GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 21 ½

LEGEND

PALAEOZOIC

CARBONIFEROUS
PENNSYLVANIAN (?)
- 11 — Red and brown conglomerate

DEVONIAN
- X/10 — Diorite and diabase sills and dykes
- 9 — Granite, granodiorite; 9a, gneissic granite to granodiorite

ORDOVICIAN
- 8 — Quartzite, slate, greywacke; minor basic volcanic rocks
- 7 — Basic volcanic rocks; interbedded slate; graphitic schist; iron-formation
- 6 — Quartz-feldspar porphyry; minor rhyolite; chlorite schist; 6a, feldspar porphyry
- 5 — Undivided 1, 3 and 4
- 4 — Acid to intermediate volcanic rocks; locally abundant agglomerate and breccia; minor sedimentary and porphyritic layers
- 3 — Quartzite, slate, greywacke; minor phyllite
- 2 — Paragneiss
- 1 — Phyllite, schist, quartzite; minor basic volcanic rocks; locally abundant gneiss

Contact metamorphic aureoles around bodies of 9; hornfels, biotite gneiss and schist . . . A

Rock outcrop . . . x

Geological boundary (defined, approximate, assumed)

Bedding, tops known (horizontal, inclined, vertical)

Bedding, tops unknown (inclined, vertical, dip unknown)

Gneissosity (inclined, vertical)

Cleavage (horizontal, inclined, vertical, dip unknown)

Axial plane of minor fold (inclined - no plunge, plunging; vertical - no plunge, plunging)

Lineation (horizontal, plunging)

Fault (defined, approximate, assumed; arrow indicates dip)

Glacial striae (direction of ice-movement known, unknown)

Esker

Mineral prospect (copper, Cu; lead, Pb, zinc, Zn) . . . XCu

Geology by F.D. Anderson, 1956 - 1958

Roads (all weather, dry weather)

Cart track

Intermittent stream

Marsh

Cartography by the Geological Survey of Canada, 1961

Approximate magnetic declination, 23° 20' West

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured

INDEX MAP

PUBLISHED, 1961
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

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MAP 41-1960
GEOLOGY
BIG BALD MOUNTAIN
NORTHUMBERLAND COUNTY
NEW BRUNSWICK

Scale: One Inch to One Mile = 1/63,360

Miles 1 ½ 0 1 2 3

DESCRIPTIVE NOTES

The map-area lies along the eastern edge of the New Brunswick Highlands[1]. Local relief varies from a few tens of feet in the southeast to several hundred feet in the northwest.

All but the southeastern part of the area is covered with a thin mantle of drift and is heavily forested. In many places in the southeastern part glacial outwash and post-glacial river gravels are more than 50 feet thick. Glacial striae indicate that ice-movement was from west to east. The presence of soft, deeply weathered rock outcrops in many places, however, shows that ice-abrasion was not intense.

Most of the rocks in the map-area have been divided on the basis of lithology and structural characteristics. Because of the absence of fossils, few exposed contacts, scarcity of outcrop, and complexity of structure, the original stratigraphic sequence is unknown, and it is possible that the units mapped are not stratigraphically significant.

A metamorphic assemblage of schists and phyllites (1) probably comprises the oldest rocks in the map-area. The composition and texture of these rocks shows that they were largely derived from a variety of sedimentary rocks although a few may have been derived from igneous rocks. Rock types recognized include quartz-sericite phyllite, talc schist, graphite schist, quartzite, slate, biotite and muscovite schists and gneisses, and amphibolite. Rocks that were apparently derived from siliceous rocks are most common in the eastern and southern parts of the map-area, whereas rocks apparently derived from argillaceous sediments and basic volcanic rocks are common in the western part.

A second group of metamorphic rocks consists predominantly of gneiss, with minor mica schist and feldspathic quartzite (2). These rocks occur along the margins of the gneissic granite bodies (9a) and as patches within unit 1. The sedimentary origin of the gneiss is clearly visible on Barracks Brook and on South Sevogle River, where bedding and other primary sedimentary features are distinguishable. Dips of the strata in this unit are generally much less than those of other units in the area.

Unit 3 may, in part, represent a relatively unmetamorphosed equivalent of unit 1. Although some phyllite, schist, and gneiss, similar to those of unit 1 in the eastern part of the map-area, occur within this unit, the predominant rock types are quartzite, slate, and greywacke.

Acid to intermediate volcanic rocks (4) are generally grey to white weathering and green to grey on fresh surfaces. They are commonly porphyritic and/or porphyroblastic, with an aphanitic groundmass. These rocks are commonly very schistose and, hence, difficult to distinguish from those of unit 6.

