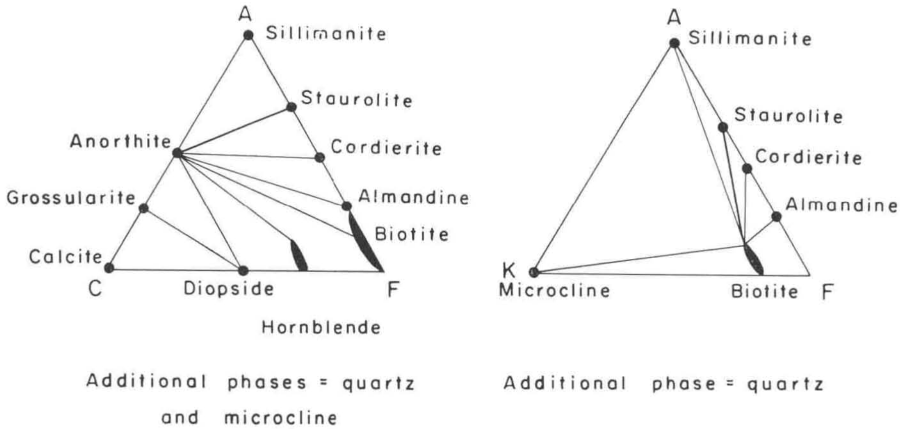

Fig. 3. ACF and AKF diagrams showing the principle assemblages in rocks of the area.

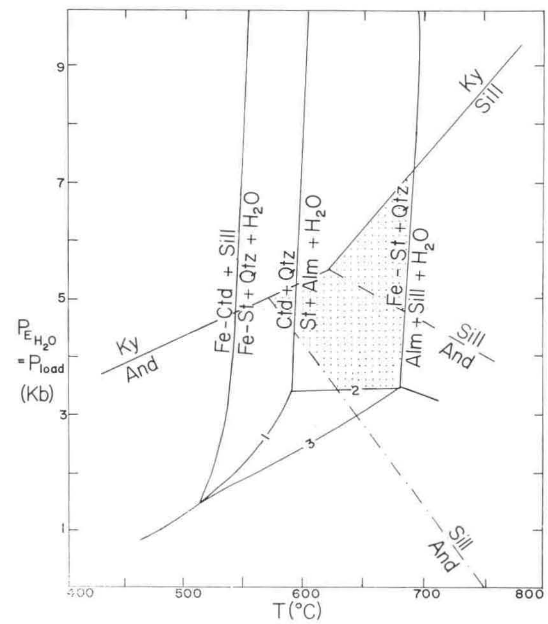

Fig. 4. A metamorphic grid for part of the Haliburton Highlands of Ontario. The maximum spread of conditions of formation is represented by the dotted area. Reactions 1, 2 and 3 are respectively reactions VI, VII and II of Richardson (1968). Sources for the other curves will be found in the text.

been proposed. Fyfe, Turner & Verhoogen (1958) originally erected three subfacies of what they called the almandine-amphibolite facies based in large measure on the work of Francis, who took much of his data from the classical Barrovian zones. Later, Turner & Verhoogen (1960) added a fourth subfacies that does not fit well with the other three, possibly because

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Fig. 2. Metamorphic assemblages from the Scottish Highlands and the Abukuma Plateau superimposed on the PT grid of Hess (1969). 1 and 2 are respectively the kyanite-muscovite-quartz subfacies and the sillimanite-almandine subfacies, in the Barrovian zones (Fyfe et al. 1958). 3 and 4 are found respectively in zones B and C at Abukuma (Miyashiro 1958).

Table 2. Mineral assemblages found in Glamorgan township.

Rock type	Characteristic mineral assemblage
Basic igneous	Hornblende-plagioclase-augite (± biotite, ± scapolite, ± calcite) Hornblende-scapolite-augite-calcite
Granitic (including granitic bands in migmatite)	Quartz-microcline-plagioclase-biotite-magnetite (± muscovite in some late stage veins) Quartz-microcline-plagioclase-biotite-hornblende-magnetite Quartz-microcline-plagioclase-magnetite
Non-granitic bands in migmatite	Quartz-plagioclase-biotite-hornblende-microcline-magnetite (± sillimanite)
Paragneiss	Quartz-plagioclase-biotite (± magnetite) Quartz-plagioclase-biotite-hornblende-microcline-magnetite Quartz-plagioclase-biotite-microcline-almandine (± epidote, ± cordierite)
Pelitic	Sillimanite-almandine-biotite-quartz-plagioclase (± hornblende ± staurolite)
Marble and skarn	Calcite-diopside-tremolite Calcite-diopside-scapolite Calcite-diopside-phlogopite Calcite-diopside-spinel Calcite-diopside-hornblende Calcite-diopside-grossularite Calcite-diopside-grossularite-plagioclase-epidote
Calc-silicate rock	Diopside-tremolite Diopside-tremolite-scapolite Diopside-scapolite

as the authors recognized, it is 'believed to have formed at lower pressures' (p. 545). In other words (and to use Miyashiro's, 1961, term), two distinct *facies series* are here placed together, all under the umbrella of the almandine-amphibolite facies.

Miyashiro (1961) in fact, was one of the first petrologists to dispute the idea that the almandine-amphibolite facies had any universal applicability. He recognized that low pressure environments (for example, Abukuma) gave rise to a set of mineral assemblages of amphibolite facies type, distinctly different from amphibolite facies assemblages found in higher pressure series such as the Barrovian.

Miyashiro's work suggests that it may be possible to divide the amphibolite facies into subfacies by means of pressure-dependent mineralogical changes, and relations between the Al_2SiO_5 polymorphs could be particularly useful in this respect. For example, the amphibolite facies defined by Eskola (1939) as that one in which plagioclase and hornblende coexist, could be divided into andalusite- sillimanite-, and kyanite-subfacies in a sequence from low to high pressure. One obvious shortcoming of a simplistic scheme of this kind arises from the fact that transitions between the Al_2SiO_5