CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

SHEET 21 H 9

LEGEND

PALAEOZOIC

CARBONIFEROUS

PENNSYLVANIAN

CUMBERLAND GROUP (9-13)

13 — *Purplish to brownish red sandstones and siltstones, some grey sandstone*

12 — *Red and grey conglomerates and sandstones*

Grey and greenish grey shales and sandstones, red shales, and minor conglomerate

10 — *Grey and greenish grey shales and sandstones enclosing a finer grained, coal-bearing zone*

10a *red sandstone and shale*

Mainly red and grey conglomerate, with minor sandstone

RIVERSDALE GROUP (7,8)

BOSS POINT FORMATION: greenish grey coarse- to medium-grained sandstones, interbedded with brownish red sandstones and shales

CLAREMONT FORMATION: conglomerate, red sandstones and shales

MISSISSIPPIAN AND/OR PENNSYLVANIAN

CANSO GROUP

6 — *SHEPODY FORMATION: red and grey sandstones, interbedded with red shales*

WINDSOR AND/OR CANSO GROUP

MARINGOUIN FORMATION: red sandstone and shale

MISSISSIPPIAN

WINDSOR GROUP

14 — *Limestone, gypsum, salt, and red beds*

HORTON GROUP

3 — *MEMRAMCOOK, ALBERT, WELDON, AND HILLSBOROUGH FORMATIONS, in structure-section only*

PRE-CARBONIFEROUS

Intrusive rocks ranging from granite to diorite

Metamorphosed sedimentary and volcanic rocks

NOTE: The position of the boundary between map-units 1 and 2 was obtained from Map 337A, Springhill

Bedding (horizontal, inclined, vertical, overturned)

Anticlinal axis (approximate)

Synclinal axis (approximate)

Fault (defined, approximate, assumed)

Coal seam (defined, approximate)

Gypsum

Salt spring

Coal slope

Bore-hole B.H.

Geology by W.S. Shaw, 1940, 1950

NO. 2

Provincial Highway

Road and buildings

Road not well travelled

Bush road or trail

Power transmission line

County boundary

Intermittent stream

Marsh

Contours (interval 50 feet)

Depression contour

Heights in feet above mean sea-level 600

Base-map compiled by the Topographical Survey 1942

Approximate magnetic declination 23°26' West

PUBLISHED 1951 SUPERSEDES MAP 337A, SPRINGHILL

PRELIMINARY MAP 51-11

SPRINGHILL

CUMBERLAND AND COLCHESTER COUNTIES

NOVA SCOTIA

Scale: 1/40,000

Miles 1 ½ 0 1 2 3

DESCRIPTIVE NOTES

The Cobequid Upland of pre-Carboniferous rocks extends along the southern margin of the map-area. On the north it is flanked by the Cumberland Lowland, which has been carved in the softer Carboniferous rocks. A fairly continuous mantle of glacial debris covers the southern and eastern parts of the area, but thins noticeably over prominent sandstone ridges in the north and west.

The map-area occupies part of the Cumberland basin of deposition, which is believed to have persisted throughout Carboniferous time. Its main outlines were determined by the positions of the rising Caledonian land mass in southern New Brunswick and the Cobequid land mass of northern Nova Scotia. The axis of strongest subsidence trended roughly northeasterly through the present site of Amherst, Nova Scotia, a few miles north of the map-area. The map-area, therefore, lies on the southern flank of the subsiding Carboniferous basin, with its northwest corner projecting into the axial region of the basin. Migration of the basin axis during Pennsylvanian time can be detected, but thus far insufficient data to measure the effect accurately.

In that part of the Carboniferous basin occupied by Springhill map-area, the rocks are, with the exception of the Windsor group, continental in origin. The section of Carboniferous rocks in the northwest corner of the area measures between 20,000 and 30,000 feet in thickness, including the subsurface Horton group. Near the margins of the basin, various unconformities preclude an accurate measurement, but it is apparent that only a very small thickness of sediments was deposited over the crests of the bordering land masses, and that this was probably restricted to Windsor time when the topographic relief was most subdued.

The pre-Carboniferous rocks of the Cobequid Upland may be broadly differentiated into metamorphosed sedimentary and volcanic rocks (1) and intrusive rocks (2) varying from a dominant, pink, coarse-grained granite to minor, dark-green diorite. On West and Brown Brooks, are fine-grained clastic rocks, some of them calcareous, bearing Silurian fossils. The Silurian beds are apparently interbedded with banded tuffs, breccias, and lavas. Other areas, underlain by similar volcanic rocks, are tentatively correlated with the Silurian beds but without evidence other than lithologic resemblance. Most of the intrusive rocks (2) are younger than the bedded rocks (1).

Horton group rocks (3) are not exposed in the map-area, but their presence is inferred from broader stratigraphic evidence. They are exposed to the northwest, in the adjoining Hillsborough map-area of New Brunswick, where, with the exception of a salt deposit penetrated by drills, they exhibit no other evidence of a marine environment. The petroliferous shale sequence in the Albert Formation of this group has been described as lacustrine in origin. In many localities about Caledonia Mountain, the rocks of the Horton group can be observed to overlap directly on the pre-Carboniferous terrain. At the eastern extremity of the Cobequid Upland, rocks of upper Horton age overlap the pre-Carboniferous rocks. A similar relationship is assumed to persist westward along the southern margin of the basin, where younger sediments have buried the contact.

