CERBEREAN CAULDRON TOUR

Introduction

Today we are going to look at some of the evidence for one of the biggest volcanic eruptions ever to occur on Earth. In this region, some 365 million years ago, a cylinder shaped block of the Earths crust, 27 km in diameter, collapsed some 1-2 km into a large magma chamber. The magma erupted with great violence along the circular or ring fracture, filling the circular basin or "cauldron" with layers of volcanic rocks and spreading volcanic ash over much of the surrounding area.

It is difficult to imagine the scale of this event, let alone that it happened so long ago. Erosion over those millions of years has worn away the edges of the volcanic layers and the softer sedimentary rocks of the surrounding region. The landscape features we see today are a direct result of these momentous events.

The region in the Devonian was probably steep to undulating, with lakes and rivers. It experienced intermittent volcanic activity over several millions of years before the big collapse. Some of the earliest volcanic rocks contain small fragments of charcoal derived from vegetation, indicating plants were growing in the region. East of Cathedral Range, fish fossils have been found in sedimentary layers deposited in a small lake between volcanic eruptions.

The geological evidence began to be pieced together back in the late 1920s, when a pioneering geologist examined the rocks in the area, in particular those forming the Cathedral Range and the volcanic rocks forming the Cerberean Ranges. The geologist, E.S. Hills realized that the volcanic rocks were sitting above the sedimentary layers.

In the 1940s, volcanic rocks were mapped in the north of the area, during construction of the Eildon Dam. It was soon realized that those were essentially the same volcanic layers as here, in the Marysville region. Since then, geological mapping has shown that a thick pile of volcanic rocks, resembling a stack of pancakes, sunk down in the middle and with crinkled edges, forms the Cerberean Ranges. Around this volcanic pile is evidence for the ring fracture, which is nearly a perfect circle and is partly filled with granite.

One particular rock in the pile stands out - the Rubicon Rhyolite. It is up to 300 m thick, here near Marysville and is responsible for the prominent scarps all around the edge of the Cerberean Ranges. The Rubicon Rhyolite was erupted from the ring fracture in the form of very hot fragments of pumice, ash and bubbles suspended in turbulent clouds of volcanic gases. In some of the outcrops we can see some of these fragments, flattened due to the weight of the erupting rock as it accumulated. Lying on top of the Rubicon Rhyolite is another thick volcanic rock, called the Lake Mountain Rhyodacite, which was erupted in much the same way. The Lake Mountain Rhyodacite forms the high level plateau of the Cerberean Ranges.

Roughly around the same time as the Cerberean Cauldron was forming, other large volcanic eruptions were taking place in the region now central Victoria. For example, the Dandenong Ranges, east of Melbourne, Mt Macedon to the northwest and the Acheron Ranges, between Healesville and Marysville, were all formed from similar volcanic eruptions. The effects of these eruptions on any forms of life in the region would have been catastrophic - there may even have been global effects due to atmosphere contamination.

The Tour

While the emphasis is on the geology of the region, there are many features to observe. Most obvious is the scenic qualities, particular of the Cathedral Range.

The region is heavily timbered. The forests have been logged extensively and were burnt during the 1939 bushfires which ravaged the state. There are a number of historical features associated with the timber industry, such as old tramways in the Marysville area. Mining has also taken place. Wolframite was mined southeast of Marysville early this century and gold and tin mines operated near Buxton.

Wildlife is abundant, particularly birds. You should hear or see lyrebirds, kookaburras, choughs, rosellas and small songbirds. Wombats and wallabies are the larger marsupials, but Leadbeater's Possum, Victoria's faunal emblem was re-discovered in 1961 at Tommy's Bend, Lake Mountain.

The flora varies widely, from subalpine snowgums, heaths and grasses on Lake Mountain, to temperate forests of messmate, peppermint and manna gums and stands of treeferns and mountain ash. Of special note are the small groves of beech which are remnants of vast cool temperate forests which covered southeastern Australia during the last interglacial period, some 40,000 years ago. Some of these beech trees are more than 300 years old. Many of the smaller plants and shrubs are flowering during November.

