

Part A.

Processes of Soil Genesis

Soil is a fundamental resource. In order to use it wisely we must understand its inner workings, the processes that keep it dynamic. The strategy is reductionism, the reformation of complex notions and events into simpler, more basic ones. The task makes use of the concepts of forces and potentials, and of atoms, ions, molecules, colloids, enzymes, and organisms, the whole armory of modern science.

In the six chapters of Part A the behavior of water in ecosystems and the interplay of ions with inorganic and organic colloidal particles, including root surfaces, is first examined. In sequence, the genesis of clays from rocks and the creation of humus from plant remains and by microbial synthesis are explored. Also discussed are how the cardinal macromolecules, clay and humus, interact with one another and form aggregates, how bacteria guide the nitrogen cycle, and how invertebrates build structures and facilitate energy flow. The principles arrived at are brought to bear on horizon formation, as in clay and carbonate accumulations, gleysation, humus-depth functions, podzolization, and laterization.