PROBLEMS related to the utilization of straw in the light rainfall sections of the United States have changed and become more acute as wheat-harvesting methods have changed from the binder to the header and then to the combine. They have also become more acute as the period of cultivation of the soils becomes longer, the content of soil nitrogen and organic matter declines, and the original structure of the soil is destroyed. In general, straw has no commercial value throughout the light rainfall areas and can be used only to a limited extent in connection with the livestock industry; therefore, straw must be disposed of in one of four ways as follows: (1) Burning, a practice which is almost universally discouraged; (2) plowing under; (3) partial or complete incorporation with the surface soil by use of the lister or oneway; or (4) leaving the straw on the surface to rot as is accomplished by use of the chisel, duckfoot, blade, or sweep type of implement.

Most of the research work relative to the disposal of straw in the light rainfall areas has been conducted by the Division of Dry Land Agriculture, Bureau of Plant Industry, U. S. Dept. of Agriculture, in cooperation with the state agricultural experiment stations. During the last few years the Soil Conservation Service has contributed materially to the information on this subject. In the original work at the dry land experiment stations major attention was devoted to methods of tillage that would conserve moisture. Studies were limited largely to the effect of different tillage practices and rotations on the amount of soil moisture stored in the soil and the relation between these practices, the amount of moisture stored, and the yield of wheat. Only limited attention was given to the effect of the different Experiment Station are cooperating. The rotation at Colby consists of milo, fallow, wheat, each one year. The crops have been harvested by binding until during the last few years when the wheat has been combined. In one series only the residues, exclusive of the straw removed, of the crops produced were returned to the soil, while in a second series 3 tons of straw per acre were applied after the wheat. The former series the nitrogen content of the soil declined from 0.28% to 0.100% from 1916 to 1938. The series receiving the straw showed a reduction from 0.120 to 0.103% during the same period. This is a decrease of 21.7% where no straw was added in comparison with 13.5% where 3 tons were added once every three years. The carbon content of the soil declined from 1.25 to 1.01% on the no-straw plots and from 1.02% on the plots receiving straw. At Colby the application of straw aided in maintaining the nitrogen content of the soil but had practically no influence on the rate of loss of carbon.

At Hays the rotation was kafir, fallow, wheat each one year, and one series received straw at the rate of 3 tons per acre each third year and no straw was added to the other series. The nitrogen content of the no-straw series declined from 0.170 to 0.115% from 1916 to 1938, while on the series receiving straw the decline was from 0.170 to 0.120%. The percentage decline was 32.3 in the former series and 29.4 in the latter. The carbon decline was 31.1% carbon in the no-straw series and from 28.9% in the series receiving straw. The decrease of 31.1% carbon in the former series and 28.9% in the latter from 1916 to 1938.

The foregoing results show that the addition of 3 tons of straw per acre every third year materially at Colby and slightly at Hays in

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