Interpretive Geology of Cypress Provincial Park

Collins Ski Run to Mt. Strachan

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Updated August 19, 2007

Introduction:

The following account is designed as a self-guiding tour of the rocks seen up the Collins Ski Run of Cypress Provincial Park to the peak of Mt. Strachan. It is for the use of members of Nature Vancouver and students who wish to know more about the geology of the area.

The stops described in this report are marked by large black painted numbers on rock faces. The distance between each location is given by number of paces and converted to metres (1 pace =2.4 m). Elevation and relationship to easily identifiable features such as numbered flood-lamps are given.

When calculating altitude, set your altimeter to the Kilometer 14 post which is marked 906 m and is correct, having been checked against the elevation of Mt. Strachan. There is no consistency with the other kilometer posts, so do not use them.

Technical terms are shown in bold type and described in the Glossary.

General geology of the area:

The bedrock of Cypress Provincial Park lies within the Coast Belt, one of 5 geological divisions that comprise the province of BC. The Coast Belt extends for 1800 km between the two international borders and averages about 150km wide. The south west part of the Coast Belt consists of **terranes accreted** to the continent about 95 million years ago and includes 3 components:

1. 170 to 95 million year old **granitic** rocks. The deeper parts of an **island arc** that formed on the eastern side of **Wrangellia.**

2. Variably metamorphosed volcanic rocks of Wrangellian age.

3. Young (40 million to present) volcanic rock of the Cascade continental arc.

1 and 2 are sometimes referred to as the Coast Plutonic Complex which refers to the fact that the granitic rock component of the Coast Belt is a complex of many granitic

plutons, each up to 50km long and half that in width that are numerous small intrusions that have coalesced over millions of years. The larger plutons are called **batholiths**. Each pluton has a slightly different chemical composition. Granitic plutons have different proportions of the three main minerals, quartz, potassium feldspar (orthoclase) and calcium/sodium feldspar (plagioclase) which are used in their classification. The accessory or darker minerals which are not used in the classification system can be **biotite, amphibole** and or **pyroxene.** These also vary in content. Plutons can intrude plutons so adding to the complexity. In Cypress area these granitic rocks are mainly of **quartz diorite** and **granodiorite** composition although significant amounts of **gabbro** and **diorite** also occur in the Mt Strachan area as we will see. To distinguish between quartz diorite and granodiorite in the field look for tabular white or grey plagioclase feldspar crystals which occur in higher concentration in quartz diorite. Gabbro or diorite is the magmatic equivalent of basalt and is characterized by having virtually no quartz and a high content of dark pyroxene.

Rock lying between or upon plutons is called **country rock**. The **metamorphic** rocks that can be seen on Mt. Strachan are country rock. Locally they are called Mt. Strachan Gneiss and have been assigned to the **Bowen Island Group (BIG),** a sequence of rocks that have been metamorphosed to such an extent that their original identity is in doubt. They were probably originally volcanic rocks such as basalt flows (including pillow lavas), tuffs and dykes and sedimentary rocks such as marine limestone and mudstone. For example what may have been limestone is now **epidote-**rich rock with the carbonate given off as CO_2. Basalt or **andesite** has been metamorphosed to amphibolite.

The Mt. Strachan Gneiss is a remnant of a very ancient land mass called **Wrangellia.** Wrangellia is an **exotic terrain** meaning it came from somewhere else, being transported by a combination of transverse faulting and subduction to arrive at its present location about 50 million years ago. There is much uncertainty between scientists as to the birth of Wrangellia, but many think it had its origin as a volcanic arc in the Devonian (410 to 354 million years ago) off shore perhaps as far south as Mexico. As Wrangellia moved, rocks were added to it as recently as 200 million years ago (Triassic). It **docked** or **accreted** upon the BC mainland about 50 million years ago.

The stops with descriptions are as follows:

Stop 1. Marked on dike, (elevation 961 m): Located west from the third chairlift pylon from the bottom. An approximately 6m wide volcanic **dike (dyke)** has intruded **granitic (granitoid)** rocks which have undergone atmospheric weathering. The contrast between the fresh, unweathered rock of the volcanic dike and the friable granitic rock is obvious. As it is only about 12,000 years since the rocks of the area were exposed to the atmosphere (after the ice melted), weathering of this type is rare. At this site, the chemical structure of the **feldspars** and **biotite** of the granitic rock has started to change due to exposure to the atmosphere and acidic water. Over time these two minerals will break down to clay releasing the resistant quartz which will become sand, a major constituent of the soil that nurtures the plants.

