a history it may often be possible to draw interesting conclusions from the occurrence of a metastable phase, but kinetic factors must lead to a large degree of uncertainty. For the correlation of physical environment with mineral assemblage to be approached with any certainty, some assurance that equilibrium has been approached is necessary. In the review that follows it will become apparent that similar zeolite-bearing assemblages do in fact appear to form in similar environments. It also appears probable that in some circumstances metastable growth takes place in nature under conditions that may be comparable with those produced in the laboratory.

On the basis of widespread occurrence of zeolitic cements in Russian sedimentary rocks (reviewed below) RENGARTEN (1950) proposed a "geochemical zeolite facies." It was suggested that rather special chemical conditions including the presence of alkaline, colloidal solutions of silica and alumina and a high oxygen potential were necessary for zeolitization to occur. The oxygen potential was believed to distinguish the zeolite facies from a glauconite facies although zeolites and glauconite have subsequently been shown to coexist (BUSHINSKY, 1950; VASIL'EV, 1954). We do not believe that RENGARTEN's views were justified.

2. THE ZEOLITE FACIES IN THE NEW ZEALAND GEOSYNCLINE AND THE TRANSITION TO THE GREENSCHIST FACIES

(D. S. C.)

2.1. *Geological setting: the New Zealand Geosyncline* (Fig. 1)

The dominant structural features of New Zealand geology are those related to the New Zealand Geosyncline (WELLMAN, 1956), in which deposition proceeded from pre-Permian times well into the Jurassic. In Otago, early greywackes, siltstones and occasional volcanics of the geosyncline have been metamorphosed into the extensive chlorite-zone schists, made well-known through the work of TURNER (1938) and HUTTON (1940). These schists continue northwards as a narrow belt, the "Alpine Schists," on the western flanks of the Southern Alps. At the south end of this belt, TURNER (1933) established chlorite, biotite and oligoclase zones, while further north in the Franz Josef–Copland River sector LILLIE and MASON (1955) have mapped chlorite, biotite and garnet zones. Boulders of kyanite gneiss in Paringa River and at Hunts Beach to the west have been collected by ODELL (personal communication), and suggest that kyanite-zone conditions were attained at least locally. The Alpine Schists grade progressively eastwards into "unmetamorphosed" (prehnite-zone) greywackes described below.

In the southern part of the South Island, the schist belt strikes south-east and is flanked on its south-west side, and apparently overlaid, by folded and steeply-dipping Upper Paleozoic greywackes, siltstones and some volcanics, the thickness of which is given by WOOD (1956) as being greater than 36,500 ft. The Upper Paleozoic rocks are in turn overlaid by Triassic and Jurassic beds in the Southland Syncline which includes at Taringatura the area that prompted TURNER's re-erection of the zeolite facies. The Triassic sediments vary in thickness along the north limb of the syncline from about 10,000 to 30,000 ft (COOMBS, 1950), but they are much thinner where exposed on the south limb (WOOD, 1953). The thickness