Notes on Localities

Locality 1: Steavenson's Falls
These are amongst the tallest falls in Victoria, with a drop around 90 metre. The Rubicon Rhyolite is the resistant volcanic rock responsible for the falls.

Locality 2: Robleys Spur
Cuttings on the Marysville-Cumberland Road up Robleys Spur expose the thick volcanic layers. The cuttings are now very weathered but we'll look briefly at the conglomerate which underlies the volcanic sequence, and also examine the base of the Rubicon Rhyolite.

Locality 3: Nicols Lookout
This lookout at the top of Robleys Spur gives a panorama of the southwestern portion of the Cerberean Ranges. Various landscape features will be explained.

Locality 4: Lake Mountain turnoff
Just before the turnoff to Lake Mountain are some groves of beech trees.

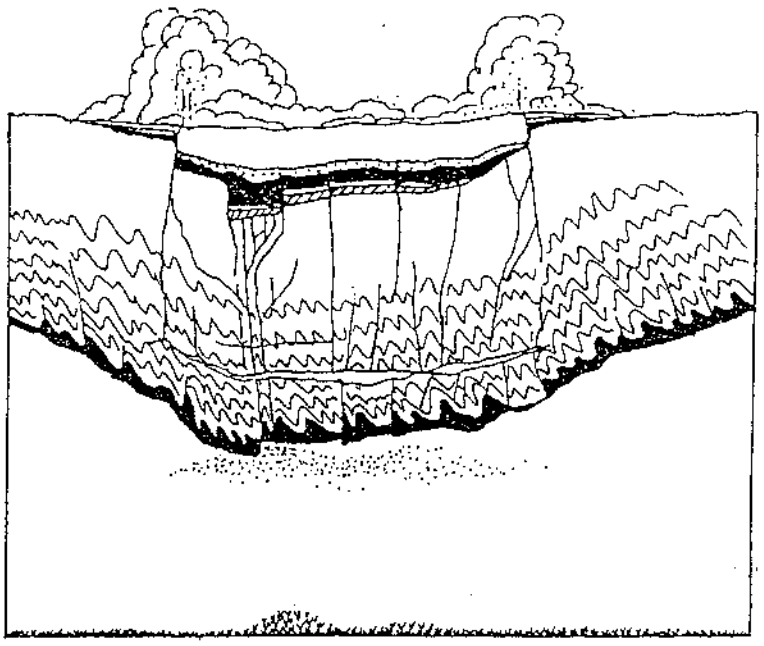
Locality 5: Sugarloaf
This is the southern end of the Cathedral Range, which consists of Middle Devonian sandstones laid down in channels in a broad flood plain. The sandstone layers have been folded to steep angles, possibly due partly to dragging against the ring fracture as the central block collapsed. The climb to the summit is fairly steep although the views are spectacular. We will aim to get about halfway.

Locality 6: Snobs Creek Road

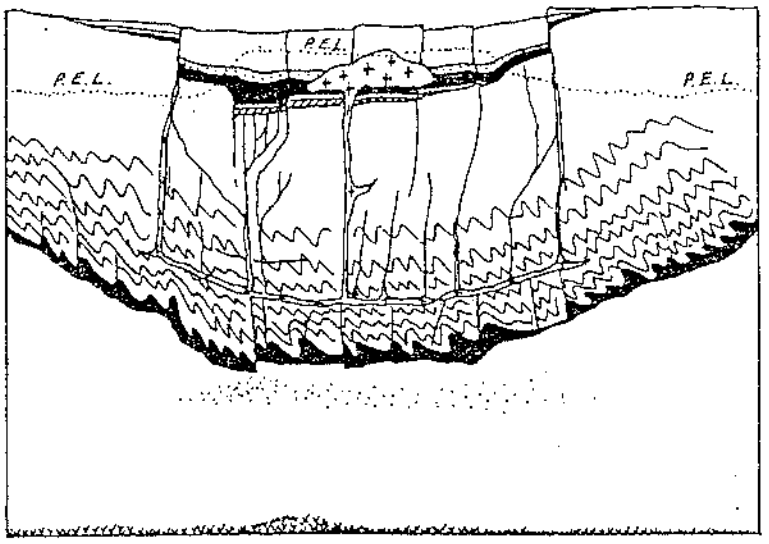
This is a series of road cuttings famous for the sequence of volcanic layers they exposed. Unfortunately however they are now very weathered and little can be seen. Note the cliffs in the Rubicon Rhyolite on spurs to the east of Snobs Creek. We'll stop briefly at a patch of granite in the ring fracture and at the quarry in the Rubicon Rhyolite before proceeding to the waterfalls.