Distance from Stop 1 to Stop 2 is 580 paces (424 m) or 40 paces (30 m) before Lamp C6.

Stop 2. Marked on outcrop, (elevation 1016 m): A patch of iron-stained (rusty) rock is granitic bedrock with a high content of **pyrite** or fools gold. The pyrite has broken down chemically on exposure to the oxygen in the air and rain water producing iron oxide, sulphur dioxide gas and sulphuric acid. The iron oxide is the rust that you see. You can smell the sulphur dioxide if you get close enough to the rock. Pyrite is often associated with gold and other metals of commercial value. In this case the pyrite is probably related to a fault in the granitic rocks which has been a conduit for sulphur-rich solutions. If the fault is there, it is not visible, probably because it is covered by soil. To the left of the rusty rock is **glacial till**. Note the blue colour due to the blue clays cementing the till.

There is glacial till in the bank 87 paces (64 m) downhill from 2.

Distance from Stop 2 to Stop 3 is 83 paces (60 m)

Stop 3. Marked on joint surface, (elevation 1025 m): Coating a large **joint** surface is dark green **chlorite,** an aluminium, iron, magnesium silicate closely related to the micas. The chlorite forms **slickensides** which are related to the direction of movement along the joint surface**.** Note other prominent joint surfaces at various angles. We can see iron oxide (rust) on some of these joint surfaces. It is formed from the weathering of pyrite which partly coats the joint face and was deposited by hot sulphur-rich solutions deep in the earth before removal of much rock by weathering processes.

Distance from Stop 3 to Stop 4 is50 paces (37 m)

Between Stop 3 and Stop 4 are well developed **joint sets** in “clean” granitic bedrock.

Stop 4. Marked on vertical rock face to south (elevation 1033 m): For about 4 m along the bottom of the ditch, we can follow a very clear contact between a **volcanic dike** and the granitic rocks that it intruded. There is a large glacial erratic of granitic rock above the bank. 30cm of blue-grey **till (drift)** lies on the bedrock. The till is overlain by rusty **colluvium.**

At flood-lamp C7 (47 paces or 34 m up-trail from Stop 4) is more glacial till.

At the base of flood-lamp number C8 (225 paces or 165 m up-trail from Stop 4) another volcanic dyke is exposed. Note the two sizes for the crystal grains that make up this volcanic rock. This is often a feature of volcanic rocks that have cooled quickly at or near the surface of the Earth. Large crystals **(phenocrysts)** have time to grow while the volcanic magma is still liquid deep in the crust. As the molten magma approaches the lower temperatures nearer the Earth's surface, the remaining melt freezes rapidly so that the remaining melt has no time to grow and so forms tiny crystals.

Distance from Stop 4 to Stop 5 is 298 paces (218 m)

Stop 5. (Elevation 1078 m): Here is another volcanic dyke (about 0.6 m wide) but at right angles to the ditch and path. This dike is much finer-grained than the dikes seen so far & has no **phenocrysts.** It probably has a different age, composition & mode of emplacement to the other dikes we have seen so far. Note green **epidote** with **slickensides** on a joint surface to the left and rust from oxidation of pyrite on a joint surface to the right.

Distance from Stop 5 to Stop 6 is123 paces (90 m)

The area either side of flood lamp C9 (1095 m) shows excellent examples of two strong **joint sets** in granitic rock.

Stop 6. (Elevation 1094m): If we look up the cliff above the Stop 6 marker we can see glacial **till or drift** filling depressions in the granitic bedrock. A joint to the left of the till shows smoothing by the passage of the ice. Lower down there is another joint face covered in dark green **chlorite**. The chlorite shows some alignment (**slickenside**) indicating the direction of movement along the joint.

Note: 8cm wide **aplite** dike to right of Stop 6 marker.

