## LOOKING BACK IN TIME: ROCKS IN FERRIS PROVINCIAL PARK

*A basic field guide*

### On the Landscape.

At first glance, Trent Hills is not a great place to study rocks. There are no rugged mountains, soaring cliffs or rocky islands. However, within 50 kilometres of the town of Campbellford there are diverse types of rocks, minerals and fossils, and deposits of iron, gold and industrial minerals. The pictures show rocks, all loose boulders, inside or visible from Ferris Park. What kinds of rocks can we find here?

**Sedimentary Rocks.** Most of southern Ontario, north of lakes Erie and Ontario, from Ottawa west to Peterborough and the south end of Georgian Bay, lies upon a great sedimentary basin, which overall is dominated by great thicknesses of **limestone** (Fig. 1). There is some *sandstone* on the edge of the basin, as seen north from Kingston, and some *shale*, found near Burlington and used in brick manufacture. The whole region is known as the Michigan basin, and extends south and west into the U.S.A. To the north and east, the limestone strata thin towards the contact with underlying, much older rocks of the Canadian Shield. The base of the limestone succession, where the strata sit directly upon the older granites and other rocks of the "basement", represents a gap of hundreds of millions of years, and is known as an *unconformity*. The vertical thickness of limestone under your feet, the grey beds you see as you stand beside Ranney Falls, is probably about 75 metres (almost 250 feet).

### What's in a name?

Like any subject, rocks get more interesting the more you know about them. As with animals or flowers, there is a whole taxonomy devoted to rocks. A **rock** is composed of one or more minerals. For example, common granite may be composed of quartz, feldspar and mica (all silicates). A limestone or marble is generally composed of calcite or dolomite, which are carbonates. A **mineral** is defined as a naturally-occurring compound of a fixed or well-defined variable composition. Each mineral has its own crystal structure, physical and chemical properties.

**Geology** is the study of the Earth, including the many types of rocks and minerals. There are many associated disciplines, such as **palaeontology**, the study of fossils. **Geomorphology** is the branch of science dealing with the formation and evolution of landforms, such as mountains, rivers and coastlines. Another term for studies of the "lie of the land" is **physical geography**.


**Figure 1.** Fine-grained limestone, with the outlines of marine sea creatures such as brachiopod shells.

The local dry stone walls are built largely of flaggy limestone bedrock, containing brachiopod, crinoid and bryozoan fossils. The fossiliferous limestone is of middle Ordovician age, belonging to the Bobcaygeon and overlying Verulam formations, deposited, according to the latest global estimates, some 460 to 470 million years ago. The limestone forms a shelf overlying the Canadian Shield, and is often seen along rivers and road cuts in the region, south of highway 7, which is closer to the thin (0-40 metres) north rim of the limestone cover.

Other rock types in the park will be found as rounded boulders, “erratics” brought by Ice Age glaciers to the area, then often “rearranged” by us humans for decorative purposes. Many can be seen around the car park (Figs. 2, 3, 5). These are all from the Precambrian Shield, and probably about 1250-1000 million years old.

**Igneous rocks** are those that crystallize from a molten state (known as *magma*, and as *lava* when it reaches the Earth’s surface). Volcanic rocks erupt under air or water and cool rapidly, so that most of the crystals do not get a chance to grow large (Fig. 2). Intrusive rocks cool more slowly in the Earth’s crust, forming visible crystals. Examples are granite (Fig. 3) and gabbro (Fig. 4). **Metamorphic rocks** are sedimentary or igneous rocks variably changed by great heat and/or pressure at depth (e.g., metagabbro, Fig. 5). In time, all rocks are eroded and redeposited to form new sediments.

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*More info*: http://www.turnstone.ca

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Right, top to bottom: **Figures 2-5**.