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CONSERVATION OF RAINFALL

MEMORANDUM

ON THE

WORK OF COL. FREEMAN THORP ON HIS
FARM AT HUBERT, MINN.

From the report of Prof. W. J. Spillman to the
Secretary of Agriculture

PRESENTED BY MR. CLAPP

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MEMORANDUM ON THE WORK OF COL. FREEMAN THORP
ON HIS FARM AT HUBERT, MINN.

On August 18 and 19, 1913, I had the privilege of examining the farm of Col. Thorp, including his forest plantations, and of studying the interesting methods which he has there developed.

The most striking originality is apparent in all Col. Thorp's work. He is a man who thinks deeply and rationally on problems which arise in his work, and he has worked out a number of important problems in connection with farming, especially for his own locality, though some of these problems pertain to wide regions. I will discuss these problems separately and outline the solutions for them which Col. Thorp has found, indicating my opinion as to the general applicability of the methods developed.

SOIL.

The soil on Col. Thorp's tract is, in the main, a light sand, but interspersed here and there are considerable areas of muck land.

EMBANKMENT SYSTEM.

Col. Thorp has instituted on the 1,500 acres of land which he owns a simple system of embankments constructed at very small cost, which accomplishes the following purposes:

In the first place, it conserves the entire rainfall of the region, causing the water to soak into the soil without run-off. Secondly, it prevents soil erosion. In the third place, the prevention of erosion incidently prevents the washing away of soluble salts in the soil.

The embankments referred to are not so numerous as to prevent all surface flow of water, but they are so arranged, so far as I could see, over the whole tract as to cause all surface flow to lodge in places where it is beneficial rather than harmful.

Col. Thorp's tract may be divided into forests, pastures, and cultivated fields. The embankment system is found on all three classes of land. The prevention of run-off in his forest tracts appears to have greatly increased the growth of forest trees in those localities where the water is held by the embankments. He has purposely left one tract of forest without embankments, though whatever run-off occurs from it is caught elsewhere. The forest growth in this section of his timbered lands is much less satisfactory than in those sections where the embankments occur.

It might be urged that on lands as sandy as those in question there would be practically no run-off even without the embankments. It happened that while I was at this place a considerable rainfall

occurred. Water ran freely over sandy soils near Col. Thorp's house. But the system of embankments in that locality led this water into a garden tract, where it was useful.

I am of the opinion that in the sandy soils of the North the simple system of easily constructed embankments used by Col. Thorp could easily be made to prevent all run-off. The saving of moisture thus made would be less striking than in some other sections, on account of the sandy nature of the soil, yet the results on this farm show that the system is important even for these sandy soils. In arid and semiarid regions, especially where the soil is not sandy, and where rainfall when it does occur is more or less torrential, I am of opinion that this system would be of even greater value than it is on the sandy soils of northern Minnesota. In what we may call the semihumid belt lying between the humid regions of the East and the semiarid regions of the West the embankment system would doubtless be of great value and would insure crops in many years where there would otherwise be failure.

In this connection I would call your attention to the inclosed extract from the *Kansas Farmer* of July 19, by Prof. Edward C. Johnson, giving an account of a very similar embankment system in use in certain portions of the State of Kansas. Prof. Johnson gives it credit for marked effect on crop yields.

CONTOUR FARMING IN KANSAS.

By EDWARD C. JOHNSON, K. S. A. C.

[Extract from *Kansas Farmer*, July 19, 1913. Copyright, 1913.]

Contour farming is the name given to a system of farming on rolling lands which are contoured in more or less undulating ridges around the slopes in order to prevent excessive run-off and soil washing after torrential rains. It has been used for many years on the sandy, rolling lands of Alabama, Georgia, and the Carolinas, where soil washing is very troublesome, and is now being used in the best young orchards of Maryland and the Virginias. Until late years, however, contour farming was unknown in Kansas.

Adaptations of this system are now in use in this State in the northeast section to prevent soil washing and in western Kansas to catch and hold water. In Leavenworth County Mr. J. M. Gilman, famous corn man and experimenter, has commenced to work his rolling fields on a contour plan. With an improvised level consisting of a 2 by 4, 14 feet long, and a carpenter's level, he has laid off base lines in his fields with a slope of $1\frac{1}{2}$ inches to every 14 feet. These base lines are run at such a distance apart that the average drop from one to the other is 6 feet. This leaves the lines 30 to 60 feet apart. In plowing these lands Mr. Gilman throws the back furrows on the base lines and the dead furrows come midway between, thus ridging the land slightly. The same system of plowing will be followed from year to year until the fields are shaped into gently rolling contours or terraces, which will carry any excess of water and will prevent washing after the heaviest rains. Even this year, when the land has been plowed only once on this plan, soil washing has been effectively prevented. As the ridges are not abrupt but gently rolling, crops are planted on the land and handled without regard to the ridges.

In western Kansas, on the farm of F. J. and D. J. Rundle, Almena, Norton County, a still more interesting modification of contour farming is found. Here a system of contouring has been used for four years, not so much to prevent soil washing as to prevent useless waste of water by excessive run-off. In this region moisture is usually the limiting factor in crop production, and if every drop can be saved much is gained. Four years ago, therefore, the Rundle brothers devised a contour system to prevent waste of water. With the aid of a farm level, similar to a surveyor's level but much less expensive, they laid out base lines around the slopes on their rolling fields, 50 to 100 feet apart,

giving no slope to them whatever. In planting corn or sorghums they start the lister on a base line, listing parallel to this line until half the land is listed. The lister is then started on the next base line and continued on both sides of it and parallel to it until the listed furrows meet the listed portion next to the preceding base line. Any small irregular strips which may remain are then listed in short furrows parallel to one listed side or the other. When these are finished listing is started on the next base line, etc., until the field is planted. Now, when the rains come in torrents, as is often the case in western Kansas, the water is caught in the furrows, which often are filled from rim to rim, so that clear belts of water may be seen stretching around the slopes. After ordinary showers there is no run-off whatever, while after a torrential rain the run-off is reduced to a minimum and the water soaks into the ground instead of being wasted uselessly. The additional moisture thus utilized often is sufficient to insure successful crops, where if run-off were allowed failure would result. The Rundle brothers have had successful crops in seasons when their neighbors, farming according to the usual methods, have had little or nothing.

This system is also used when oats and wheat are grown, the land being ridged slightly along the base lines by an improvised grader or drag, made of planking, or by plowing back furrows along the base lines, leaving dead furrows midway between.

Contour farming could undoubtedly be utilized profitably in this State to a much greater extent than at present. In the northeast section there is much rolling land which is not cut up too badly to contour easily. Here contouring to prevent soil washing would be found practicable in many cases not only where general farming is carried on but also where young orchards are being planted.

In western Kansas rolling lands or lands sloping slightly are also exceedingly plentiful. Here, where every drop of water that comes should be saved and utilized to the utmost, contour farming will be a wonderful help in water conservation.

In humid and superhumid regions it is doubtful if Col. Thorp's system could be utilized without modification, on account of the excessive amount of moisture it would hold on the soil in many places. But by a very slight modification, such as is seen in the Mangum terrace described in Bureau of Plant Industry Circular 94, the system would add greatly to the proportion of the rainfall absorbed by the soil and at the same time dispose of the surplus which would be injurious rather than beneficial if held on the soil.

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