Note: Rounded dark inclusions (**xenoliths)** up to 5 cm diameter. These may be the remnants of **metamorphic** rocks (**Bowen Island Group or BIG**) intruded and digested by the granitic rocks. Their original mineral composition has been changed by metamorphism to an amphibole-rich rock called **amphibolite.**

Distance from Stop 6 to Stop 7 is 27 paces (20 m)

Stop 7. (Elevation 1098 m): Here we see a fault with about 15 cm of **crush & gouge** which has been a focus of atmospheric weathering and subsequent erosion by the last glaciation. Glacial till has filled the V-shaped depression formed where the glacier removed the rock weakened by the fault. Look for two boulders (about 1m diameter) of **intrusive breccia** at the bottom of the slope.

Distance from Stop 7 to creek/trail intersection near Stop 8 is 422 paces (309 m). From creek/trail intersection up creek to stop 8 is 66 paces (48 m).

Stop 8. (Elevation 1135 m): About 60 m to the north-west away from the ski-run up a narrow gully and creek is an area of **agmatite (intrusive breccia) and migmatite** consisting of massive and laminated amphibolitic meta-volcanics (Big Island Group) & dark-colored **gabbro/diorite** which has been intruded by a fine-grained, light-colored granitic rock that we have not seen so far. Much brecciation and rounding of breccia fragments of the amphibolitic rocks and the **gabbro/diorite** can be seen (Photo 1). To the left of the Stop 8 marker is a 20 to 25 cm green volcanic dyke that shows the effects of some faulting. Reconstructing what has happened here would be as follows:

1. The sequence of metamorphic rocks known as the Bowen Island Group (BIG) was intruded by **gabbro/diorite**.

2. The fine-grained, light-coloured granitic rock intruded both the BIG and the granitic rock.

Plastered over some of the bedrock at this site is a patch of cemented glacial till.

Photo 1: Stop 8. Agmatite formed by the process of stoping of the BIG & gabbro/diorite by the light-coloured granitic rock so that rounded inclusions of BIG & gabbro/diorite lie in the light-coloured granitic rock.

Distance from the creek/trail intersection to Stop 9 is 353 paces (258 m)

Stop 9. (Elevation 1180 m): Fine-grained granite (as seen at Stop 8) has intruded massive **amphibolite** (BIG)**.** As with Stop 1 there has been deep weathering of the granitic rock along the contact between the two rock-types. Note the **cannon-ball** weathering (Photo 2).

Note: A small outcropping of pegmatite intruding gabbro can be seen to the right of the entrance to a trail head near this location.

Distance from Stop 9 to Stop 10 is 258 paces (189 m)

Photo 2: Stop 9

Stop 10. (Elevation 1202 m): Encircling the base of flood-lamp C9/C15 is **gabbro** together with BIG all of which have been intruded by dark-coloured volcanic dykes. See Photo 3.

Photo 3: Stop 10. Note volcanic dike cutting gabbro.

67 paces (49 m) up the ski-run in a meadow on the right hand side and also opposite Stop 10 on the south side of the Collins ski-run is bedrock of **agmatite** comparable with Stop 8 i.e. light-coloured, fine-grained granite intruding **gabbro** and volcanic dikes.

Distance from Stop 10 to Stop 11 is 189 paces (138 m)

Stop 11. (Elevation 1216 m): Stop 11 is located below lamp C16 to the left of the ski-run. The bedrock here is **Bowen Island Group** intruded by **gabbro/diorite** which has in turn been intruded by volcanic dykes. On the vertical face, well-defined horizontal glacial striations can be seen. Four metres east from the Stop 11 marker is bedrock of the same fine-grained, light-coloured granitic rock seen at Stops 8 & 9. It exhibits distinct **segregation** bands of differing mineral composition. 27 paces (20m) down the ski-run on the south side is light-coloured granitic rock (seen at Stops 8 & 9) which is intruding amphibolite forming an intrusive breccia (**agmatite**) as seen at Stop 8.

Distance from Stop 11 to Stop 12 is 617 paces (451 m).

Stop 12. (Elevation 1251m): Top of chair-lift. Massive amphibolite and BIG intruded by gabbro intruded in turn by numerous volcanic dikes. Note epidote associated with faulting.

Distance from Stop 12 to Stop 13 is 343 paces (251m).

Stop 13. (Elevation 1287 m): Stop 13 is located opposite lamp 4. An ice rounded, smoothed & striated area of amphibolite is intruded by diorite & volcanic dykes. A fault cuts into this face. Fractures either side of the fault are coated with **tremolite.** Note the shearing of the amphibolite related to a substantial fault extending across the sheer rock face that forms the cliff down the north side of the ski-run from Stop 13. 111 paces (81 m) west of Stop 13 is a very thin, fine-grained, black vein (2.5 cm) which may be a **pseudotachylite** injection vein related to the major faulting seen at Stop 13..

