OVER three-fourths of the agricultural lands of the country are more or less subject to erosion. The surface soils of today were the subsoils of yesterday, and it is safe to say that the subsoils of today will be the surface soils of tomorrow. Therefore, it is vitally important that we find the fertility possibilities of our subsoils. While natural forces gradually change the barren eroded soils into a much more productive condition, this is only a gradual change. If we know the deficiencies of subsoils, we are in a position to speed up this process. Chemical methods are of some value in determining the availability of soil constituents, but tests by means of growing crops are much more to be depended upon than is the solvent action of chemicals.

The work reported in this paper is a continuation of the investigations presented at the tenth annual meeting of the American Soil Survey Association held in Chicago in 1929 and published in Bulletin XI of that Association.

Complete fertility pot tests have been conducted with five Indiana surface and subsoils, the description and analysis of which are shown in Table 1. These soils vary from poorly drained to well drained and from thin high land to rich alluvial bottom land.

Ammonium nitrate, mono-calcium phosphate, potassium chloride, and calcium carbonate were mixed with the soils at the start, in various combinations, including complete treatment and in other combinations with one ingredient omitted. Nitrogen was added to the nitrogen pots for the second wheat crop. Minerals were applied only on the first crop.

Four crops were grown in succession on soils from four horizons of Crosby silt loam, a naturally level poorly drained type of upland soil. This soil was taken from the soils and crops experiment farm at Lafayette, Ind. It is now tile drained with the tiles about 3 feet deep and 59 feet apart. This soil has a rather heavy B horizon and the tile should be much closer to furnish adequate drainage. Fig. 1 shows the tile effect on corn on this land. Lack of drainage between tile lines prevents deep rooting of corn and other crops. On areas where little or no potash is applied, potash starvation causes depressed yields. This depressed growth of corn showing potash starvation symptoms is not seen where manure or fertilizer supplying adequate potash has been used. Root studies show that corn does not root much deeper than plow depth half-way between tile lines, but near the tiles it roots 3 or 4 feet deep, thus being able to secure potash as well as moisture from the subsoil.

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1 Contribution from the Department of Agronomy, Purdue University Agricultural Experiment Station, Lafayette, Indiana. Also presented at the annual meeting of the Society held in Washington, D. C., November 22 and 23, 1934. Received for publication November 28, 1934.

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