APPLICATION OF SOIL SCIENCE IN TERRAIN INTELLIGENCE STUDIES
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The soil plays an important role in modern military activity; the mud of Italy and Okinawa and the loose volcanic sand of Iwo Jima are but two of the better-known examples of its influence on a battle or campaign. Movement across country of mechanized equipment and foot troops is partly controlled by the soil and the weather. Ease of excavation of field fortifications is a function of soil depth and properties. The soil, again, plays an important part in the field of military construction; roads, airfields, camps, and dumps are mainly temporary, hastily built structures that depend in large part on the natural soil for their foundations. Many other military problems involve the soil more or less directly, such as drainage and sanitation, camouflage, and the use of mines and mine detectors.

Terrain intelligence is advance information about the topography, vegetation, ground, and sub-surface conditions of enemy-held or otherwise inaccessible areas. The soil scientist, the geologist, and other specialists in the study of landscapes are particularly well trained to supply such information though they often need the cooperation of engineers and military men to give their work the necessary practical slant. Early in the war the Military Geology Unit of the Geological Survey, Department of the Interior, began producing terrain intelligence as part of a series of Strategic Engineering Studies published by the Army Engineers. The work was financed and requested by the Military Intelligence Division, Office of the Chief of Engineers, U. S. Army. The first studies were made by a rather small group of the regular Survey geologists, but as the value of the work was recognized by the Army, its scope was broadened, the staff was increased, and a number of soil scientists with varied backgrounds and experience were added. A cooperative agreement was made with the Soil Survey Division through which a number of soil scientists were loaned to the Unit. In addition to the generalized Strategic Engineering Studies produced in Washington, more detailed work on specific and small areas was done by teams assigned to the overseas theaters. Most of these teams included one or more soil scientists.

After some experimentation with the format of the terrain intelligence studies, they were issued as folios, each made up of a number of “sheets”. The sheets were concerned with terrain appreciation, road construction, airfield siting and construction, water supply, construction materials, geology, soils, and sometimes certain other subjects. Much overlapping occurred, as each sheet was largely sufficient. The soils sheets included a map, sketches, and one or two descriptive tables. Tables were really elaborated, detailed legends included in tabular form a general description of soils in each map unit, particular attention being given to the physical properties. Then, either in part of the same table or as a separate sheet, engineering properties were described. In most cases emphasis was placed upon soil features of interest to military engineers and purely agricultural information was omitted. Stress was laid upon properties as texture and consistence, permeability and drainage, and depth. Engineering properties included density, void ratio, moisture retention, estimation of how the soil would react to wheel loads and to compaction and stabilizing treatments, and features which might have an important influence on military activities were stressed.

These maps and reports were of the reconnaissance and detailed reconnaissance type. Not detailed soil surveys were available in any of the areas studied. Thus each map unit was commonly a graphic or land use unit, including a complex of associated soils in a definite pattern. The more detailed survey would have been too detailed for military work.

In addition to the sheets dealing entirely with information obtained by application of soil science, there were a number of other parts of the folios. Engineering soils descriptions went into the airfields sheet and the roads sheet. Information about surface soil was the most important element in the treatment of “ground conditions” in the sheets concerned with terrain and trafficability.

The application of soil science also aided in mining the probable nature of rocks and undated deposits when geological information was either inadequate or doubtful. The soil scientists’ familiarity with crops and natural vegetation contributed to the description of that part of the terrain.

The work done by the teams overseas was generally similar to that produced in Washington; there were a number of important differences. Instead of dealing with broad areas such as groups of islands or whole countries, these terrain studies were concerned with specific target areas and were aimed for tactical planning, and often for pre-briefing. Hence studies were done on large-scale maps, commonly at 1/10,000 or 1/25,000; more analysis was placed on map details and descriptive notes than in the Washington work.