Water in Relation to Weeds.

BY PROF. J. HOYES PANTON.

In discussing the question of weeds, we usually emphasize seven objections to their being permitted to grow where we are raising crops: (1) They involve extra labor; (2) they render fields unsightly; (3) they add impurities to the grain; (4) they rob useful plants of their food; (5) they do injury by shading those growing near, and so preventing their proper development; (6) they afford places of shelter for injurious insects; (7) they waste water. This last is one of the worst features in connection with weeds.

The importance of water to plant life is such that we cannot afford to waste it through useless channels. Let us consider briefly the use of water in the plant economy:

1. It serves as *food* by entering into the formation of starch, which is produced by the union of water and the carbon dioxide of the atmosphere when it enters the cells of the plant. From these compounds, water and carbon dioxide, the chlorophyll granules (minute green bodies which are very numerous in the leaves), through the influence of sunlight, are able to produce starch, a substance that may be considered among the crude materials in plants from which other more complex compounds are prepared.

2. It is an important factor in the circulation of sap, acting as a *carrier* of compounds in solution to all parts of the plant.

3. It performs an important service in maintaining the *firmness* of the cells, so as to give the plant form. When plants wilt, it is largely due to the withdrawal of water from the cells, and if not permitted too long the flaccid leaves may be restored to their former condition by furnishing the plant with water.

4. The *temperature* of the plant may be modified largely through the influence of water, which may indirectly exert an effect upon the chemical changes taking place in the plant.

5. Its use as a *solvent* of substances in the soil, and thus preparing them for absorption by the plant, is of great importance. Plants can feed only upon material in the form of a liquid or a gas, consequently the presence of water becomes necessary. Keeping in view the value of this common compound, how important it is to take care of it and to guard against its waste.

There is no doubt that if more attention were given to the preservation of water we would hear much less about damage sustained by our crops during a time of drought. Let us suggest some ways in which this may be done:

1. *Mulching* is largely recommended and followed by fruit growers. This checks the evaporation of water, and so retains it among the roots of the plants and extends the time they are able to obtain moisture from the soil.

2. *Tillage* by constantly stirring the soil makes the surface in such a condition that it prevents evaporation, and thus acts as a mulch. The finely-divided earth on the surface checks the ascent of the water from below farther than to the layer thoroughly stirred. It is a common practice among gardeners and nurserymen to keep cultivating during a time of drought. Fields treated in this way retain their moisture, while those where no cultivation has been carried on suffer from the loss of it.

3. *Drainage* also serves to keep the soil in such a condition as to retain sufficient moisture for plant growth during a dry time.

4. *Subsoiling* is also found to aid materially in the preservation of moisture. This has been shown by experiments carried on for the purpose of ascertaining its influence in retaining moisture.

5. *Destruction of Weeds* becomes of great importance in this connection. Very few are aware of what enormous quantities of water are thrown into the atmosphere by plants; consequently the growing of such as are not needed is permitting an extravagant use of water which should be passing into plants from which we desire to obtain a crop.

During the summer of 1895 the writer conducted some experiments with the object of ascertaining to what extent some weeds pumped up water from the soil and passed it into the air through their leaves. Two species of plants were selected, the common mustard (*Brassica sinapistrum*) and the pigweed (*Amarantus retroflexus*). These were placed in large pots and put in the garden, with conditions much as might be found in the field. A check pot with no plant in it was placed near the others. For nearly two weeks the experiment was continued, and during the time showed that on fair days (9) the average amount thrown off daily by the mustard was 14 ounces, and by the pigweed, 10½ ounces.

The greatest was on a dry, bright day, with light wind: 19½ ounces by the mustard and 13 4-5 ounces by the pigweed. On a hot, sultry day the mustard transpired only 7 ounces. During four days of more or less rain the average was about 6½ ounces in each case.

This is a large amount of water to have passing from the soil through useless channels. Taking an average of 10 plants to the square yard, it shows that the mustard would throw off from an acre 21 tons, or 4,235 gallons, of water daily.

