CANADA

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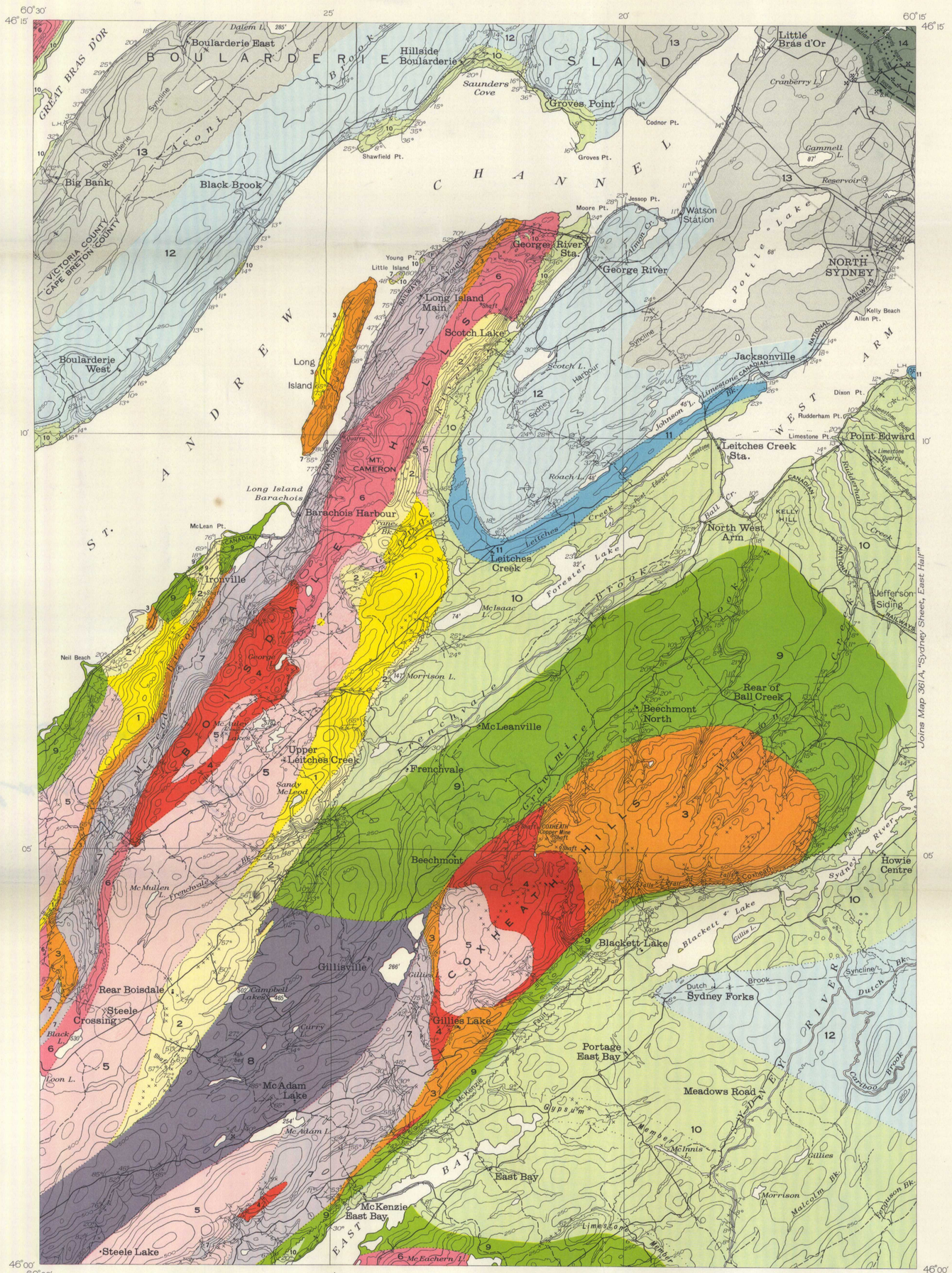

LEGEND

PALAEOZOIC

CARBONIFEROUS

PENNSYLVANIAN

14 — MORIEN SERIES, *Ptychocarpus unitus* zone: (*Anthracomya* zone): grey sandstone and shale, thin beds of freshwater limestone, intercalated red beds, workable coal seams

13 — MORIEN SERIES, *Linopteris obliqua* zone: grey arkosic grit and sandstone, some shale and conglomerate, a few red beds, a few workable coal seams

12 — MORIEN SERIES, *Lonchopteris* zone: grey conglomerate, arkosic grit and shale, a few red beds, thin coal seams

11 — CANSO SERIES, POINT EDWARD FORMATION: red and grey conglomerate, sandstone and shale, thin beds of freshwater limestone

MISSISSIPPIAN

10 — WINDSOR SERIES: limestone, anhydrite, gypsum, shale, sandstone, conglomerate

9 — WINDSOR SERIES, GRANTMIRE MEMBER: conglomerate, sandstone, shale

DEVONIAN

8 — McADAM LAKE FORMATION: conglomerate, arkose, shale, tuff

ORDOVICIAN AND CAMBRIAN

7 — Conglomerate, grit, sandstone, shale

PRECAMBRIAN (?)

