SHORT COMMUNICATIONS

Natural glass from Macusani, Peru

If their chemical compositions are examined, it is found that tektites are different from natural glasses in that they have a very low water content, a K_2O/Na_2O ratio in excess of one, and appreciable amounts of MgO, CaO, TiO_2, and iron (as FeO and Fe_2O_3). If, with these points in mind, the composition of the Paucartambo glass (Linck, 1926) is considered, there are several differences that have contributed to the general opinion that this glass may not be a tektite. For example, the analysis quoted by Linck, who was convinced that this glass was a tektite (see also Linck, 1934), showed some important differences from those given for the accepted tektites, namely in a high content of alumina and a small content of magnesia. Neither TiO_2 nor water was determined, although a loss in weight on ignition is quoted. In 1936, Heide described a glass from Macusani, Peru, and concluded from the appearance, the crystals contained in it, the specific gravity and the refractive index that this glass was identical with the Paucartambo glass, which conclusion, having regard to the close proximity of the two places, may not be surprising.

The composition of the glass was not given, so it was decided to make an analysis in order to ascertain in what respects its composition differed from those of tektites. The results were: SiO_2 71·6; Al_2O_3 16·7; B_2O_3 0·4; P_2O_5 0·4; FeO 0·6; MgO trace; CaO 0·4; Li_2O 0·8; Na_2O 4·7; K_2O 3·6; TiO_2 0·04; MnO 0·05; F 1·4; H_2O 0·2. Total (less $O \equiv F = 0{\cdot}6$), 100·4. A spectrographic analysis indicated also the presence of about 100 ppm of beryllium and 200 ppm of tin. The specific gravity of the glass is D_4^{20} 2·359 and the refractive index (Na) is $1{\cdot}4857 \pm 0{\cdot}0003$. The glass melts at about 1000° C.

It will be seen that the composition of the Macusani glass differs in many respects from that of a tektite, namely in the contents of H_2O, Al_2O_3, B_2O_3, FeO, Fe_2O_3, MgO, CaO, Li_2O, TiO_2, F, and in the ratio of K_2O/Na_2O. The appreciable amounts of B_2O_3 and Li_2O in the glass were unexpected, but a search of the literature revealed that Preuss (1935), who in a spectrographic investigation of tektites had also included the Paucartambo glass among his samples, had obtained similar results namely B_2O_3 0·8 %; Li_2O 0·8 %; TiO_2 0·05 %; BeO 100–200 ppm; SnO_2

300 ppm, results that are in reasonable agreement with those obtained by us.

Martin *et al.* (1955) have drawn attention to the difference between this Peruvian glass and that found in Colombia, and is of the opinion that the Colombian glass is an obsidian whereas the Macusani glass has a composition intermediate between that of sedimentary and igneous rocks. It has been shown that the uranium content (Friedman, 1958) and the germanium content (Cohen, 1960) of Macusani glass are several times greater than those found in tektites and other forms of natural glass.

There seems, therefore, to be overwhelming evidence to support the contention that this Peruvian glass is unique, yet it is still not possible to formulate an acceptable theory about its origin.

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Tellurbismuth and meneghinite, two minerals new to Britain

Tellurbismuth from North Wales. For many years the bismuth telluride tetradymite (Bi_2Te_2S) has been accepted as a British species, but this status has never been satisfactorily established. It was originally thought to occur in Brandy Gill, Carrock Fell, Cumberland, though in 1858 Greg and Lettsom[1] had stated that the mineral appeared to differ much in composition from other tetradymites. The Carrock mineral was later regarded as a new species and was named grünlingite, but further investigations have shown that these specimens are not all identical and probably represent several varieties or phases of the allied mineral