THE MEANING OF THE TERM SOLONETZ

by

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What is a solonetz soil? The term "solonetz", as applied to soils, is apparently used with different meanings by the scientists working in soil morphology and those working in soil chemistry. Morphologists apply the term "solonetz" to soils which have as distinctive morphological features a porous lighter-colored homogeneous sandy surface horizon resting on a dense, darker-colored columnar-structured heavy clay subsoil, while chemists apply the term to soils which have a high degree of sodium saturation in the colloidal absorption complex. As an illustration of the degree of confusion which exists in this field, the following may be cited: In 1927, while on the Soil Inspection Tour of the First International Congress of Soil Science, Dr. K. D. Glinka personally examined certain alkali soils at Salt Lake, Utah, and at Fresno, California, and pronounced them to be typical of the solonetz. Dr. K. K. Gedroiz pronounced each of these to be solonetz, basing his judgment on analyses published by Kelley. Both of these profiles contained substantial amounts of replaceable sodium, but neither had the morphology which has generally been associated with the "solonetz" profile.

There is evidence that many soil scientists, who apparently have not had opportunity to investigate the chemical and physical characteristics of these soils, have assumed that both the relatively high degree of saturation with sodium and the typical morphological characteristics are always present in the "solonetz" profile. We are unable to substantiate this assumption, but find positive evidence to the contrary. We have found, for example, that several different California soil profiles, each of which show well developed solonetz morphology, do not contain significant amounts of absorbed sodium. The colloidal absorption complexes of many of these soils are not only not saturated with sodium but contain relatively little absorbed sodium. In fact, the absorption complexes of many of these soils are practically saturated with calcium and magnesium. All the available evidence indicates that a sodium-saturated colloidal complex and the "solonetz" morphology are not coexistent in these soils. What, then, is a "SOLONETZ" soil?

The term "solonetz" was introduced into the terminology of the American soil classification by Dr. C. F. Marbut following his translation of Glinka's "Die Typen der Bodenbildung". From the translation of Glinka's works and through contacts with the Russian scientists in 1927, the workers in soil morphology in the United States and Canada have generally made use of the term "solonetz" to indicate soils whose profile shows the following general characteristics:

"An A horizon that is without any definite cap is followed by a B horizon which is sometimessubsidiary". The A horizon varies in the different regions, but in general consist of stratified fragments of alluvial, lacustrine, or marine origin. The solonetz soils, insofar as our experience goes, are all of secondary origin, being derived from transported and re-deposited parent materials. In many cases the amount of soluble salts is apparently higher in the horizon than in the column.

The columnar units are the most distinctive features of the solonetz profiles. In some cases there may be a very slight cut would appear as a massive or homogeneous mass of rather porous soil. When disturbed, this soil breaks into irregular lumps and with considerable amounts of fine powdery granular material. Usually the lower part of this horizon is of a lighter shade than the upper portion, and the lowest part is quite grayish. In the lighter-colored portion, and particularly in the grayest layer, the pores are vesicular and often make up a large proportion of the soil mass, giving a low volume weight. This surface, or A, horizon, generally of a rather sandy texture and from 30 to 50 centimeters in depth.

"The B horizon is a very heavy-textured dense clay which when dry breaks into columns whose vertical axis is two to four times that of the horizontal axis. These columns are characteristically rounded on the top and usually capped by the gray vesicular layer characteristic of the lowest part of the A horizon. The columnar horizon usually develops many secondary cracks, but in nearly every case these serve only to break the columns in smaller columns, maintaining the relative size of the original large or master column. The contact between the A and B horizons is abrupt.

The deeper B horizon (B2) usually to a roughly cuboid shape with the fragments having vertical and horizontal axes approximately equal. While the columnar horizon usually from 10 to 15 centimeters in depth, the cuboid horizon may vary from less than 10 to as much as 40 centimeters. The deeper portion of the cuboid horizon usually contains limonite and isertions as incrustations on the surfaces of the structural units or as small aggregates within the soil. Below the cuboid horizon soil usually is rather massive with little evidence of definite structural units and does not contain considerable quantities of lime.

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The columnar units are the most distinctive features of the solonetz profiles. The tops of the columns are in nearly every very definitely rounded, but the amount of gray material at the base of the A horizon which caps the columns, varies considerably. In some cases there may be a very slight