GEOLOGICAL PAST

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 construction material, elsewhere mineral ores have been mined for valuable commodities such as zinc, potash, and gold. Exploration continues across the province in search of deposits yet to be discovered. But how and when did they form?

New Brunswick's geological story began over 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 slowly 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 time after time.

As the plates separated, whole oceans developed between them. Sediments eroded from the continents were deposited in the basins beneath the expanding sea. As the plates moved together 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 the area we now know as New Brunswick became a montage of many rock types from different ages. The oldest known rocks in New Brunswick are Proterozoic age and once formed different parts of the supercontinent Gondwana. They are found in the highlands of coastal southern New Brunswick from Alma to Beaver Harbour and on eastern Grand Manan Island.

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

Around 425 to 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 rose to shallower levels in the crust and solidified into massive bodies of granite. These granites have been quarried for dimension stone and aggregate material and contain significant mineral deposits such as the former Lake George antimony mine and Mount Pleasant tin-tungsten mine.

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The foregoing eons of violent geological activity ended about 370 million years ago for most of New Brunswick, 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 deposits of gypsum, potash, limestone and salt precipitated on the sea floor, several of which have been mined.

The climate then became hot and humid, an environment that encouraged the widespread growth of plants and the formation of lakes with abundant plant and animal life. During the same era, massive volumes of sediment eroded from the Appalachian Mountains and were deposited in river systems as sand, gravel and clay. These sediments became the sandstones, conglomerates, and shales that overlie much of the province today and have been quarried for a variety of purposes. These same sediments buried ancient plant remains transforming it to coal, whereas the remains of algae and plankton that accumulated in the ancient lakes became oil shales, albertite, and natural gas.

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. These are the youngest rocks in New Brunswick and 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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