Distance from Stop 13 to Stop 14 is 390 paces (285m)

Stop 14. (Elevation 1331 m): Stop 14 is located at lamp 7. Massive amphibolite. As we will see later what appears to be massive amphibolite reveals itself as BIG when it weathers differentially. White sheets & patches of **tremolite** cover joint surfaces.

Distance from Stop 14 to Stop 15 is 375 paces (274m)

Stop 15. (Elevation 1367 m): Lamp 12. Massive amphibolite. Where the amphibolite has superficially weathered, you can see layering which identifies it as BIG. White tremolite covers joint and fracture faces of the BIG. The BIG has been sheared and isoclinally folded. This is indicated where thin beds of epidote have been repeatedly folded upon themselves.

Stop 15 to Stop 16 is 104 paces (76 m)

Stop 16. (Elevation 1381m): Stop 16 is at lamp 13. Diorite intrudes massive amphibolite which on weathered faces reveals strata of the BIG gneiss/schist.

A number of epidote-filled faults occur along this outcrop area. Epidote also in patches and discontinuous bands which may be remnants of beds in the BIG gneiss/schist.

Stop 16 to Stop 17 is 245 paces (179 m)

Stop 17. (Elevation 1408 m): Stop 17 is across from lamp 15. Glacial pavement on BIG gneiss/schist is intruded by narrow volcanic dykes. There are no glacial striations. Features that may be confused with glacial striations are abrasions and scrapes over the rock surface caused by heavy machinery. There are also very thin veins or fractures which may also be confused with striations.

Stop 17 to and end of the ski run at lamp 16 is 103 paces (75 m).

Stop 18. (Elevation 1454 m): First peak of Mt Strachan. Elevation taken at cairn. This is a large platform of ice-smoothed BIG; a sequence of metamorphosed volcanics interbedded with epidote layers that show **boudinage** (see description of BIG in

Glossary). Exposure to the elements since the ice left the area has removed all glacial striations. The epidote bands may have been limestone beds, as epidote is a calcium silicate. The epidote bands and quartz-rich beds, usually quite narrow, are interbedded with the volcanics and help to reveal the very tight **isoclinal** folding that is common throughout. Some of these beds have been stretched forming **boudins.** A **boudin** can be seen in Photo 4.

Photo 4: Stop 18. A boudin in BIG (Strachan Gneiss or Strachan Schist).

More recent, usually thin, volcanic dykes intrude the sequence. The strike of the beds is towards the southern tip of Gambier Island i.e. 280^{o}

Photo 5: Stop 18. The BIG, Strachan Gneiss or Strachan Schist.

Note freeze-thaw split **glacial erratics** sitting on the pavement. Most are of granodiorite brought from the north by the ice. One contains rounded inclusions of a dark rock which are remnants of what the granodiorite intruded; probably **Wrangellian** rocks. Another large erratic is of volcanic rock containing numerous angular fragments of another volcanic rock. It is probably a **pyroclastic** volcanic formed from material blown out of the vent of a volcano

Stop 19. (Elevation 1454 m): Second and highest peak of Mt Strachan. Not a glacial pavement but same geological sequence as Stop 18.

Stop 20: Two large **erratics** of granitic rock (photo 6) lie in the alpine meadow to the south-east of the area described under Stop 19 where a trail leads back to the car park via meadows and the forest.

Photo 6: Stop 20. Glacial erratics of granitic rock.

Glossary:

Many of the following definitions were taken from Roadside Geology of Southern BC by W.H. Mathews and J.W.H. Monger (2005).

Accreted terrane: A land mass that originated as an island arc or a micro-continent that was later added on to a continent e.g. new land or exotic terrain carried atop the Juan de Fuca Plate is wedged against stuck on or accreted onto the margin of the North American Plate during the process of convergent subduction.

Agmatite: Intrusive breccia (see **intrusive breccia)**. A type of **migmatite**.

Alumino-silicate: A descriptor for minerals that have the principal composition Al_2SiO_5.

Amphibole: A group of common rock-forming minerals characterized by good prismatic cleavage in two directions intersecting at 56^o and 124^o.