Locality 7: Snobs Creek Falls

These falls are in Lake Mountain Rhyodacite, the rock which overlies the Rubicon Rhyolite. Snobs Creek follows a very large fault or fracture, along which movement was occurring prior to, during and after the eruption of the volcanic rocks. The falls mark the gradual movement upstream of the intersection of the fault and the volcanic sequence.



The last stages in the collapse of the Cerberean Cauldron.



Erosion has reduced the volcanic pile and the surrounding rocks to the present level (PEL)

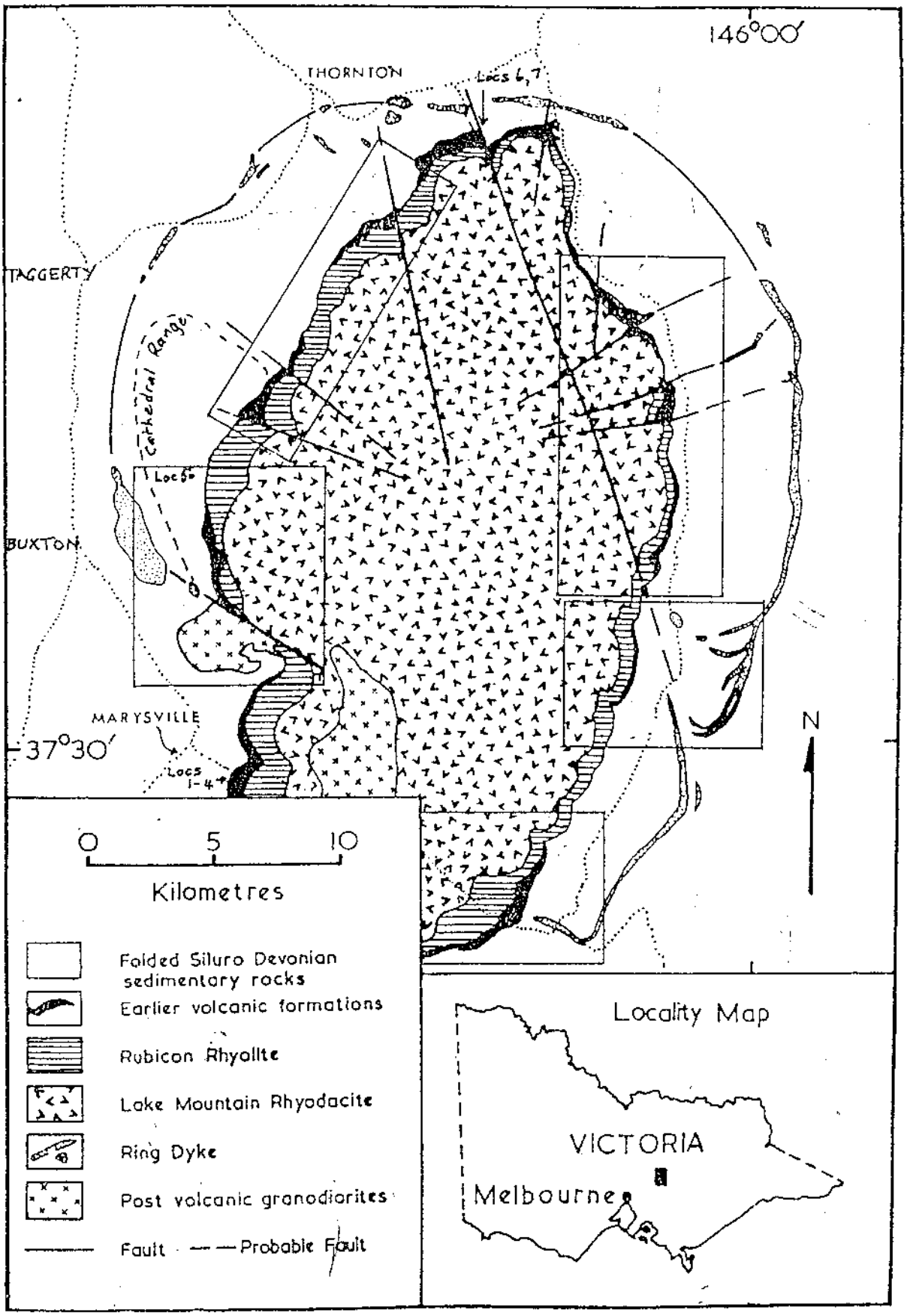


Figure 1—The Cerberean Cauldon, showing its location and the positions of the larger scale maps of the sequence along the margin of the volcanic pile shown in Figs. 4 to 8.

