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Rock of Grenville Age from Rockall Bank

WE report an age of 987 ± 5 m.y. obtained on a sample drilled from an outcrop at the southern end of Rockall Bank. The specimen was part of a 7-cm long core of andesine–ortho-pyroxene–biotite–quartz granulite and its petrography has been described by Roberts, Ardus and Dearnley[1]. Surveillance by underwater television of the outcrop prior to drilling left very little doubt that it is in place and is not an enormous erratic block.

The sample was dated using the $^{40}Ar/^{39}Ar$ method (refs 2 and 3) with correction made for isotopic interference in the manner described by Brereton[4]. The total sample weight was 0.08 g and two separate determinations were made with results shown in Table 1.

Table 1 Age Data

J	Atmospheric contamination (%)	R	Age (m.y.)
4.75×10^{-3}	12.7	145.26	989 ± 5
4.75×10^{-3}	11.8	144.21	984 ± 5

J is a measure of neutron absorption and is related to the value R by the equation

$$Q = J\,R$$

where

$$Q = [\exp(t/\tau) - 1]$$

t is age, R ratio of radiogenic ^{40}Ar/neutron induced ^{39}Ar and τ is decay constant for ^{40}K.

Geophysical and geological results have confirmed that Rockall Bank is underlain by continental rocks[1]. There are now two dated drill cores from the bank: an acid granulite from an outcrop about 45 miles SW of Rockall islet (Discovery station 7964, 57° 04.3′ N, 14° 31.9′ W, drill site A of ref. 1, Fig. 1) and the intermediate granulite discussed here which was collected from a position about 95 miles SSW from the islet (station 7955A, 56° 16.5′ N, 15° 11.8′ W, site B of ref. 1). The acid granulite gave Laxfordian ages of $1,566 \pm 33$ m.y. on secondary hornblendes and $1,670 \pm 24$ m.y. on the whole rock. These ages were determined at the Institute of Geological Sciences, London, using a mass spectrometer to determine argon and flame photometry to determine potassium. The intermediate granulite gave a Grenvillian age of 987 ± 5 m.y. by the method outlined here. This is the first Grenville age to be reported from the British Isles or west of the Caledonian Front in Europe, although the probability of findings rocks of this age on the southern part of Rockall Plateau was suggested by Roberts *et al.*[1] and, much earlier, by Miller[5]. An age of $1,194 \pm 6$ m.y. obtained from an Rb-Sr whole rock isochron on mica schist from western Scoresby Sund in Greenland has been reported[6] and may indicate the same metamorphic event[7]. The result from Rockall clearly stands in need of confirmation by further dating of drilled and dredged samples. It does, however, suggest that the Grenville Front crosses the southern part of Rockall Bank where it may be indicated by an E-W magnetic lineament[8] that separates the positions of the two specimens. A similar magnetic feature is associated with the Grenville Front in eastern Canada[7]. If the reconstruction[1] of the North Atlantic continents involving closure of Rockall Trough is to be believed it further suggests that rocks of this age may be found to underlie parts of Porcupine Bank or of the Continental Shelf off northern Ireland.

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Oscillations during Catalytic Oxidation of Carbon Monoxide on Platinum

IT is generally accepted[1,2] that (at least) two different mechanisms are involved in the catalytic oxidation of carbon monoxide on platinum. In the first (Langmuir–Hinshelwood) oxygen and carbon monoxide are both adsorbed on the metal surface and react in the adsorbed state. In the second only one component is adsorbed and the reaction proceeds by collision of the other component which comes from the gas phase (Eley–Rideal). Experiments at low pressure[3] have shown that the Langmuir–Hinshelwood mechanism is apparently autocatalytic. It could thus lead to oscillations, provided experimental conditions are suitable.

We started by studying the influence of oxygen and carbon monoxide on the contact potential of platinum at atmospheric pressure and at temperatures comparable to those at which reaction starts. This was done in the apparatus shown in Fig. 1. These measurements are not absolute but they indicate that the nature of the adsorbed molecules depends on the composition of the gas phase (Fig. 2) and thus suggest that a composition can be found such that both oxygen and carbon monoxide are mixed in the adsorbed phase. This composition is in the neighbourhood of 2% CO–98% O_2. At 120° C these measurements are reversible, but at room temperature they are apparently not reversible.

We studied the CO_2 production over a thin film of evaporated platinum as a function of the ratio O_2/CO. It turns out that this production goes through a maximum near compositions corresponding to those giving mixed adsorption (Fig. 3). The CO_2 produced was measured by chromatography. Evidently no oscillation can be observed by this technique.

In order to detect the oscillations we used two methods: in the first, thin platinum wires (diameter 0.03 mm) were used