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Age Measurements on Antarctic Rocks (Queen Maud Land)

We wish to report here the results of absolute age measurements carried out on rocks from the Sör-Rondane Mountains. These mountains, extending from 23° E. to 28° E. in Queen Maud Land, were explored in 1958 in the course of the Belgian Antarctic Expedition led by Gaston de Gerlache[1]. Preliminary accounts of the geology and of the petrography of this region have been published[2,3] already.

We have measured rubidium–strontium ages on biotites obtained from various types of rocks: 'intrusive' granite and diorite, gneiss and migmatites, granitic and pegmatitic veins. The procedures for the determination of rubidium-87 and strontium-87 were similar to those described by Aldrich *et al.*[4]. The isotopic ratios were measured with a 33-cm. radius of curvature mass-spectrometer equipped with an electron multiplier. The analytical error of the concentrations is between 1 and 3 per cent, resulting in an uncertainty of ± 15 million years in the calculated ages. The analytical data and the resulting age appear in Table 1. The geographical names refer to the map of the Sör-Rondane Mountains, published by the Norsk Polarinstitutt, during 1957.

The results indicate that the biotites are all the same age, ~475 million years, which corresponds in the stratigraphic scale to a Lower or Middle Ordovician age.

Ravitch and Krylov[5] carried out argon–potassium measurements on rocks occurring in the mountains situated west of our region. Their data yield ages ranging from 410 to 500 million years by using the values: $\lambda_\beta = 4{\cdot}72 \times 10^{-10}$ yr.$^{-1}$ and $\lambda_\varepsilon = 5{\cdot}85 \times 10^{-11}$ yr.$^{-1}$ for the decay constants of potassium-40.

On the other hand, Nicolaysen *et al.*[6] report rubidium–strontium ages of ~515 million years for biotites from pegmatites and charnockitic gneiss occurring near Lützow-Holm Bay, on the eastern limit of Queen Maud Land.

Our data around 475 million years refer clearly to the last major metamorphic episode in Queen Maud Land. They confirm the very large extension of this episode, which has been recorded from 165° E. (ref. 7) to 10° E. along the Antarctic coast.

Biotites are known to be very sensitive to metamorphism and to keep record only of the last metamorphism, therefore very little can be said about the

Table 1. Rubidium–Strontium Ages of Biotites

Location	Source rock	Rubidium (p.p.m.)	Radiogenic ^{87}Sr / Total ^{87}Sr	Age (m. yr.)
Romnoesfjellet	Porphyroblastic granite	563	0·42	478
Romnoesfjellet	Pegmatite vein in granite	1,108	0·91	465
Småhausane, 1,180	Quartz diorite	139	0·56	458
Småhausane, 1,180	Diorite	328	0·39	457
Nordtoppen, 1,100	Biotite gneiss (xenolith in diorite)			
	Fine fraction	1,477	0·92	476
	Coarse fraction	1,459	0·89	481
Nordtoppen, 1,100	Coarse biotite crystals from xenolith in diorite	786	0·59	493
Strandrufjellet	Biotite gneiss	545	0·56	455
Strandrufjellet	Fine-grained granite (anatectic ?)	1,329	0·90	483
Bautaen	Fine-grained granite (anatectic ?)	1,282	0·93	506
Trillingane	Amphibole biotite gneiss	371	0·50	471
Trillingane	Leucocratic pegmatite	842	0·60	474

$\lambda_{rubidium\text{-}87} = 1{\cdot}39 \times 10^{-11}$ yr.$^{-1}$, $_{rubidium\text{-}87} = 0{\cdot}283$ gm./gm. rubidium

age of the intrusive bodies, the migmatites and the pegmatites occurring in Queen Maud Land, in relation to the ~500 million years old metamorphic episode.

In order to solve these problems, more measurements should be carried out not only on biotites but also on minerals like feldspars, muscovites or zircons, which preserve pre-metamorphic ages better than biotites[8,9].

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