The sunflower is reported by some observers to throw off 25 30 ounces daily, and the cabbage, 19 25 ounces. Another way of expressing how much water is used by weeds is ascertaining the number of pounds of weeds grown and considering that each pound of dry substance has required 400-500 pounds of water in its formation. With such data before us, it does seem a serious case is made out against allowing weeds to grow among our crops. In connection with our experiment it is well to note that water was regularly supplied to the plants, but not more than it was considered they could properly take up. However, this, no doubt, would be a better supply, likely, than what they would have obtained in the field, and consequently the amount above represents larger figures than would probably result under normal conditions.

Hydraulic Rams.

SIR,—In your issue of FARMER'S ADVOCATE, Jan. 1st, I gave a short description of how a hydraulic ram could be utilized on many farms and how it might be put in to work satisfactorily. In next issue Mr. Taylor takes exception to some of my statements, and fears some of my points are misleading to those not practically acquainted with the working of a hydraulic ram. Will Mr. Taylor point out what is *misleading* in my article? He says "I advise the use of a tile drain, and where the fall is none too great this is a mistake." I reply that leading the water along the bank of the stream until sufficient head is obtained in a tile drain is the cheapest and most practical method of obtaining a head of water. It is simply the same as the headrace of a mill, and is used because a high dam is hard to keep nowadays on account of great freshets. Mr. Taylor says "the tiles must have a certain amount of fall, which will make the supply barrel that much lower than the dam." If he will read my article carefully he will perhaps see that it states that the tile drain must not have more than six inches of fall in fifty yards, and by the diagram he might at once see that the water stands as high in the supply barrel as in the dam. Perhaps he does not know that water will rise as high as its source, if confined. I would like to ask Mr. Taylor where freshet water goes if it does not get around his salt barrel or into his open ditch, and if cattle would not tramp the banks of his tailrace all in when ground is soft with rain. He says "fifty feet of feed pipe is too long and will lose power, owing to friction of water in a pipe of such length." The best authorities on hydrostatics say that fifty feet is the *shortest* feed pipe that should be used, but that it should be of such diameter that the water will not lose its power or momentum in rushing into the air-chamber of the ram, the long column compressing the air to a greater degree than a short column would, just as a long stick of timber, when in motion endwise, strikes a heavier blow than a short one moving with the same velocity. He tells how his pipes are only eighteen inches underground and says he would not advise anyone to put them in that deep only, as they might get frozen. In the one I described (excepting the dam of three feet on a very small stream) all pipes, ram, supply barrel, and tile were completely underground, away from freshets, the tramping of cattle, and free from frost in winter. I think it too far to pump water a mile with a ram for practical success without great expense in purchasing large pipe, as the whole power of the ram would be expended in trying to force a stream of water through a small pipe a mile long, and at some elevation, no doubt. If pipes were large enough the ram would lose very little in friction of water in the pipes, but the expense is an item to be considered by many, especially if buying pipes a mile in length.

R. C. ALLAN.

Winter Manuring.

We have received a letter from "R. C. M.," who favors winter manuring for the following reasons: 1st. It saves manure. 2nd. It save more valuable time in summer. 3rd. It regulates the farm work. 4th. It gives quick returns and larger profits. 5th. It keeps the yard clean in winter and spring. 6th. It does away with the heavy labor of manure hauling during the hot days of summer.

In order to save the most valuable portion of the manure—the liquid—he thinks it wise to cut all the bedding, in which condition it will better absorb the liquid and work more easily into the land. The manure can, in this condition, be taken directly from the stables daily and spread upon the field, when such a thing as loss from leaching or overheating cannot occur. In the beginning of winter it is not always convenient to haul manure, when it should be neatly piled in the yards; all sorts mixed together. This may be taken out in February, and after that time daily drawing would be beneficially practiced. There is also a time in the spring when a heap will have to be made. This can be drawn out later and spread upon grass or in an orchard, ten or twelve loads per acre being about the most economical dressing.

Our correspondent differs from many others in the matter of spreading manure upon deep snow. He claims that depth of snow is no objection, except in getting to the field. The writer claims great results in obtaining a catch of grass upon land that has been winter manured. He claims that manure should be kept as near the surface as possible, only plowing it down when it is soon to be plowed up again, as in preparing root land. When land is underdrained, either naturally or artificially, no loss can occur from winter manuring. The melting snow and falling rain tend to combine the manure and soil in the most desirable form. "R. C. M." doubtless has comparatively level land.

The N. B. Farmers and Dairymen's Association.