6 — Granite

5 — Granodiorite, quartz monzonite

4 — Quartz diorite

3 — Pyroclastics, rhyolite, quartz latite, dacite, andesite

PRECAMBRIAN

2 — GEORGE RIVER SERIES: crystalline limestone or dolomite

1 — GEORGE RIVER SERIES: quartzite, schist, gneiss, amphibolite

Geological boundary (approximate, assumed)
Bedding (inclined, vertical, overturned)
Glacial striæ
Rock outcrop (attitude not determined)
Coal seam (approximate, assumed)
Anticlinal axis (approximate)
Synclinal axis (approximate)
Fault (approximate, assumed)
Bore-hole B.H.
Prospect pit
Slope
Fossil locality (F)

Geology by W. A. Bell and E. A. Goranson, 1930, 1931.

Scale, 1 Inch to 200 Miles

MAP 360A

SYDNEY SHEET

(WEST HALF)

CAPE BRETON AND VICTORIA COUNTIES

NOVA SCOTIA

Scale, ~~63,360~~ or 1 Inch to 1 Mile

Miles 1 0 1 2 3

Kilometres 1 0 1 2 3 4 5

Approximate magnetic declination, 25°55' West.

LEGEND

Road
Road (not well travelled)
Trail
Post Office
Bridge
Abandoned railway
Lighthouse LH
County boundary
Contours (interval, 50 feet)
Elevation in feet 525'

Compiled and reproduced by the Bureau of Geology and Topography from information supplied by Federal Government Departments.

GENERAL GEOLOGY

The oldest rocks in the area, the George River series (1, 2) are crystalline rocks, essentially of sedimentary origin. They strike northeasterly and dip steeply to the north or south. The series is divided into two groups on the basis of lithology and distribution, a quartzite-schist-gneiss member (1) and a carbonate member (2). Field evidence, not entirely satisfactory suggests that the carbonate member overlies the quartzite-schist-gneiss member. The latter consists mainly of pure and impure quartzite, schist, phyllite, gneiss, meta-argillite, and some amphibolite. The carbonate member is mainly crystalline limestone or dolomite, with or without secondary silicates.

The Precambrian (?) volcanic rocks (3) apparently overlie the George River series and are considerably less metamorphosed than the latter. They are mainly pyroclastics, with some rhyolite, quartz latite, dacite and andesite; some of the andesite bodies may represent shallow seated intrusives. On the shore of Long island, Middle Cambrian sediments overlie the volcanic rocks apparently with slight angular unconformity. The base of sediments is a conglomerate made up of volcanic pebbles. The age of the volcanic rocks is therefore definitely pre-Middle Cambrian and possibly post-George River.

The plutonic rocks (4, 5, 6) of the area consist of four main petrographic types, quartz diorite, granodiorite, quartz monzonite, and red granites. The red granites are further divided into micrographic granite and sodic granite. The plutonics intrude the George River series and the Precambrian (?) volcanic rocks. They are believed to be closely related in age and were intruded in the order named either in late Precambrian or very early Palaeozoic time. A small stock of diorite porphyry occurs in the Coxheath hills and is probably related to the quartz diorite.

A variety of dyke rocks cut the plutonic and older rocks and include pegmatite, granophyre, ceratophyre, lamprophyre, bostonite and diabase. Pegmatite dykes were found only in the George River crystalline limestone on the south flank of the Boisdale hills. The other dyke rocks with the exception of bostonite and diabase are confined mainly to the plutonic bodies.

The Ordovician and Cambrian strata (7) include arenaceous and argillaceous fossiliferous marine sediments that carry fossil faunas of Middle Cambrian, Upper Cambrian, early Ordovician and Middle Ordovician (?) ages. The Middle Cambrian sediments are mainly sandstones, grits, sandy shale and some conglomerate; the Upper Cambrian and early Ordovician rocks are mainly black and grey shales. Middle Ordovician (?) sediments have been recognized 1½ miles S.S.W. of McAdam lake and are conglomerates and black shales. The early Palaeozoic sediments are tightly folded and strike northeast. No igneous rocks were found cutting them.

The McAdam Lake formation (8) consists of grey fresh-water arkoses and conglomerates that are generally highly inclined. Outcrops are too scattered for determination of succession of beds and the structure is consequently doubtful. It is assumed that the base of the formation rests upon the Precambrian (?) granitic rocks and early Palaeozoic sediments of the Coxheath hills and that the formation is faulted against the Precambrian rocks of the Boisdale hills. Near McAdam lake there is a bed of carbonaceous shale at one time prospected for oil shale and a mile to the north an interbedded volcanic fragmental rock is poorly exposed. The formation contains fragments of plants that belong to the *Arthrostigma-Psilophyton* flora and is hence of Lower or Middle Devonian age. It is overlain unconformably by basal conglomerate of the Windsor series.