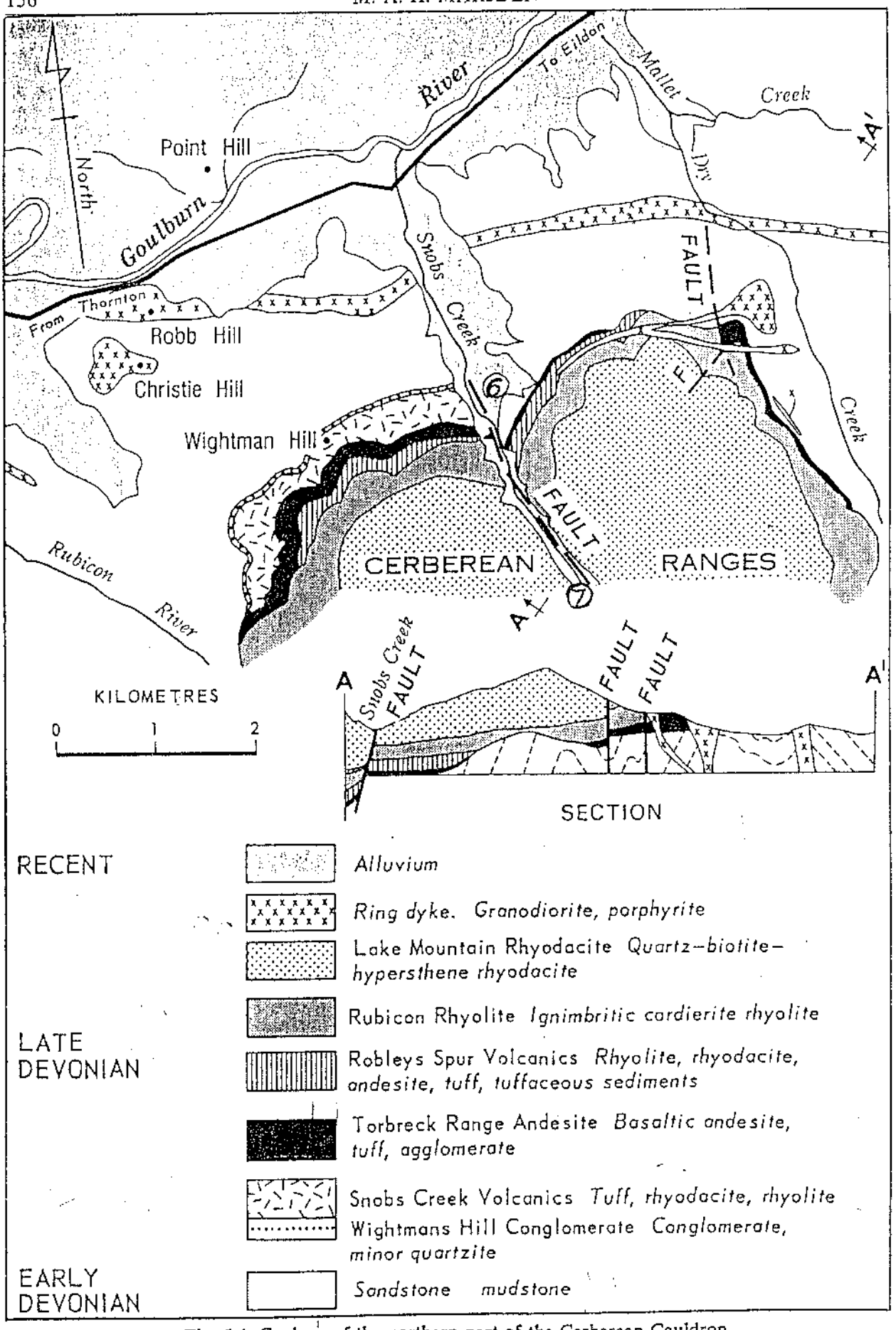


Fig. 5.4. Geology of the northern part of the Cerberean Cauldron.

