the public to neglect such natural resources, are still of enough importance to render their possible diminution a subject of consideration.

Our attention has been specially called to this by an article on mill dams and other water obstructions, and their relations to public health, published in the report of the Massachusetts Board of Health.

This article, prepared by Mr. George Derby, the Secretary of the Board, contains many interesting facts, some of which we must pass over entirely, but one of which is of great significance. This is stated as follows:

"There is reason to believe that the territorial line of division (always ill defined) between fevers of a continued and of a periodic type is extending northward, and that our immunity from remittents and intermittents is far less complete than in previous generations. Thirty-four years ago, Dr. Oliver Wendell Holmes instituted an inquiry, among the most experienced physicians of the time in New England, with the purpose of learning what they themselves knew and whatever had come down from their predecessors concerning intermittent fever originating within the field of their practice. The materials thus collected were made the basis of an essay of singular interest, which was published in 1838 as a Boylston prize dissertation. It appeared from all the evidence collected by Dr. Holmes that the traces of indigenous intermittents in Massachusetts were, except in a very few places, but scanty.

About the year 1828, a dam was built for obtaining water power for mechanical purposes on the Housatonic, two or three miles south of the Massachusetts line. It affected the hight of water on that sluggish stream for a distance of ten miles, and was followed by such increase of intermittent fever that the people sought and obtained legal authority for the removal of the dam on the ground that its effects on public health were such as to constitute it a public nuisance.

Twenty-five years ago, it was taught in our medical schools that intermittent fever was a disease almost unknown in Massachusetts, except when contracted in other places.

The exemption of the people of this State from periodic fever seems to be far less complete at the present time."

The gradual enlargement of the area of malarious influence from the latitude of Long Island toward the southern border of Massachusetts is a fact, to which earnest attention is called. There have been during the past eight years, as near as can be estimated, 6,700 cases of periodic fevers in and about New Haven, Conn. According to Dr. E. W. Blake, who furnishes these statistics, these cases "have been of every form and type, regular, irregular and defective; the latter covering cases of dumb ague which are very common in the old fever and ague localities. Cases of remittent have also been quite numerous. In many localities, whole families have been prostrated with the various forms of this malarious disease; old and young have alike suffered. There have been instances of the closing of factories by their proprietors from this cause."

While this increase of malarial disease is not attributed by Mr. Derby entirely to the increase of mill dams and other water obstructions, there can be no doubt that these are in many cases fruitful sources of fevers. Tide mills in crowded neighborhoods are particularly named as objectionable in this respect. Probably any of our readers are cognizant of many dams in which the water becomes stagnant and offensive in hot weather. Such are undoubtedly productive of disease. The tide mills mentioned have, it is stated, not been found profitable, but their dams remain to poison the air and injure the general health. All along the Massachusetts coast are to be found old dams likely to become similar nuisances.

No dam ought ever to be abandoned and left undrained; yet these may be met with in many parts of the country, stagnant pestiferous pools of corruption.

While there can be no doubt that water obstructions tend to promote fevers of various types, we believe that other causes have a more direct relation to the increase of malarious disease in the New England States. There has been, in these States, an enormous reduction of standing timber during the past decade. Wood working of all kinds has been making inroads upon the wooded districts, scarcely credible except to those who are well acquainted with the magnitude of this class of manufactures. The depletion of the timber sets in motion a train of causes which has been well recognized as a fruitful source of malaria in new countries. The increased evaporation of water, through the action of heat upon the newly exposed soil covered with decaying vegetable matter, at once engenders malaria, while the lessened flow of water in the streams exposes marshes and bogs, previously covered with water, and the moist stagnant mud thus denuded ferments and pours forth streams of fetid and poisonous gases and vapors. It is well known that of late the streams in Massachusetts and Connecticut have run very low in the summer season, leaving, in many places, wide flats of ooze directly exposed to solar heat.

It has been well said that civilization has its penalties, and this spread of malaria is probably unavoidable. Certain compensations will take place in time. Bogs will gradually fill up and become drier. The newly cleaned lands will gradually cease to emanate malaria, and the country will probably resume its original healthy condition.

In building dams, much might be done to prevent their ill effect upon the general health. The construction of cheap dykes will often prevent the shallow overflow of acres of ground without materially limiting the useful capacity of the dams. In many instances, the value of the land reclaimed would more than pay the cost of the dykes. This method of protection could undoubtedly be enforced, without oppressive restrictions and to great advantage. In building dams, a little plowing and scraping will also often change the contour of the surface so as to obviate shallow margins without at all lessening the amount of water the dams will hold. In short, there are few instances where a little cost and pains might not remove the objectionable features of dams as many of them are now constructed.

The report of the Massachusetts State Health Board is full of interesting information, but we have not space to review it more extensively. We close with its following extract:

If the cycle of malarious influence should again come round, if intermittents and remittents should prevail in Massachusetts as they do now in Connecticut, they need not be looked for on the dry pine plains or on the hillsides, but will surely be found by the sluggish water courses, in the salt water marshes, by the side of obstructed streams and reservoirs, and wherever the natural flow of water is so hindered by man's contrivances that the result is stagnation.

THE AIR FILTER.

Professor Tyndall, after a long series of experiments with atmospheric air, concluded that many of our most formidable diseases, such, for example, as small pox, cholera, and typhoid were propagated by the flotation of invisible particles in the atmosphere, and that, by the use of a suitable breath filter, it would be practicable for any person to enter an infected apartment without danger. The same apparatus, he stated, might be used by firemen, enabling them to enter buildings filled with dense smoke without injury, as the filter would arrest the particles of carbon, of which smoke is composed, allowing only the air to pass into the lungs. A further use of the breath filter is to facilitate miners in exploring and working in mines where carbonic acid gas is present in noxious proportions.

A recent trial of filters, made substantially as suggested by Professor Tyndall, has lately taken place in England, and we will describe some of the results. The filter itself consists of a cylinder, four or five inches long and two inches or more in diameter. Its interior contains, at the top, a layer of cotton wool which has been moistened with glycerin, then a layer of dry cotton wool, then a layer of charcoal, then cotton wool, with wire gauze covers at both ends, and at the upper end a mouth piece so shaped as to fit closely over the mouth of the wearer. By drawing the breath through this instrument, the most dense smoke may be entered with impunity. This filter has been tested by the London Fire Department with such success that the firemen of that city are to be provided with it for regular use. When places are to be entered, such as mines or wells, where carbonic acid gas is present, it is necessary to add another layer of cotton wool, and to place a layer of slaked lime between the two bottom layers of cotton. The object of the lime is to arrest the carbonic acid and oxide gases.

A recent test consisted in placing the experimenter, who had one of the instruments secured over his mouth, within a small closet, with a rabbit and two birds for companions. Carbonic acid gas and carbonic oxide were then injected until the atmosphere of the closet was rendered highly poisonous. In 23 minutes, the animals were dead, but the experimenter came out at the end of 30 minutes, having suffered no inconvenience from the noxious gases; but the work of breathing through the small instrument for so long a period and the heat of so small an apartment rendered him uncomfortable. Experiments are still in progress to determine the best sizes and forms for the instrument, and ere long we may expect that the air filter will be an instrument of common use.

THE shortening of puddling furnaces, by leaving out the neck almost entirely, is now being done after trial by some mills. The improvement contracts the entire furnace about thirty inches. The fire chamber and working chamber are the same as usual. Some half dozen of the Pittsburgh mills have adopted the change; the saving is obvious.