Cobequid – Chignecto



1. Milford Drumlins – low oval, dome-shaped hills – consist of sediment bulldozed and shaped by glaciers, which retreated from Nova Scotia by 12,000 years ago. They commonly make excellent farmland, such as this example near Highway 102 in the Milford-Shubenacadie area. Citadel Hill in Halifax (28a) and many islands off Nova Scotia's South Shore are other







3. Burntcoat Head

This location is ideal to see red Triassic sandstone and conglomerate, some of which **4. Truro** reptile bones discovered nearby.

show distinctive cross-bedding (preserved As it cascades over waterfalls and rapids underwater sand ripples) produced by to meet the Salmon River, Lepper Brook in currents in long-disappeared rivers. The lighthouse holds a small display of fossil

Western Shore



35. Cape Forchu various times in the past, Nova Scotia had active volcanoes, as shown by these meta morphosed Silurian volcanic rocks around the lighthouse at Cape Forchu (35a). The inset (35b) shows a volcanic lava "bomb" set in ash.



36. Cape St. Mary

sedimentary rocks of the Cambrian-Ordovician Halifax Group form these cliffs at Cape St. Mary. Similar rock outcrops occur along the Atlantic coast, such as at The Ovens and Blue Rocks (32). These rocks are characteristic of a microcontinent known as the Meguma terrane that originated near Africa and joined what was to become North America by about 360 million years ago (see also 7).

1400



ghtly folded Cambrian-Ordovician metaphosed sedimentary rocks can be seen on e exit ramp off Highway 101 (exit 24 East) near Digby. Here the fold is enhanced by a afic sill (lighter colour) that was intruded parallel to the bedding in the buried sedinentary rocks and then folded and metaorphosed along with them.

1000

600

Precambrian

arious rock types and ages

(sites 19, 22, 23)

1200

various rock types

Precambrian

Blocks to the right show the rock types and age for the sites above, coloured to match the geological map.



On a falling or low tide, walk eastward along the beach at Five Islands Provincial Park past Jurassic sandstone and mudstone (to the left in photo) to The Old Wife. Looking east from re, you will see the dramatic scene shown to the right in the photo with Triassic basalt lava flows (long ago solidified to rock) overlying mostly red sedimentary rocks of Triassic age. (See also location 40.)











6. Parrsboro

Canada's oldest dinosaur skeletons have been excavated in earliest Jurassic sedimentary rocks at Wasson Bluff (6a) near Parrsboro, but the fossils are hard to see if you are not an expert. Rocks here are mainly complexly faulted and tilted latest Triassic to earliest Jurassic sandstone and basalt. Minerals such as celadonite (6b), stilbite (6c), and chabazite (6d) can be found here and at nearby Partridge Island (6e). Basalt cliffs are most impressively exposed farther west, at Cape d'Or near Advocate (see cover photograph).



Some 390 to 350 million years ago, a fragment of continental crust, or microcontinent, that geologists call the Meguma terrane slid into place along a fracture known as the Cobequid-Chedabucto Fault Zone. This fracture is analogous to today's San Andreas Fault Zone in California and is a prominent feature of geological and topographic maps of Nova Scotia. A good place to see it is at Crossroads, north of Parrsboro, where the Fundy lowlands on the south side are in stark contrast with the Cobequid Hidblands to the north. This actively view if for the runty low is for the runty low is for the runty low. with the Cobequid Highlands to the north. This aerial view is farther west, near Port Greville.



The cliffs of Brier and Long islands are made of that heralded the birth of the Atlantic Ocean. As the basaltic lava cooled, in many places it ormed polygonal columns, as on Brier Island (38a) and at Point Prim near Digby. Near iverton on Long Island, the columns have eroded to form the Balancing Rock (38b).

38. Digby Neck and the Islands 41. Blue Beach

The sandstone and mudstone at Blue Beach (41a) were deposited along the shores of early latest Triassic basalt, the product of eruptions Carboniferous lakes. As you walk the beach, you will find preserved ripples (showing that the sediments were deposited in water), mud cracks (41c; diagnostic of drying conditions), and perhaps even ancient raindrop imprints. Many fossils can be found at Blue Beach, which experts hail as the best place anywhere to see the diverse remains and trackways of early non-marine vertebrates, including those of freshwater fish and amphibians (41b). The round depressions in 41c are relicts of long-decayed tree stumps.





granite rocks (sites 22, 23)

Friassic sedimentary rocks formed in lakes and rivers over 200 million years ago, when Nova Scotia was at lower latitudes. These rocks form the red cliffs, for example, at Blomidon.

sites 7, 24, 25, 26, 27, 28, 31, 32, 34, 36, 37)



42. St. Croix (42b) ing from Halifax to Windsor on Highway 101, it's hard to miss the white gypsum cliffs at St. Croix (42a). The gypsum, like the salt mined at Pugwash, represents mentary deposits of



rocks of southern Nova Scoti

various rock types (sites 8, 18, 19)

granite rocks of varying age (sites 20, 29, 30, 34)

(sites 35, 36)











were first to recognize the international significance of Joggins in telling the story of life's past, a uniqueness recognized in 2008 by its designation as a UNESCO World Heritage Site.