Amphibolite: A dark coloured rock formed mainly of the silica, calcium and magnesium-rich mineral amphibole. Formed by metamorphosis of basalt and its intrusive equivalent, gabbro.

Batholith: A large body of intrusive rock whose surface area is more than 100 square kilometres.

Biotite: Black mica. An alumino-silicate mineral found mainly in granitic rocks.

Boudin or Boudinage (sausage structure): A structure common in strongly deformed sedimentary and metamorphic rocks, in which an original continuous competent layer or bed between less competent layers has been stretched, thinned and broken at regular intervals into bodies resembling boudins or sausages elongated parallel to the fold axes.

Bowen Island Group (BIG): Also known in this area as the Mt Strachan Schist or Mt Strachan Gneiss these rocks are schistose volcaniclastic & fine-grained clastic rocks dated as Early Jurassic from fossils and from a U-Pb date of 185 Ma on felsic volcanics (Friedman et al 1990). The BIG is considered as a relic of a volcanic arc succession constructed either within or along the inboard margin of **Wrangellia**.

Breccia: A coarse-grained rock of angular fragments in a fine-grained matrix. Breccia may be sedimentary or volcanic in origin or of material fragmented and crushed by a fault or by an igneous intrusion (see intrusive breccia). The opposite of a conglomerate which contains rounded fragments.

Chlorite: A platy, soft, green silicate mineral rich in Fe and Mg. Common in low-grade metamorphic rocks.

Chlorite schist: Medium to coarse-grained metamorphic rock with foliation formed by aligned, platy chlorite.

Colluvium: Loose rock & soil debris accumulated through action of gravity at the base of a low-grade slope or against a barrier on that slope.

Continental arc: A subduction-related chain of volcanoes formed on a continental margin e.g. Cascade magmatic arc that extends from southwestern BC to northern California.

Country rock: The rock intruded by and hosting an igneous intrusion or a mineral deposit.

Crush & gouge: Crushed and pulverized rock material filling a fault and formed as a result of movement of the two opposing rock masses on either side of the fault.

Dike (=dyke): A sheet-like intrusion that cuts across bedding, foliation, layering or massive country rock.

Diorite: An intrusive igneous rock typically composed of white crystals of feldspar (sodium, calcium and alumino-silicate minerals) and black crystals of amphiboles (iron and magnesium silicate minerals) with little if any visible quartz

Docked: The accretion event when an **exotic** terrane accretes to the continental plate by the subduction process.

Drift: Sea glacial till.

Epidote: A calcium, alumino-silicate mineral common in metamorphic rocks.

Exotic terrane: A terrane that had a geological history independent of the continent that it is now part of.

Feldspar: One of a group of alumino-silicate rock-forming minerals. The most common mineral in the Earth's crust.

Gabbro: Dark-coloured intrusive rock of mainly calcium-rich plagioclase feldspar and iron and magnesium rich pyroxene. There is usually little or no quartz. It is the intrusive equivalent of basalt. It could also be called pyroxene diorite.

Glacial erratic: Rocks transported and deposited by a glacier that do not come from the local area.

Glacial till (drift): An unsorted and generally unlayered mixture of rock fragments of all sizes down to clay that were deposited by a moving valley glacier or continental ice sheet.

Gneiss: A layered or foliated, coarse-grained rock formed during high-grade metamorphism. As an example, granitic gneiss is segregated into light-coloured layers rich in quartz and feldspar and dark layers of biotite and amphibole.

Granitic (granitoid): A suite of felsic plutonic igneous rocks with principal minerals consisting of differing proportions of potassium feldspar, plagioclase feldspar and quartz. Examples are granite, granodiorite, diorite, quartz diorite and quartz monzonite.

Granitic gneiss: See the example given under gneiss.

Granitization: One of two principal theories as to how granitic (granitoid) rocks are formed Granitization is considered a metamorphic process by which solutions of magmatic origin enter a solid rock changing it without the solid rock going through a magmatic phase. **Magmatization** is where granitic rocks crystallize out of a melt**.** The two mechanisms are poorly understood and highly contested.

Intrusive breccia: Where granitic magma contains a high proportion of fragments of the rocks it intruded. In the examples described in this report many fragments of BIG and other granitic rocks can be seen in the granitic rock.

