Dry Land Farming

By Prof. Thomas Shaw.

SOIL MOISTURE—DRY FARMING.

In the farming of dry areas the question of soil moisture is all-important. To farm such areas intelligently and successfully the farmer should have information regarding: (1) the amount and character of the precipitation; (2) the rate of the evaporation; (3) the methods by which water may be retained in the soil until needed, and (4) the plants that may be grown with the most complete success under the conditions that prevail.

When judging of rainfall and the use that is to be made of the same, the farmer should have information not only in regard to the amount of the annual precipitation, but also with reference: (1) to the period covered by the records; (2) the season or seasons when it falls, and (3) the manner in which it falls. The longer the period during which the records have been kept, the more reliable are they. It is never safe to base the nature of the farming to be followed on the record of precipitation for one or two seasons, the records vary so much in different years. In dry areas the rainfall of one year is sometimes less than one-half of normal, and in other years it is greatly in excess of the same. The season at which the rain falls has a greatly important influence, not only in determining the crops that shall be grown, but also the precise character of the tillage that should be adopted. These differ very materially when the bulk of the precipitation falls in the winter in the one case and in the summer in the other. The manner of the precipitation has also an important influence on the methods that should be adopted in order to utilize it to the best advantage.

While the degree of evaporation is probably less important than the amount of the precipitation, it is nevertheless greatly important. In areas far southward in the dry belt, the precipitation called for to produce plant growth is very considerably more than what is called for to effect the same in areas of the same altitude but located far to the northward.

The methods by which water may be retained in the soil until it is needed involve consideration of the handling of the soil in all its phases, including: (1) the breaking up of the same; (2) the subsequent plowing; (3) the various processes of tillage, including packing, discing, harrowing and rolling; (4) subsoiling, and (5) succession in the crops that are to be grown.

The plants that may be grown with the greatest success is in itself an important study. The species of plants not only differ very much in their adaption to dry areas, but this is also true of varieties of the same species. To attempt to grow those lacking in adaption would not be wise. The value of correct information along these lines cannot easily be overestimated.

Water in Semi-arid Soils.

Water occurs in all soils: (1) as free water; (2) capillary water; (3) hygroscopic water, and (4) the water that runs away and is lost to the soil. In semi-arid areas the free water and the water that runs away is much less abundant than in humid areas. The distinctions thus given are not sharply drawn, as will be apparent from what is said below.

Free water, sometimes called gravitational water, is that which fills the pore spaces between the soil grains and moves down through the soil by gravity. When present in excess it excludes the air so as to hinder healthy plant growth and in many instances to confine it to growth that is not of much value. Passing down into the subsoil, it may reach a point where further descent ceases, and where ascent may begin, when it becomes capillary water, which is very frequently the case in semi-arid soils. In humid areas it frequently passes down until it reaches ground water below, when it may move laterally through the soil until it reaches some outlet, as for instance, through springs. When the water table is not too near nor too distant from the surface and when the supply is constant, it renders great service to plants by supplying them with water carried to the roots through capillary action. Water occurs thus not infrequently in the basins of semi-arid countries, more especially where mountains occur. When thus found it comes from higher levels. In its downward movement it finds a stratum of subsoil that is usually sufficiently porous to admit of free movement laterally. Such movement of water in the soil is spoken of as seepage. The presence of such water at proper levels will frequently maintain good crops in areas where they will completely fail when not supplied from such a source.

When the air spaces between the soil grains are completely filled, the maximum of gravitational water is present. The capacity of dry farm soils thus to hold this water will, of course, vary, but on the average it is from say 35 to 40 per cent of the dry weight of the soil. In humid soils such water moves downward after every heavy rain, until it reaches the water table, that is, providing it is not too distant, when it flows out into streams. In dry areas the water table in the ordinary sense of the term is seldom present. In such areas it goes down as far as the force of gravity can take it, which is, of course, dependent upon the supply. It is thus stored in the subsoil as capillary water until drawn upon by plants in process of growth, in areas that are properly cultivated. The great importance of such water to the dry farmer cannot easily be overestimated, hence it should be his aim to increase this supply to the greatest extent practicable. This, of course, can only be accomplished by keeping the soil sufficiently open to admit of the downward passage of all the water that falls, and by not cropping so frequently as to completely exhaust the supply.

Capillary water is the thin film that surrounds and adheres to each soil grain. It is the outcome of the attraction between soil grains and water which is always present. Because of the almost infinite number of the soil grains, an average soil may hold a large amount of capillary water. As the fineness of the soil grains increases, it is manifest that the capacity of the soil to hold capillary water will increase. Thus it is that the capacity of clay loams to hold capillary water is much greater than that of sandy loams. King is authority for the statement that the largest amount of water that can be held in clay loams varies from 22.67 to 18.16 per cent, in sandy loams from 17.65 to 10.67 per cent, and in humus soils from 44.72 to 21.29 per cent.

The movement of capillary water in the soil is upward when it moves. It climbs thus on the principle that oil climbs up through the pore spaces of a lamp wick when the lamp is lighted. The supply of oil that renews the flame is thus maintained until the oil is consumed, when the flame must cease. Capillary water is thus drawn upon as the supply above above becomes exhausted. It may be drawn up in two ways: first to supply water removed from the surface by evaporation, and, second, to renew the supply called for by plants in process of growth. If evaporation should virtually cease, as it does frequently in winter in the absence of plant growth, the movement of capillary water would practically cease for the time being. The movement of water in the soil may be thus summarized. (1) It enters the soil in the form of rain or melted snow. (2) It moves downward in the soil as gravitational water until it is converted into capillary water or until it reaches the water table below. (3) The distance that it goes down as gravitational water before it is converted into capillary water will depend mainly on the dryness of the soil and on the copious character or otherwise of the precipitation. (4) The rapidity of the downward movement will be accelerated by increase in the degree of the soil saturation. (5) It is being continually drawn upon by the influences of evaporation and to supply the needs of growing plants. (6) These drafts lead to that upward movement of the water known as capillary movement. (7) When the supply of capillary water is too small to meet the needs of the plants they languish proportionally in their growth. To maintain such supply is one of the most important questions that can engage the attention of the dry land farmer.