Northumberland Shore

10. Malagash These ripple marks at Treen Bluff near flood plains during the Carboniferous Period.



The coastal lowlands of Nova Scotia's North Ialagash appear as if created yesterday, but Shore reflect the underlying, easily eroded were made by rivers that flowed across sandy Carboniferous-Permian sedimentary rocks. Similar rocks extend across Northumberland Since then, the sediment has been compacted Strait, forming the famous red cliffs and soils



12. Arisaig

The cliffs at Arisaig (12a) are formed mainly of Silurian limestone that contains a variety of fossils such as crinoids (sea lilies; 12b). Other fossils found here include brachiopods, nautiloids, trilobites, and graptolites. Antigonish - Monks Head

k. On the other side of Antigonish, gypsum can I from evaporation of sea water under a dry tropical climate.



Cape Breton Island

WINT WINT PARAMENTER

15. Mabou Coal Mines

that are cut by faults (where the sedimentar ayers are abruptly cut off). The white rock to

the right is gypsum. As well as faults and a

can be found in the low cliffs behind the small

beach to the southeast of the wharf.

variety of rock types, an unconformity (se



14. Port Hood Look closely and you will see evidence of a Carboniferous forest that existed here when Nova Scotia lay close to the equator. Shown is a fossil root of a clubmoss tree. Some clubmoss trees may have been several tens of metres tall.

Bedrock geology map

(See geological time scale

below for rock types and ages)



16. Margaree and Inverness / Margaree Harbour Cliffs of late Carboniferous sedimentary rocks outcrop along the coast, for example at Margaree

17. Baddeck

Over time erosion has molded the landscape into a plateau with V-shaped v

Sinkholes, like this one just north of the Trans-Canada Highway east of Baddeck, are typical of landscapes underlain by gypsum of the Carboniferous Windson Group. Gysum, like rock salt, potash, and in some places limestone, is easily dissolved by groundwater, formin ressions and caves and even underground collar 18. Cheticamp / MacKenzie Mountain The MacKenzie Mountain look-off (18a) offers breathtaking views o ndscape formed in ancient gneiss (as in "have a gneiss day"; 18b) and grani



produced by fast-flowing streams.

Eastern Shore



23. Canso Causeway

The causeway is constructed of Precambrian ranite quarried in the 1950s from Cape cupine, the prominent hill on the mainland, east of Aulds Cove. Granite continues to be quarried for aggregate (crushed rock) and shipped to destinations such as Florida and New York. The low-lying Cape Breton Isla side is underlain by Carboniferous rocks. The deep Strait of Canso is underlain by a fault Building the causeway resulted in an ice-free harbour at Port Hawkesbury.

24. Canso

The coastline around Canso provides almost continuous exposures of Devonian granite and Cambrian to Ordovician metamorphosed sedimentary rocks, which in places have been tilted almost to vertical. These rocks underlie much of Nova Scotia south of the Cobequid-Chedabucto Fault Zone (7). Part of the archipelago in view is Canso Islands National listoric Site, a British base in the 18th Century that predates Halifax.

25. Eastern Shore

Glaciers, powerful agents of both erosion and leposition, molded most of Nova Scotia's andscape during the last glaciation, with glaciers finally receding only about 12,000 years ago. At Taylor Head Provincial Park, the glaciers have polished Cambrian metanorphosed sandstone, the grey rocks in the ground in 25a. In the same photo, in the middle distance, are erratic boulders of Devonian granite carried here from inland Nova Scotia by the ice sheet. At Clam Harbour Beach, a short hike northeastward leads to an amazing surface with natural grooves and striations (25b) carved by glaciers. Note that the ice advanced over these rocks more than once because the striations are not all aligned in the same direction. Drumlins (1) are common along the Eastern Shore, and many are cut by e coastline, as at Lawrencetown (25c).