Igneous: A rock formed by solidification (crystallization) from a molten magma. Can be divided into plutonic or intrusive (e.g. granitic) and volcanic or extrusive (e.g. basalt) rocks. With sedimentary and metamorphic rocks, igneous rocks are one of the three great classes into which all rocks are divided.

Island arc: An arched chain of volcanic islands lying off the coast of a continent e.g. Japan. They are formed when a tectonic plate subducts beneath another plate producing magma which rises to form volcanoes.

Isoclinal: Dipping in the same direction. When applied to a fold it is referring to a fold with parallel limbs.

Joints: Planar fractures in rock along which no differential movement has taken place. Often occur in parallel groups called joint sets. Intersecting joint sets produce a joint system. Very common in incompetent granitic rocks. Joints can be caused by both compressional and tensional stress due to the subduction process or unloading after retreat of ice sheets.

Magmatization: See **granitization.**

Migmatite: Mixed rock produced by intimate inter-fingering of magma and invaded rock.

Orthoclase: A calcium alumino-silicate mineral. A member of the feldspar group of minerals. A common mineral of granitic rocks.

Phenocrysts: The large and generally conspicuous crystals in a **porphyritic** igneous rock

Plagioclase: An alumino-silicate mineral series ranging in composition from sodium to calcium. A member of the feldspar group of minerals. A common mineral of granitic rocks.

Pluton: An igneous intrusion generally applied to bodies of granitic rock.

Porphyritic: A textural term for an igneous rock in which larger crystals (**phenocrysts**) are set in a finer groundmass.

Protolith: The precursor rock of an existing rock e.g. sandstone is the protolith of quartzite and limestone is the protolith of marble.

Pseudotachylite: A fine-grained rock formed by frictional melting of wall-rock during rapid fault movement.

Pyrite (fools' gold): An iron sulphide (FeS_2) that forms golden coloured, cube-shaped crystals. The most common sulphide. Yields SO_2 on heating or striking with a hammer. Readily changes by oxidation to the hydrated hydroxide limonite with liberation of sulphuric acid. Further oxidation of limonite yields hematite.

Pyroclastic: Fragmental material expelled from a volcano e.g. volcanic ash, volcanic breccia.

Pyroxene: A family of magnesium and iron-rich silicate minerals, typically dark and forming stubby crystals. Common in some volcanic rocks.

Quartz diorite: An intrusive igneous rock compositionally intermediate between granodiorite, which contains some potassium feldspar, and diorite, and has little or no visible quartz. Together with granodiorite, it is the most common variety of granitic rock in our area.

Segregation: In this case gravitational settling or flow sorting of minerals has resulted in very localized bands within the otherwise amorphous granitic rock.

Slickensides: A polished and striated surface that results from fiction along a minor fault plane. The direction of the fault can be determined by the alignment of secondary minerals such as epidote and chlorite on the fault surface and by feeling for the smoothest direction.

Stoping: The process whereby intrusive igneous magma makes space for its advance by detaching and engulfing fragments of the invaded rocks.

Subduction: The process by which one crustal plate is pushed beneath another crustal plate into the underlying mantle when plates move towards each other. The subducted plate usually moves in jerks causing earthquakes. The rate of this movement is typically measured in centimeters per year. Usually an oceanic plate subducts beneath a continental plate e.g. the Juan de Fuca Plate west of Vancouver Island is subducting beneath the North American plate. The subduction process is generated by convection cells in the mantle

Terranes: A fault-bounded body of regional extent within which there is some degree of compositional or stratigraphic uniformity and whose geological record is different from those of adjoining terranes. In the southwestern Coast Mountains it is represented by septa of metavolcanic and metasedimentary rock within Middle Jurassic to Early Cretaceous plutonic rocks. The septa comprise pillow basalt, amphibolite and marble, which are correlated on the basis of geology with Karmutsen and Quatsimo formations, and Bowen Island Group (see **Bowen Island Group**).

Till: See glacial till.

Tremolite: A white or grey silicate of calcium and magnesium, a variety of **amphibole,** occurring in fibrous masses or thin-bladed crystals.

Wrangellia: An **exotic terrain**. A Devonian to middle Jurassic **island arc** which was welded (**docked, accreted**) onto North America 95 million years ago in Cretaceous time.

Xenolith: A fragment or inclusion of older rock embedded in an igneous mass.

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