Quartz-feldspar porphyry (6) as mapped in nearby areas[2] occurs in lenticular bodies within the acid volcanic rocks (4). In many places this porphyry unit includes siliceous tuffs and porphyritic rhyolites. Feldspar porphyry (6a) is associated with rocks of unit 1. This porphyry has little free quartz, is only slightly sheared, and in many places exhibits a layered appearance that resembles bedding. Relatively low dips are common. Feldspar crystals transect boundaries between layers, suggesting recrystallization. This feldspar porphyry has the appearance of being of tuffaceous origin.

Basic volcanic rocks and associated sediments (7) are similar in character to those of a member of the Middle Ordovician Tetagouche group described in adjoining areas to the north and east. In the northeastern corner of the area the basic volcanic rocks are fine grained to aphanitic, dark green, and of andesitic to basaltic composition. They are rarely very schistose, and in many places contain calcitic amygdules and display pillow structures. In the western part of the area, unit 7 is generally highly sheared and here and there contains red, purple, and maroon slates, with narrow lenses of hematite. Northwest of Big Bald Mountain a few outcrops and erratics of porphyry similar to that of unit 6, occur within the outcrop area of unit 7.

Rocks of unit 8 are similar to those of unit 3; however, the slates and quartzites of unit 8 are associated with basic volcanic rocks and are commonly graphitic.

Two distinct types of granitic rocks occur in the map-area. Massive, pink to grey, coarse-grained, biotite granite to granodiorite (9) outcrops only in the western part of the area. Gneissic granitic rocks (9a) occur as lenticular bodies in several parts of the area. The gneissic bodies outlined near South Little River Lake, west and northwest of Mullin Stream Lake, and some of the gneiss exposed along South Sevogle River—all appear to be of intrusive origin. Other occurrences of granitic gneiss—in the extreme northwestern corner of the map-area, and on parts of South Sevogle River, Sheephouse Brook, and Lake Brook—appear to be granitized sedimentary rocks, as bedding and other primary sedimentary features are locally discernible. Along Lake Brook sedimentary rocks in various stages of metamorphism from unaltered rock to granitic gneiss are readily visible.

Diorite and diabase sills and dykes (10) are typically dark green on fresh surfaces and various shades of brown on weathered surfaces. They are medium to coarse grained, and locally display ophitic textures. Some of these rocks are highly sheared and are now essentially chlorite schists.

Three small patches of red and brown conglomerate (11) lie unconformably on rocks of unit 1 on tributaries of the North Sevogle and South Sevogle Rivers. These patches are interpreted as outliers of extensive flat-lying Pennsylvanian strata that occurs to the east of the map-area. However, this conglomerate may actually be recently limonite-cemented gravel.

Thermal metamorphic aureoles (A) are commonly present around the massive granite bodies (10). The rock types in the aureoles include biotite hornfels and biotite-quartz gneiss and schist. Andalusite, cordierite, and a little garnet have been noted.

The structure of the area is very complex. The rocks of units 1, 3, and parts of 5, regionally are essentially gently undulating, but in detail are intensely folded, sheared, and crenulated. Beds are commonly overturned, and here and there folds are recumbent. Cleavage planes are inconsistent in attitude and their origins are difficult to establish. Crenulations appear to have been formed both by microfolding of bedding and cleavage planes, and by cleavage folding of bedding and shear planes.

The paragneiss of unit 2 is generally undisturbed by minor deformations, and on a regional basis the attitudes of the gneiss indicate that it is conformable with unit 1.

The structural pattern of other layered rock units in the area, although simple in detail, is complex on a regional basis. The dips of the rocks in these units are, for the most part, essentially vertical. Strikes are more or less consistent in a southeasterly direction, except for those in the acid volcanic unit (4) in the north-central part of the area where the strike of the rocks changes from southeast to northeast and gives the impression of a broad open fold with a northerly trending axis.

Faulting has undoubtedly been largely responsible for the present distribution of the rocks. The faults shown on the map are drawn from topographic lineaments supported by geological and geophysical data. Many more faults are suspected.

Copper, lead, and zinc sulphides are common in most of the rocks in the area, but are rarely in sufficient quantities to be of economic importance.

Development of sulphide deposits has been restricted to those in unit 1. Bellechasse Mining Corporation, Limited investigated lead and zinc sulphides that occur disseminated and as veinlets in a fine-grained siliceous rock. The deposits appeared too small for full-scale development. Massive and disseminated copper-rich sulphides occurring in a chloritic schist were outlined by Kennco Explorations (Canada) Limited. This property has recently been purchased by Chesterville Mines, Limited, for possible production.

Neither of these deposits is associated with 'porphyry', although this relationship is common to most of the other sulphide deposits in the district.

[1] Weeks, L.J.: Geology and Economic Minerals of Canada; Geol. Surv., Canada, Econ. Geol. Ser. 1, p. 126 (1957).
[2] Smith, G.H.: Bathurst-Newcastle Area, New Brunswick; Geol. Surv., Canada, Map 1-1957.

MAP 41-1960
BIG BALD MOUNTAIN
NEW BRUNSWICK
SHEET 21 ½