The Windsor group (4) occupies restricted areas in the eastern extremity of the map-area, where its occurrence is marked by outcrops of gypsum, fossiliferous concretionary limestone and calcareous black shale, brine springs, and sink-holes, and where its complex structural relations with younger sedimentary formations preclude any close measurement of its thickness. The Windsor group is partly exposed in the axial zone of the Maude anticline, whose southern limb extends across the northern margin of the area. There, its main elements are, in ascending order, (1) red shales of unknown thickness and possibly the basal laminated limestone observed in neighbouring areas; (2) gypsum and salt interbedded with red shales and of undetermined thickness; (3) zone of red sandstones and shales about 800 feet thick; and (4) a calcareous zone 120 to 450 feet thick. A somewhat similar sequence may be assumed for the Windsor group of this map-area.

Along the shore of Chignecto Bay, the marine Windsor group was observed to grade upwards into the non-marine Maringouin formation (5), which is overlain by the Shepody (6), Claremont (7) and Boss Point (8) formations, and these in turn by the various facies of the Cumberland group.

Throughout this succession of strata no structural discordances were observed, and in fact all formational contacts were chosen more or less arbitrarily on the basis of dominant characteristics such as relative grain size, colour, content of coal seams, etc. It will be noted that this apparently continuous section is situated in the axial region of the subsiding Carboniferous basin, away from the axial zone and nearer the margins of the basin are several pronounced unconformities.

Along the Claremont anticline, whose axis passes through Springhill and Oxford in the adjoining Oxford map-area, the Claremont conglomerate rests directly on Windsor strata, and the equivalents of the Maringouin and Shepody formations are apparently missing. On Black River, a conglomeratic facies of the Cumberland group lies across the truncated edges of the Boss Point formation at an angle of about 40 degrees, and beyond the eastern margin of the map-area and along the contact with the pre-Carboniferous rocks of the Cobequid Upland, Cumberland conglomerate again overlays the Boss Point strata unconformably.

The Cumberland group (9-13) occupies most of the map-area. It contains important coal deposits, and has, therefore, been subdivided into units that are the most significant in delineating the distribution of the coal. Essentially it consists of a flat wedge of fine, dominantly grey, coal-bearing, clastic sedimentary beds enclosed by coarser, barren strata that are partly contemporaneous with it. The wedge has its edge lying along the Cobequid positive axis and thickens northward. Its regularity is broken on the eastern extremity in an area immediately north of Springhill that was structurally active during deposition. For a considerable part of early Cumberland time, this area was maintained at least slightly above the general level, and the sediments did not completely overlap it until later.

This structurally positive area is complex, and lack of outcrops prevents a clear statement of its history. The writer's interpretation is that folded structures, trending northeasterly, were initiated during late Carso time, and that later folding, particularly in early Cumberland time, occurred along the same lines and resulted, in places, in overturned folds and thrust faults. The Cumberland group eventually overlapped the entire positive area, and relatively gentle folding followed, accompanied by small displacements along the established fault zones. The Joggins-North Springhill group of coal seams overlaps this positive area from the west, whereas the Springhill group of seams overlaps it from the south. It is improbable that any of the seams of either group ever completely covered this positive area.

West of Springhill and away from the positive area, structure-sections were drawn across the syncline that separates the Springhill from the Joggins-North Springhill districts. The Chignecto seam of the latter was considered, within a short distance, with the lower workable seams (Nos. 6 and 7) of the Springhill group. A rather low precision in the structure-section may be expected across the broad intervening syncline, yet a close relationship is indicated between the two groups of seams. It is believed that the lowest seams of the Joggins group lie stratigraphically below the lowest seams of the Springhill group; a relationship that would conform more closely with the obvious overlap of the Cumberland group southward onto the rising Cobequid land mass.

The workable coal seams of the Springhill district are restricted by the original distribution of the peat-forming bogs, which were bounded on the south by the rising Cobequid land mass and on the north by the structurally positive area referred to above. The belt of highest quality coal, which is not more than 6,000 feet wide in most of the seams, trends, with some irregularities, about south 65 degrees west on a centre line through a point near the Springhill railway station. Barring unforeseen complications, this belt of workable coal should eventually be found to spread more widely to the north in each seam, when the workings have been carried beyond the influence of the positive area north of Springhill. The lowest workings in the No. 2 seam have not as yet reached this more favourable area, and how far they must be extended to reach it cannot be predicted at the moment.

The number of workable coal seams in the Joggins-North Springhill district decreases from five in the western extremity to one at Chignecto. This latter seam may be traced eastward to beyond Fenwick where it splits into several seams, two of which have been worked at North Springhill. These deteriorate eastward, and finally disappear into barren, coarse sediments before reaching Little Forks River. The seams display considerable irregularity and may deteriorate locally in any direction; in places the direction may be predicted reliably for short distances. Over most of this district the seams will probably extend southward, with similar local irregularities, for a considerable distance. Towards the east, however, they will deteriorate, and eventually will terminate against the northern margin of the positive area that separates this district from the Springhill district.

In the Ash Spring district, the Sandrun coal seam averages between 2 and 3 feet in thickness along most of its outcrop length, and disappears to the west and northwest. The seam cannot be confidently correlated with any of the seams beyond its restricted area, but the northwest extension of the No. 2 seam of the Springhill group strongly suggests that this seam may have overlapped the positive area to that extent. The fact that the thickest part of the Sandrun seam falls on the centre line of thickest coal in No. 2 seam corroborates such a contention.

Gypsum and salt occur in parts of the areas mapped as Windsor, but the complex structural relations, together with the heavy mantle of drift, will make prospecting difficult. It may, however, be expected that the structurally incompetent gypsum and salt will be piled up along the axes of the anticlinal folds. Sandstones suitable for grindstones and building stone may be found in the Boss Point formation and in certain parts of the Cumberland group.