Hygroscopic water is water that is held within the soil grains. The proportion of the hygroscopic water in the soil varies in soils and in localities. In some very dry areas this percentage has been placed at less than 2 per cent.

Whether such water aids to any extent in promoting plant growth is a disputed question. It may aid in keeping the soil cooler than it would otherwise be in warm areas. It may also exercise some influence in bringing plant food into solution, but there is not enough of it present in the soil to make it a carrying agent.

The run off waters are those that flow away: (1) in quick melting of the winter snows; (2) from the downpour of torrential rains, and (3) from the continuance of prolonged rainfall. Especially in areas where "Chinook" winds prevail, the snow melts so rapidly that much of it runs away before it can sink into the soil. In much of the semi-arid country rain frequently falls in showers that are dashing in character. In some localities these assume the character of a downpour. Occasionally cloudbursts occur, and when they do the rain falls in sheets. When it falls thus much of the water is lost to the soil, much of the soil is also removed to lower levels and the gullying of the land becomes more pronounced. The aim should be, of course, to prevent such loss as far as this may be found practicable. The loss from the third source mentioned is seldo inserious, as prolonged and heavy rains seldom occur in dry areas.

(To Be Continued)

K. P.'S ARRANGE BANQUET.

The Knights of Pythias lodge of Bend will have high jinks this evening in the Sather Hall, in celebration of occupying their new quarters there. The first, second and third ranks will be put on during the evening. At 11:30 there will be an adjournment to Hotel Wright where a banquet will be served. The local lodge officials wish it to be known that all knights, whether members in Bend or not, are invited to attend and participate in the gayeties.

NOTICE FOR PUBLICATION.

Department of the Interior, U. S. Land Office at The Dalles, Oregon, October 21st, 1912.

Notice is hereby given that Ralph A. Dunn of Bend, Oregon, who on June 29th, 1906, made Desert Land Entry No. 641, Serial No. 0447, for E½NE¼, section 25, township 18 south, range 12 east, Willamette Meridian, has filed notice of intention to make final desert proof, to establish claim to the land above described before H. C. Ellis, U. S. Commissioner, at his office at Bend, Oregon, on the 30th day of November, 1912.

Claimant names as witnesses: Milo W. Wilson, Henry Starr, George E. Lowell and Kenneth R. Dunn, all of Bend, Oregon.

C. W. MOORE, Register.

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BRICK FOR CISTERNS.

The Bend Brick Company desires to call special attention to the advantages of using brick for cistern and similar work. It is the most economical and the most satisfactory material. 22tf

GIVE UNEXCELLED SERVICE.

Good barber service? That is what you want, of course. There is one shop in Bend where you always get this, at Innes & Davidson's, on Oregon street near Wall. Innes & Davidson's is the pioneer barber shop of the city, and they have, by their courteous and superior service, gained a large patronage. That haircut and shave that you need—better get them at Innes & Davidson's.

(Advertisement)

NOTICE FOR PUBLICATION

Department of the Interior, U. S. Land Office at The Dalles, Oregon, October 16th, 1912.

Notice is hereby given that Elmer A. Antes, of Bend, Oregon, who, on September 13th, 1911, made homestead entry No. 09482, for NE¼, Section 25, Township 20 South, Range 16 East, Willamette Meridian, has filed notice of intention to make final commutation proof, to establish claim to the land above described, before H. C. Ellis, U. S. Commissioner, at his office at Bend, Oregon, on the 30th day of November, 1912.

Claimant names as witnesses: Orlea O. King, Peter Jordan, O. C. Henkle and W. C. McCuiston all of Bend, Oregon.

C. W. MOORE, Register.

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NOTICE FOR PUBLICATION.

Department of the Interior, U. S. Land Office at The Dalles, Oregon, October 17th, 1912.

Notice is hereby given that Albert Harryman, of Bend, Oregon, who, on February 6th, 1909, made homestead entry No. 02460, for N½ NE¼, Section 7, Township 17 South, Range 12 East, Willamette Meridian, has filed notice of intention to make final three year proof, to establish claim to the land above described, before H. C. Ellis, U. S. Commissioner, at his office, at Bend, Oregon, on the 3rd day of December, 1912.

Claimant names as witnesses: John F. Young, Earl B. Houston, George Bates of Bend, Oregon, and George W. Horner of Laidlaw, Oregon.

C. W. MOORE, Register.

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NOTICE FOR PUBLICATION

Department of the Interior, U. S. Land Office at The Dalles, Oregon, October 16th, 1912.

Notice is hereby given that C. S. Benson, guardian of Jesse L. Poush, of Bend, Oregon, who, on June 19th, 1907, made homestead entry No. 15542, Serial No. 04113, for NW¼, Section 8, Township 18 South, Range 16 East Willamette Meridian, has filed notice of intention to make final five year proof, to establish claim to the land above described, before H. C. Ellis, U. S. Commissioner, at his office at Bend, Oregon, on the 26th day of November, 1912.

Claimant names as witnesses: C. H. Erickson, Oliver Erickson of Bend, Oregon, George T. Kitching and Ralph E. Gates, of Roberts, Oregon.

C. W. MOORE, Register.

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