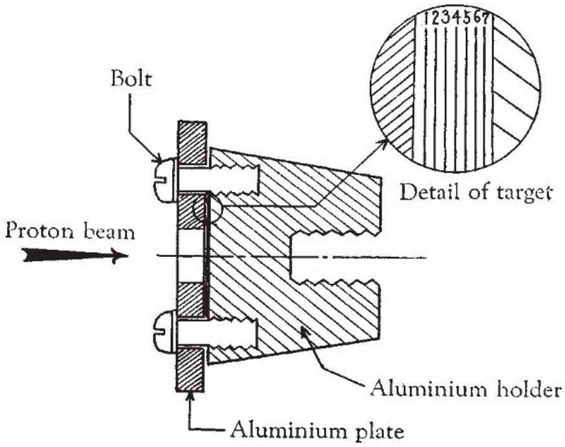

Fig. 1. Cross-section of target and target holder. 1, 3, 4, 5, 7, tantalum foil; 2, 6, niobium foil

and then the solution was heated to boiling and kept near the boiling point for 5 min. under continuous passage of hydrogen sulphide. After cooling the solution in ice water, the precipitation of molybdenum as sulphide was filtered off, washed, dried and radioactivity measured. This chemical process required less than 1·5 h, with a yield exceeding 80 per cent.

The total γ-ray activities of ^{93m}Mo were counted with a well-type sodium iodide (1·75 in. diam. × 2 in. high). Further, the ^{93m}Mo (0·263, 0·685 and 1·479 MeV) photopeaks were measured with an Argonne type 256 channel pulse height analyser with a large sodium iodide crystal (3 in. diam. × 3 in. high). The decay curve agreed with that of ^{93m}Mo. The niobium content in tantalum was estimated to be 0·2 per cent from the ^{93m}Mo activities of the two niobium foils. The contribution of the (Mo + p) reactions was negligible under our conditions.

This method appears to be a very sensitive one for the determination of niobium and is very effective for the analysis of niobium in tantalum. The determination of 10^{-1} p.p.m. niobium can be expected by this method.

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[1] James, R. A., *Phys. Rev.*, **93**, 288 (1954).

A Negative Ion Source using a Mercury Pool Cathode

NEGATIVE ion sources are now being used extensively in nuclear research. The demands from these sources are more rigorous than for their positive ion counterpart, and lives are around 100 h for hydrogen, much less for oxygen. Experiments in which the filament of the ion source has been replaced by a mercury cathode (Fig. 1) have given much larger currents (up to 700-amp pulse) and lives. With hydrogen beams, after 600 h operation the source showed only slight wear on the electrodes and indicated an indefinitely long life, while tests with oxygen and with sulphur beams, each for 300 h, indicated no difficulties. These tests were under conditions which gave magnetically analysed ion beams of H^-, 15 μamp; of O^-, 15 μamp; and of S^-, 8 μamp.

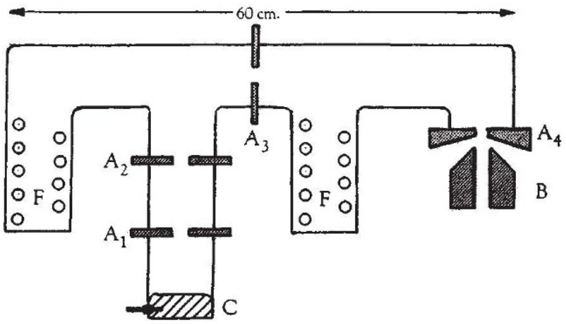

Fig. 1. A_1, A_2, A_3, auxiliary anodes; A_4, final anode; B, 40 kV ion extraction canal and electron donor target; C, mercury pool cathode; F, refrigerated coils

The mechanically refrigerated traps operate at − 50° C. A search was made for a mercury beam by running the ion source positive. None was found, which puts the upper limit in terms of the negative ion beam as less than 1 per cent.

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GEOLOGY

The Highland Boundary Fault : Reverse or Wrench Fault?

DETAILED work which I have done in the Loch Lomond area suggests a definite answer to the above problem which is of some importance since it concerns one of the major geological features of the British Isles. The direction in which the principal stress acted in the production of the fault can be approximately determined from the pattern of structures in the Lower Old Red Sandstone conglomerates, and this supports the contention put forward in stratigraphical accounts (summarized by J. G. C. Anderson[1]) that the Highland Boundary Fault is a reverse fault of Caledonian age and not a Proto-Armorican wrench fault as envisaged by E. M. Anderson[2].

Immediately south of the fault, the chief rock type is a conglomerate composed of rounded to ellipsoidal boulders of quartzite with subordinate vein quartz, porphyry, and andesite. The inequidimensional boulders have their major and intermediate axes parallel or slightly oblique to the planes of bedding, and in the upturned to vertical attitude of the bedding close to the fault had their maximum surface areas normal to the direction of principal stress during most of the deformation.

The compressive stresses in the vicinity of the fault during deformation were sufficient to rupture most of the pebbles in the conglomerate for some distance south of the fault as noted by du Toit[3]. The cracking is megascopically conspicuous and is independent of shape and size of the boulders. The fracture planes