The Windsor series (9, 10) of Upper Mississippian (Viséan) age is extremely variable and is characterized locally by a thick deposit of chocolate-red conglomerate probably deltaic in deposition and hence affording a computed thickness probably much greater than the actual. About 3,500 feet (computed) of red conglomerate with interbeds of red sandstone and shale in the Coxheath district is capped near Point Edward by 750 feet of Upper Windsor marine limestone and alternating red conglomerate and shale. In Frenchvale valley basal conglomerate, thin marine limestone and calcareous grey sandstone of Lower Windsor age is present in addition to limestones of the Upper Windsor; the base of the Upper Windsor there consists of fine conglomerate, red shale and probably some gypsum. Farther north, in the district of Saunders cove, the basal part of the Upper Windsor consists mainly of limestone, limestone breccia and gypsum. On the southeast flanks of the Coxheath hills thin limestone and calcareous sandstone of Lower Windsor age again overlies basal red conglomerate, whereas the top of the Lower Windsor along the south margin of the map-area includes a thick limestone; some 800 feet stratigraphically above this limestone is a thick gypsum member that probably belongs to the base of the Upper Windsor. McInnis lake, the lake at East Bay, Blackett lake and Sydney river near Howie Centre presumably owe their origin in part to solution of this gypsum. On the flanks of the Boisdale hills fossiliferous limestone of Lower Windsor age rests directly upon older rocks and locally forms the base of the series. Where thick deposits of conglomerate lie below marine limestone or sandstone of Lower Windsor age and form the base of the series they are mapped as the Grantmire member (9).

The Point Edward formation (11), a division of the basal Pennsylvanian Canso series is conformable in attitude with both underlying Windsor rocks and overlying rocks of the Morien series. It is definitely separated from the Morien series by a pronounced erosional interval, and over a large part of the area was completely removed prior to deposition of the Morien rocks.

The Morien series (12, 13, 14) includes Pennsylvanian rocks of upper Westphalian age, homotaxial with strata of the Pictou series of the mainland of Nova Scotia. It is subdivided into three zones on the basis of fossil content; but the boundaries between these zones were chosen arbitrarily. The uppermost or *Ptychocarpus unitus* zone (*Anthracomya* zone) (14), the main coal-producing zone, has slight representation within the map-area. The middle or *Linopteris obliqua* zone (13) oversteps the basal zone in Boularderie and overlaps there upon Windsor rocks. In Boularderie the zone consists of conglomerates, arkosic grits and sandstones; in Sydney harbour it is mainly sandstone. The maximum thickness of the zone is about 2,300 feet. The *Lonchopteris* zone (12) is mainly sandstone although the sediments become coarser and arkosic northwards in Boularderie. The maximum thickness of the zone within the area of outcrop is probably less than 2,000 feet.

ECONOMIC GEOLOGY

Metallic minerals occur at several localities and include iron, copper, lead and zinc ores. The most important occurrence is at the Coxheath Copper Mine where chalcopyrite is found along parallel, steeply dipping shear zones in quartz diorite and andesite. The chalcopyrite is associated with hematite, magnetite, pyrite and tourmaline. Chalcopyrite is sparsely distributed in a roof pendant within red granite at the eastern end of the Boisdale hills. Some small bodies of hematite and magnetite are found in the George River series. Galena and sphalerite replacements in the carbonate member of the George River series occur south of Steele Crossing and two and a half miles to the northeast.

Quartzite and dolomite are quarried from the George River series on the south slope of the Boisdale hills. Red granite is quarried for crushed rock about one mile north of Barachois Harbour.

Coal, limestone and gypsum are the important economic rocks of the Carboniferous areas. Gypsum occurs at sea level in Saunders cove though the supply at the surface is insufficient for present development. A thick bed of gypsum, mainly covered by drift, occurs at, and west of, McInnis lake. Limestone has been extensively quarried at Point Edward. There is a limited amount along the shores of Saunders cove and on Moore point and lower part of George river, whilst a band of limestone, largely concealed by drift, runs from Leitches Creek station to McIsaac lake. Outside of Point Edward the most important reserve of limestone is located south of McInnis lake along the south margin of the map-area, where a member, 100 feet or more thick, is partly exposed and over a large area is only thinly covered by drift. It runs in a southeasterly direction beyond the map-area.

Workable coal seams are confined to the extreme northeastern corner of the area where the Edwards (= Bouthillier seam of Glace Bay map-area), Indian Cove (= Backpit seam of Glace Bay map-area), Collins (or Stony) and Mullins seams occur. Each of these seams has a mean thickness of about four feet. The Mullins seam whilst sufficiently thick to be workable at North Sydney is believed to thin rapidly northwards. Several thin coals of little economic value at present occur at horizons between the Collins and Mullins seam.