calcite were common in vesicles of the lava flows around Kap Brewster. Large cavities bearing zeolites were not common anywhere, and it is interesting to note that zeolites appear to be absent in the upper 1,500 ft. of the lava pile in the Torv Gletscher region. The absence of zeolites in the vesicles suggests that these lavas are analogous to the upper 700 ft. of lavas found by Walker⁷ in Iceland which are similarly free of zeolites. Elsewhere the best zeolite samples were collected on scree slopes where the scale material is often representative of the material in the underlying lava flow.

Sandstones and shales occasionally occur in the succession and fossil wood and coal were frequently found. The discovery of a pillow lava that grades upwards into a normal lava flow suggests a shallow water environment during at least one stage of the volcanicity. This is further indicated by the molluscs and other fossils occurring in Bopladsdalen⁴.

No indication of the source of the volcanic material was seen, and the poor development of pipe amygdalae made it impossible to estimate the direction of flow. The dyke swarm with its associated crustal flexure, described by Wager⁸ from further south-west, does not extend into this area. As the exposures of the lava field are restricted by the ice cap to the west and the Denmark Strait to the east, it may not be possible to find the vents from which these flows came. The thickness of the pile near the Denmark Strait has been estimated at 7 km⁸. The discovery of the base of the basalt pile in Gaaseland by Wenk⁹, combined with the present observation of the flat topped nunataks, confirms the view that considerable thinning occurs to the west.

The expedition was obliged to walk for 3 miles over the pack ice in order to reach a relief boat to return home, so a certain number of specimens, together with equipment and food, had to be left in huts at Kap Brewster. These specimens will be brought back to Europe in 1966 at a time when conditions permit, but meanwhile work will proceed on those specimens which it was possible to bring out. The work will be done at the University of Oxford, the University of Toronto and the University of Newcastle upon Tyne.

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J. J. FAWCETT

Department of Geology,
University of Toronto.

J. C. RUCKLIDGE*
C. K. BROOKS

Department of Geology and Mineralogy,
University of Oxford.

* Present address: Department of Geology, University of Toronto.

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PHYSICS

A Single Grid Photoelectron Spectrometer for Gases

IN an earlier report¹ from these laboratories a spherical grid photoelectron spectrometer suitable for ionization studies in the gas phase was described, in which ionization occurs at the common centre of two concentric grids and an outer collector. The outer grid is normally kept at a potential 3 V positive to the inner grid to effect positive

Fig. 1. The integrated photoelectron spectrum for argon obtained (a) with double, and (b) with single grid operation in the energy analyser. The first differential (dotted) indicates the single grid resolution to be the better by a factor of about two.

ion repulsion. The photoelectrons are analysed in energy by means of a variable retarding field between the outer grid and collector. The first differential of the stopping curve gives the photoelectron energy distribution, and the resolution of the instrument just permits complete separation of the Ar⁺ doublet (²P_{3/2} - ²P_{1/2}), the components of which lie 0.18 eV apart.

It is the purpose of this communication to show that a substantial increase in resolution is obtained by dispensing with the outer grid, and applying the retarding field between the single remaining grid and the collector. In this mode of operation all positive ions (other than those lost on the grid walls) reach the collector throughout the electron retardation sweep. This presents no problem, however, because allowance can easily be made for the constant background.

The advantage of single grid operation lies in the decrease in electron scattering between the central ionization region and collector, and the consequent improvement in resolution. Our grids are of 50 × 0.003 in. stainless steel mesh, giving theoretical transparencies for single and double filters of 75 per cent and 56 per cent respectively. Fig. 1 shows the photoelectron stopping curve for argon and illustrates the energy resolution which can be attained with one and two grids. The former arrangement results in a peak half-width of only 0.045 eV, compared with double this for the latter, and will obviously be advantageous in the detection of fine structure in photoelectron spectra.

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D. C. FROST
J. S. SANDHU
D. A. VROOM

Department of Chemistry,
University of British Columbia,
Vancouver 8, Canada.

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