

1933, but it was not until 1944 that significant production started. In 1956, the year of the final closing of the mines, 138,000 tonnes of crocidolite had been shipped. Ninety-eight percent of this fiber came from two mines in the Wittenoom Gorge (Fig. 4), the Colonial Mine and the Wittenoom Mine. Here mining was entirely within the Dales Gorge member of the Brockman Iron Formation (Trendall and Blockley, 1970).

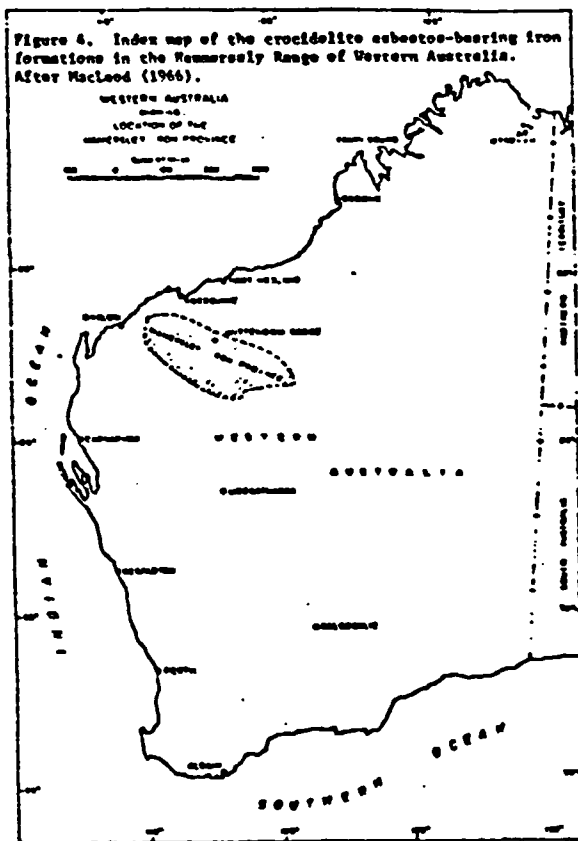


Figure 4. Index map of the crocidolite asbestos-bearing iron formations in the Hamersley Range of Western Australia. After MacLeod (1966).

slabs of oceanic or continental mantle material, which during the mountain building episode broke up into smaller volumes of rock and were injected upwards into overlying rocks of the Karelidic schist belt. The Karelide metasediments are thought to range in age from ~2200 to ~2000 m.y. (Simonen, 1980). Late Karelian granites (~1900 m.y.) were injected into the schist belt rocks, and where they make contact with the serpentinized peridotites, commercial quality anthophyllite asbestos is developed -- at Paakkila, located on the northern shore of Lake Juojärvi, East Savo, and at Maljasalmi, 10 km to the southeast.

The main asbestos producing area at Paakkila is comprised of biotite gneiss with numerous pods or lenses of ultramafic rock cut by Maarianvaara granite (Fig. 5). These pods typically contain relict olivine surrounded by serpentine aggregates and bundles of anthophyllite needles. Commonly the anthophyllite needles penetrate poikiloblastically the relict olivine (Wiik, 1953). Talc sometimes has replaced anthophyllite and olivine; there is not much serpentinization (Raspala, 1936).

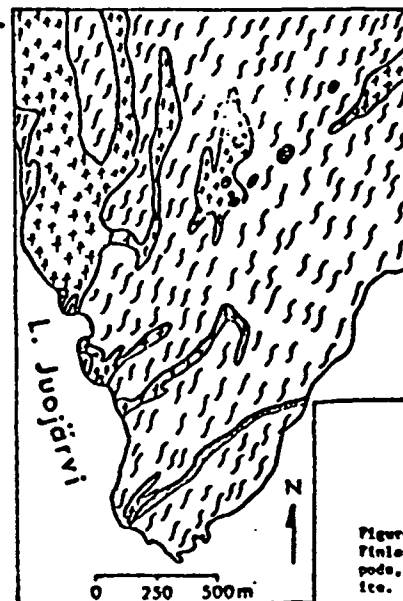


Figure 5. Geological map of Paakkila region, East Finland. 1 - anthophyllite-bearing ultramafic pods, 2 - granite, 3 - biotite gneiss, 4 - quartzite. After Aurola (1956, p. 96).

The country rocks in the Maljasalmi area, the secondary anthophyllite asbestos producing locality, are Karelian mica schist cut by granite pegmatite dikes. The serpentinized peridotites within the schists are

Anthophyllite in Alpine-type ultramafic rocks of East Finland

In the Karelian Mountains of East Finland there occur a number of ultramafic bodies in the form of pods or lenses which were originally dunite or enstatite-bearing peridotites. These alpine-type serpentinized ultramafic masses are thought to have been once a part of much larger