wave potential of the first wave is 0.35 v and that of the second wave 0.68 v versus S.C.E. The diffusion current is directly proportional to the tungsten concentration, but the solutions more concentrated than about $10^{-3}$ molar exceed the solubility of the tungsten.

In the proposed method the sample is fused with sodium carbonate, leached with water, and filtered. The tungsten is complexed with tartrate and the solution acidified with hydrochloric acid. The percentage of tungsten is calculated from the diffusion-current constant obtained on standard tungsten solutions. Vanadium (whose wave surprisingly overlaps that of tungsten) is complexed with cinnamic acid, and iron is removed by the filtration. Molybdenum, tin, and antimony need to be removed if the molar concentration of any one greatly exceeds that of the tungsten. Any other ions present in the filtrate from the carbonate fusion are either not reduced in hydrochloric acid or their half-wave potentials are more negative than tungsten. Results on samples analyzed both polarographically and gravimetrically are in close agreement.

LAURA E. REICHEN

*U.S. Geological Survey*
*Washington, D. C.*

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## Geology and Ground Water Resources of the Matanuska Valley Agricultural Area, Alaska

THE agricultural area of the Matanuska Valley lies on a wide valley floor, most of which is formed by glacial deposits. Nonglacial unconsolidated deposits include wind-blown material distributed generally over the agricultural area and slope deposits along the valley walls. Small bodies of perennially frozen ground (permafrost) are present in some bogs.

Till ("hardpan"), possibly of late Wisconsin (Mankato) age, occurs at the surface or beneath surficial outwash gravel deposits in a large part of the valley floor. In several widely separated localities the till is known to be underlain by older glacial gravel, and the presence of an older till beneath this gravel is suspected. Several types of outwash deposits, most of them formed during glacial recession in this area, can be differentiated. Associated with glaciofluvial deposits of existing streams are estuarine deposits of glacial silt. The topography developed on the unconsolidated deposits is due chiefly to glacial deposition, large-scale stagnation of ice, and trenching of glacial deposits by melt-water streams.

Most wells in the agricultural area obtain water from gravel. Supplies sufficient for domestic and farm use are generally available wherever the gravel is saturated. Only little is known of the quantities of water available. Till in this area is relatively impermeable; most wells in till obtain water from included thin sand or gravel layers. Bedrock here appears to be relatively poor water-bearing material.

Recharge of ground water is chiefly from precipitation on the area, but parts of the area receive drainage from adjacent mountain slopes. Seasonal fluctuations of the water table of as much as several feet were observed during the period 1949–51.

Chemical analyses show that the ground water ranges from moderately hard to very hard but is otherwise satisfactory for general domestic and farm uses.

FRANK W. TRAINER

*U.S. Geological Survey*
*Anchorage, Alaska*

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