

New Brunswick's Geological Past



New Brunswick geology forms a rich tapestry of rock types and landscapes. In several areas of the province, the rocks are quarried for commercial purposes or contain valuable mineral deposits. Some of the deposits are being mined today, whereas others remain to be discovered. But how and when did they form?

New Brunswick's geological past began about 1 billion years ago when the world was already 3.5 billion years old. The continents as we know them did not exist. Instead, there was a giant supercontinent that broke into tectonic plates or protocontinents around 600 million years ago. For several hundred million years, the plates gradually migrated around the globe, driven by intense heat from beneath the earth's crust. Their movement resembled a slow geological 'dance' in which the continents repeatedly drifted apart and then collided with each other over time.

As the plates separated, whole oceans developed between them. Sediments were eroded from the continents and filled huge valleys beneath the expanding sea. As the plates moved together and the oceans closed, volcanoes erupted and mountains formed at buckling plate margins. The boundaries of plate separation altered with each opening and closing, so that New Brunswick-to-be became a montage of varying rock types from different ages. The oldest known rocks in New Brunswick were deposited within warm shallow seas during an early period of ocean opening, and include the limestone currently quarried near Saint John.

As the ocean opened at 480-465 million years ago, volcanic rocks were erupted onto the sea floor. Sea water circulating through these hot volcanic rocks were expelled at geyser-like vents called black smokers. Metal-rich, superhot water emitted from these black smokers was responsible for forming the rich base metal deposits in the Bathurst area.

Around 420 – 400 million years ago, as a result of the collision brought about by the closure of the ocean, large volumes of magma were generated deep within the earth. The magmas mostly solidified into massive bodies of granite, which intruded the older rocks. These granites have been quarried for dimension stone and aggregate material, and contain significant mineral deposits such as the Lake George antimony mine and Mount Pleasant tungsten mine.

The foregoing eons of violent geological activity ended about 370 million years ago with a relatively tranquil era that lasted over 120 million years. During the Carboniferous Period, New Brunswick lay near the present-day equator, and a shallow sea encroached upon the land. As the ocean slowly evaporated in the heat, it precipitated out gypsum, potash, limestone and salt deposits, all of which have been mined in the province.

The hot humid environment also encouraged the widespread growth of plants that later were buried and altered to coal. Plant and animal remains became oil shales, albertite and natural gas. During the same era, massive volumes of sediment eroded from the Appalachian Mountains and were deposited in river systems as sand, gravel and clay. They became the sandstones, conglomerates and shales that overlie much of the province today, and have been quarried for a variety of purposes.

The present Atlantic Ocean began to open about 250 million years ago, and is still widening today. As the plates split apart, volcanic rocks called basalts filled the fractures caused by rifting. Such rocks can be seen in several locales, including Grand Manan Island where they contain rare minerals called zeolites that attract collectors from across the continent.

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