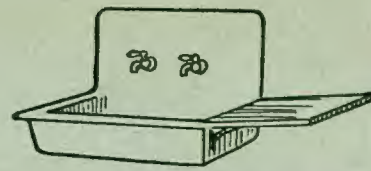
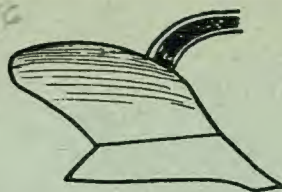
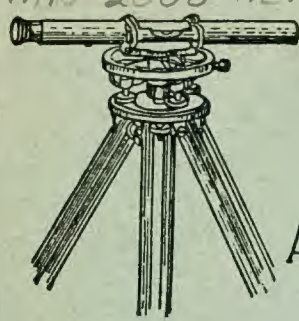


MIN 2000 AENL 16



AGRICULTURAL ENGINEERING NEWS LETTER

AGRICULTURAL EXTENSION DIVISION
UNIVERSITY OF MINNESOTA

UNIVERSITY FARM, ST. PAUL, JULY 15, 1933—No. 16

TERRACING FOR SOIL EROSION CONTROL

H. B. ROE

When sheet erosion becomes generally controlled gulying will be practically eliminated and the soil erosion problem in agriculture will be solved. The surest single means for control of sheet erosion is terracing of all fields subject to it. Terraces not only aid in retaining the surface soil but they also hold the water from rainfall on the slopes until most of it is absorbed by the surface soil.

CORRECT AND CAREFUL CONSTRUCTION ESSENTIAL

To be effective, terraces must be laid out with capacity to hold and to carry the water from rainfall; and they must be carefully constructed as to rate of fall and height of bank. Amount and intensity of rainfall, type of soil, and rate of fall of the natural ground surface, should determine terrace design. It is not practical to build terraces large enough to care for torrential rains occurring only once every year or two, as, on such, the slopes would usually be too steep to operate field machinery over; but they should be made of a size to handle ordinary rainfall.

A Level Required. To stake out terraces one must know how to handle a level. The principle may be mastered by any one who is skillful with his fingers and who adds and subtracts readily. For the method of leveling consult any surveyors' handbook or Extension Circular No. 36 of the University of Minnesota, Department of Agriculture.

Spacing. The horizontal distance between two terraces will change with the changing natural slope on any given field. The vertical distance will not greatly vary as it should be such that no appreciable washing of soil between terraces will occur. The vertical interval between terraces should increase with the rate of fall of the natural surface; otherwise, on steep slopes the horizontal interval will become so small that the bank slope from one terrace will tend to run into the ditch

behind the next terrace below, or else the bank slopes will be so steep as to make operation of field machinery over them impossible.

Width of Base. For the sake of permanence, easy maintenance and convenience in crossing terraces in field operations, they should have as broad bases as possible. The width may be increased each year by throwing the soil to the center of the terrace in plowing, until, on moderate slopes, the lower edge of one terrace meets the upper edge of the next terrace below and the whole field becomes a series of terraces. (See Figure 1.)

Rate of Fall. The rate of fall of a terrace should increase gradually from the upper end toward the outlet to prevent the water from the upper part of the terrace from piling up on that at the lower end before it has had time to get away, thus causing overflow and breaking of the terrace. Such a break in one terrace overloads those below it so that they are all apt to fail. Rules for terrace design within a wide range of conditions and the method of staking out terraces are clearly stated in U.S.D.A. Farmers' Bulletin No. 1669 "Farm Terracing."

Outlets. Outlet channels, to carry the water away from a system of terraces, are essential. A road ditch, a drainage ditch, or a gully may serve as an outlet but if the drop from the mouth of the terrace to the bottom of the outlet channel is so great as to cause a considerable waterfall some kind of a flume of sod, rock, concrete, or galvanized iron is needed to conduct the water from the terrace level down to the outlet ditch to prevent serious damage to the washing of either. Figure 2 shows such an outlet flume of galvanized iron. A rock apron at the base prevents serious cutting away of the bed of the ditch.

TERRACING EQUIPMENT

Good terraces can be built with a team and slip scraper, with a home-made plank



Fig. 2. Galvanized iron flume as terrace outlet. Fall about 10 feet. Location southeastern Minnesota

drag or a commercially built light drag grader drawn by a team or a light tractor; but experience has shown that, where time is valuable, the most effective and economical type of equipment for terracing in Minnesota is a heavy road grader or regular terracer grader with a heavy frame, and a high, curved adjustable blade, drawn by a crawler type tractor. Farmers who do not own such equipment can usually rent from some one in the community or from the township or county at a reasonable rate. A good operator of both tractor and grader is essential for economy and good results.

FARMING AIDS TO TERRACES

While terraces are the best final means of controlling sheet erosion their effectiveness is greatly aided by a permanent cover crop of some tough sod. A good stand of alfalfa on a terraced field will almost wholly stop sheet erosion. Contour plowing, planting, and cultivation—that is along the level and approximately parallel to the line of the terraces—helps greatly in holding the water from rainfall on the slopes until the soil has had time to absorb most of it. What gets by the tillage lines will be caught and further held by the terraces, so that, on a field thus operated, there is little and frequently no run off. Planting and cultivation diagonally across the line of the terraces is entirely practicable but contour tillage is increasing in popularity, where erosion is a serious problem, and it is recommended.

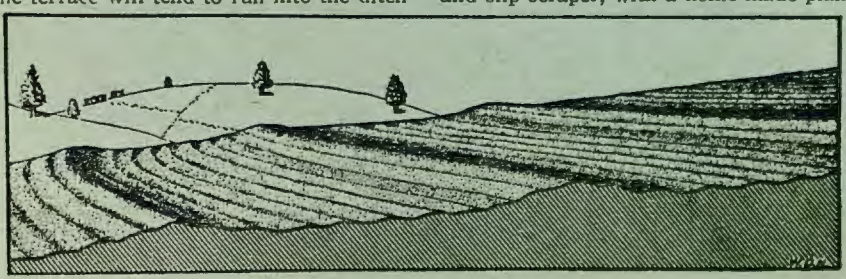


Fig. 1. Manguum terraces on a field slope showing how one blends into the other next below making the field a succession of terraces