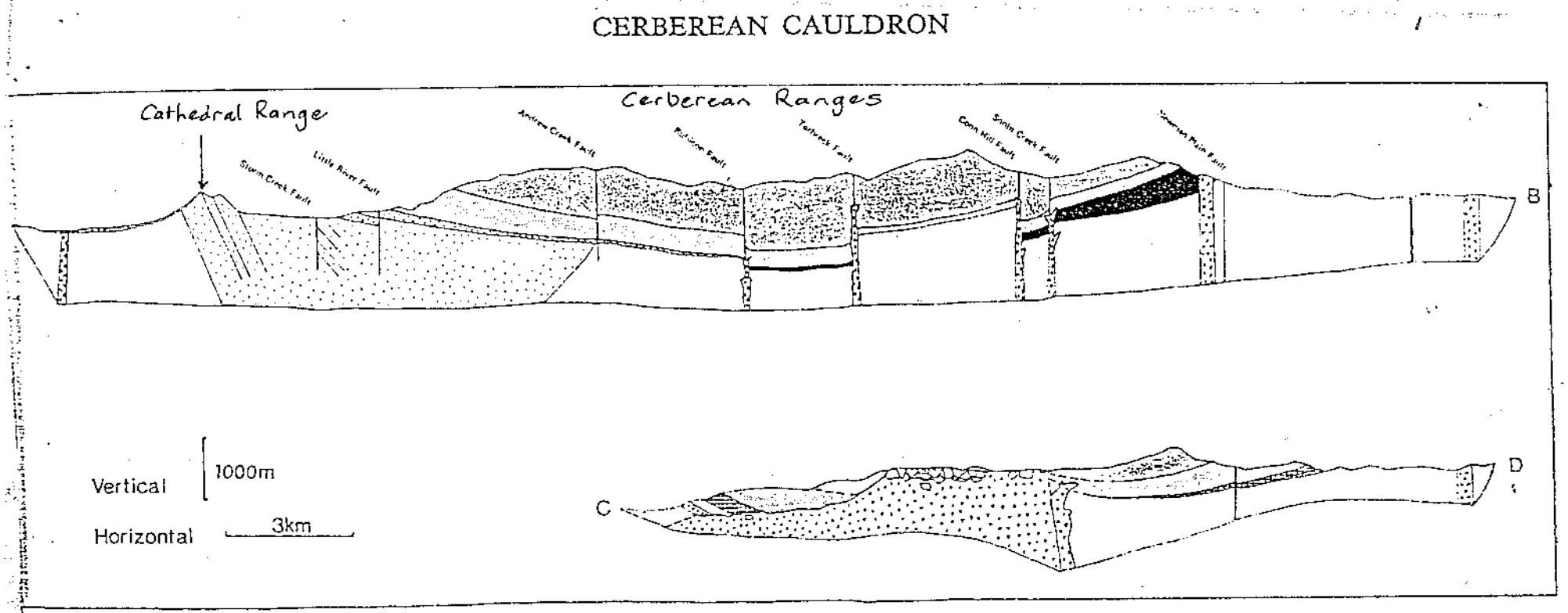


Figure 3—Cross sections of the complex.