The 20th annual meeting of the Farmers and Dairymen's Association of New Brunswick convened in the Legislative Council Chambers, Fredericton, February 4th, 5th and 6th. The meetings were the best-attended in the history of the Association, but still more should have been present, especially from York Co. A number of prominent men were present, including Premier Blair, Hon. Jas. Mitchell, Provincial Secretary; Prof. Robertson, Prof. Faville, Mr. J. E. Hopkins, Experimental Farm, Nappan; A. G. Gilbert, Ottawa; Mr. John Robertson, Provincial Dairy Commissioner; and others. President Baxter presided; W. W. Hubbord, Secretary. The President referred to the marked advance made by the Association during the past few years. Several farmers' meetings were held last year in different parts of the Province. He pointed out the need of more education for the young farmers. New Brunswick could boast of having great natural resources for general agriculture. Fruit growing only needed more attention to make it rank among the first industries. Improvements in breeding stock should be considered more carefully, as it costs as much to raise a poor animal as a good one. More farmers should be sent to Parliament, so that the farmers could get what they wanted. Bee-keeping and poultry raising were industries yet in their infancy in New Brunswick, but were promising.

Prof. Jas. W. Robertson gave an address on "A Bowl of Bread and Milk." The Province should raise its own bread, growing what is needed, and not ship in from outside; more money would be kept in the Province. This was practical economy. Food had four uses to be applied in feeding animals and man: 1st, to form fluids and tissues; 2nd, to repair waste; 3rd, to be consumed as fuel; 4th, to be stored in body for future use. In speaking on "the marketing of perishable food products," he said the success of the farmer depends upon the way in which he rears, feeds, and markets his animals and their products. Cattle would be shipped as dressed beef in the near future; when this was inaugurated it would be a boon to live stock industry. Cold storage and aid from the Government would solve the question.

In the discussion on cold storage it was agreed that it would prove of advantage to New Brunswick, but some thought it premature.

His Honor Judge Stevens delivered an encouraging address, paying a high tribute to farming and the part it now played in the intellectual, industrial, and commercial life of the nation.

Hon. James Mitchell, Provincial Secretary and Commissioner for Agriculture, expressed the pleasure it gave him to see so many representative farmers met to consider the best methods of carrying on their work. In the name of the Government, he assured them that they would do everything in their power, so far as their means would allow, to assist the farmers and dairymen of the Province to pursue their noble calling successfully, till our Province would take her rightful place in the Dominion. The Government were spending a considerable sum of money to assist the agricultural societies, and some societies are doing good work and deserve credit therefor, but others are not: they are relying chiefly on the Government grants, and not upon their own resources. It might come to be a question with the Government whether it was right to take public money to assist those who were not doing what they might and could do to assist themselves.

Poultry Raising (by A. G. Gilbert).—Young chickens should be left in the nest twenty-four hours, and not fed for thirty-six hours after hatching. They should then be given stale bread dipped in milk and squeezed dry. Warm, comfortable houses, with darkened nests, should be supplied, and a scratching-room provided with window facing the south. Hens should be fed, when laying, such foods as will make up the materials of the egg. The hen should not be gorged, but should obtain her food gradually from morning until night. Ground or cut bones, green clover, oyster-shells, gravel, and water in abundance are also necessary. Hens should not be kept over two or three years. Care should be exercised in breeding to select only the best hens, and breed to a pure-bred rooster of the desired strain. Gather eggs daily, and keep no rooster during the summer. The Plymouth Rocks, White Javas, and the Wyandottes are about the best breeds for general purposes. When dressed they are most marketable. A valuable paper was read on "Poultry Management," by Mr. J. Oldman. Bee-keeping was also discussed.

Orchard Management was treated by Prof. E. E. Faville, Director of Nova Scotia School of Horticulture. Sod should never be allowed to take the place of thorough cultivation in any orchard. Trees abhor *wet feet*; drainage was essential; old orchards needing drainage could be treated where drains were placed deep enough. In planting orchard avoid novelties: stick to the reliable kinds; intermix varieties in planting to aid fertilization of blossoms. In full bearing orchards potash was the essential fertilizer to apply; unleached wood-ashes were recommended. Pruning should begin in the early life of the tree and be carried on each year. Prevention by spraying should be the rule in combating fungous growths and insect pests. Soil and location for different fruits should be studied. In marketing all fruits, proper grading should be made.