> 100 Quaternary - 0 Paleogene Neogene glacial feature and deposits form during the last glaciation (see reve sites 1, 20, 25, 26, 28, 30, 33

Cretaceous Geological Time Scale highlighting the rocks of Nova Scotia

Main map: Simplified geology generated from DP ME 43, Version 2, 2006. Digital Version of Nova Scotia Department of Natural Resources Map ME 2000-1, Geological Map of the Province of Nova Scotia, Scale 1:500 000, Compiled by J.D. Keppie, 2000.

South Shore



31. Rissers Beach – Green Bay tary rocks underlie this area. Cambrian and Ordovician metam At Rissers Beach white outcrops of metasandstone emerge from the sandy





32. Blue Rocks Blue Rocks is a good place to see Cambrian to Ordovisian sedimentary rocks that have been compressed into metamorphic rocks. The briginal sedimentary bedding can still be seen in the light and dark colour banding, and ripple marks can still be seen in some of the beds. The original beds were deformed when the rocks were buried and crushed by forces related to Peggys Cove lighthouse stands on 375-million-year-old Devonian granite that has been polished to the movement of tectonic plates, the deformits present smoothness not by the sea but by glaciers that retreated by about 12,000 years ago. The ation expressed by the slaty cleavage, or granite formed from molten magma that cooled and crystallized several kilometres deep in the parallel fractures, in the rocks. Similar rocks Earth's crust and was exposed at the surface by later erosion. Darker inclusions of older can be seen in Point Pleasant Park (26) in Halifax

Carboniferous

(sites 13, 15,

mainly lake and river in Windsor Sea 📄 (sites 9, 10, 11, 14, 16, 21, 23)

marine sedi- non-marine sedimentary rocks

mentary rocks (mainly river and swamp deposits)

millions of years ago (Ma)

(sites 2, 4, 19, 23, 41) 17, 19, 42)

non-marine

deposits)

sedimentary rocks

Devonian

Halifax Metro

33. Kejimkujik National Park This granite boulder, now supporting the root of a stately tree, was smoothed and transported to this spot by the action of glaciers. Geolo gists sometimes refer to such boulders "glacial erratics" (see also site 25).



34. Kejimkujik National Park – Seaside

The seaside part of Kejimkujik National Park, near Port Mouton, boasts white beaches and low headlands of Devonian granite. The granite started as a magma deep in the crust. As it rose, it incorporated older metamory



26. Martello Tower, Point Pleasant Park, Halifax

27. Lower Sackville - Mount Uniacke

Thin layers of sandstone in slate show the folds produced over 385 million years ago. Glacial polish

from locally quarried slate and "ironstone", although the lighter coloured granite blocks were

A road cut beside Highway 101 between Lower Sackville and Mount Uniacke reveals vertically

tilted Cambrian (Goldenville Group) metamoprhosed sedimentary rocks. The rocks were formed

some 500 million years ago near the South Pole, their present position resulting from plate tectonic

sible in the large flat slate outgrons by the tower

Citadel Hill (28a) is an example of a drumlin (1). The strategic location of the hill overlooking a deep glaciated harbour and providing a defensive position against attack from the rear prompted the choice of this site for Halifax in the mid-18th Century. Many of the 19th Century offices and warehouses in downtown Halifax were built of locally derived stone. In Historic Properties (28b), a popular choice was Meguma "ironstone" with granite and sandstone trim.

Jurassic

formed of Devonian granite, which underli

Friassic

n-marine sedimentary rocl

(lake and river deposits)

and basalt

(sites 2, 3, 5, 6, 38, 39, 40)

rocks, gradually melting and assimilating them. The shoreline to the southwest of the main beach reveals rocks that show this darker slivers of mica-rich metamorphic rock (xenoliths) within the lighter granite.

Permian

29. Chebucto Head process frozen in action. The picture shows much of the South Shore and southern interior of Nova Scotia.



imported

Harbour (16a) and Chimney Corner (16b); the latter image shows a coal seam. Coal fragments can still be found on the beach at Inverness, reminders of the area's long history of coal mining. Petrified tree trunks (16c), also from the Carboniferous "Coal Age", can be found in the area.



19. Aspy





Pink granite engulfed fragments of biotite gneiss as it was intruded, then was later cut by many dykes of pegmatite



21. Sydney area

ous sandstone, mudstone, coal and limestone compose many of the low cliffs between Donkin and Boularderie Island. Fossils, including tree trunks (21a) and other plant remains (21b), can be seen at many localities along this shore.

22. Louisbourg

The lighthouse at Louisbourg (22a) stands on Precambrian volcanic rocks formed from ash, which was explosively thrown into the atmosphere during violent volcanic activity. Younger dykes (volcanic plumbing systems) cut the older rocks at both Louisbourg lighthouse and Kennington Cove (22b).



