GEOLOGY OF THE COLUMBIA FALLS - JONESBORO AREA, MAINE

by

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Introduction

This report is based on geological information obtained by the writer and the principal field researcher, Dr. Richard L. Gilman, while mapping the Columbia Falls 15 minute Quadrangle during the years 1959-1964. This part of the geologic work represents eight days combined field days. Since the area is of low relief and heavily covered with glacial outwash and aeolian deposits, there are very few outcrop localities. The work must, therefore, be considered reconnaissance and generalized.

Location & Geology

The area included in this report covers a two-mile-wide strip overlying the track of the Maine Central Railroad line between the villages of Columbia Falls and Whitneyville, a few miles north of the ocean in eastern Washington County, Maine. The topography of the area is controlled by the flat lying, unconsolidated sand, gravel and cobble-boulder deposits of the Post-Wisconsin glacial outwash material. The drainage is fair to poor, depending upon proximity to the two major streams, the Chandler River on the west and the Machias River on the east. The eastern half of the area is swampy and of very low relief, averaging 60 feet. There are a few hills of 100-150 feet
in the western part of the area mostly related to the contacts between resistant and non-resistant bedrock formations. Depths of overburden to bedrock averages 40-120 feet for most of the area. Marine clay is present just above the bedrock as a 5-10 foot thick floor below the coarser sands and gravels. The surficial materials above the clay are not acceptable as a foundation base. Groundwater is plentiful and readily available from the gravel banks above the bedrock. Rainfall is normal and runoff quite rapid and not a problem. No local flooding has been reported. With the exception of small village populations in the two railway towns, Columbia Falls and Whitneyville, the area is uninhabited.

Bedrock Geology

The area is underlain by a variety of rock types: pink granite, gray potassic granodiorite, volcanic conglomerate and volcanic flows and tuffs, and a banded chlorite quartz schist. The granitic rocks are part of the Bays of Maine Plutonic Sequency which extends from Calais to Bar Harbor. The volcanic rocks represent surface equivalents to some of the Plutonic rocks. Both sequences are Siluro-Devonian in age, metamorphosed in mid Devonian and Permian time by the Acadian and later orogenies.

The chlorite schist is the oldest rock in the area.
It is of Cambro-Ordovician age, the basement of all northern Appalachian layered rocks. No major tectonic fracturing has been noted. The area is far enough north of the Lubec Fault System so that no breaks have occurred.

Description of Mapped Units

Quartz-Chlorite Schist. This unit is exposed in the western part of the area along the Pleasant River. It is described as a green-gray, dark green series of highly metamorphosed quartz, chlorite biotite, calcic feldspar schist and minor banded gneiss. There are several outcrops near Columbia Falls Village which indicate the massive, highly contorted character of the Schist. This unit is named the Ellsworth Schist in the Penobscot Bay area. It is an excellent foundation and construction material.

Volcanics and volcanic debris rocks. This rock unit occurs in an area east and south of Columbia Falls Village, and in the northwest part of Jonesboro Township. It is composed of metamorphosed intermediate to acid volcanic flows, tuffs and flow breccia containing binary feldspars, quartz and minor biotite and pyrite. It is generally gray-green, gray and black in color and is quite hard and resistant. Weathering has been very slight.

Volcanic Conglomerate. This unit represents an active and rapid erosion stage when the granites and older lava
flow rocks were reduced to a lower elevation during early Devonian time. It is composed of sands, gravels and boulders cemented into a volcanic mudstone matrix. The unit is gray to gray-green in color and has been subjected to regional east-west shearing forces which have produced a foliation that weakens the structural integrity of the formation.

**Pink Granite.** The unit is located in the center of the area, mostly within the Town of Jonesboro. This is a typical medium to coarse grained gray-pink two feldspar granite of the Lucerne type described by Chapman. It is weakly foliated but is generally quite massive and undisturbed. Weathering is not a factor in the strength characteristics of the unit.

**Gray Granodiorite.** This unit occurs as a single mass in the eastern part of the area. It is genetically related to the Jonesboro pink granite. It is gray-brown, gray in color with a sufficient percentage of biotite mica to give a spotted cast to the unit. The same general physical characteristics described for the pink granite can be used here.

**Structural Relations**

For the purpose of this report there is no critical structural information that applies. Both the granite and

granodiorite rocks are weakly foliated but with no significant pattern shown. There is a general N65°-80°E linear trend in the schist and volcanic rocks, owing to regional tectonic foliation. Only one presumed fault, north of Whitneyville, has been recorded. Unlike the area along the coast and on the islands, syn-tectonic faulting and shearing is not present along the Maine Central Railroad line. Competency and compressive strength of these lithologic types is not altered by metamorphism or tectonic activity.

Conclusions

The bedrock materials make an excellent foundation and can be used to make aggregate materials. Adequate drainage and level low relief of the surface provide unlimited site selection. Foundation points will have to be placed at considerable depth to reach bedrock.