The counting-rate was measured every hour for 10 hr. together with the γ-ray spectrum, which consisted only of the annihilation peak at 0·51 MeV. The decay curve agreed with that of fluorine-18. The oxygen content was calculated from the disintegration-rate of fluorine-18 by the absolute method, the contribution of $^{16}O(\alpha,p3n)^{18}F$ and $^{17}O(\alpha,p2n)^{18}F$ reactions being negligible under our conditions.

A raw silicon contained 4 p.p.m. oxygen, while a transistor-grade silicon had 0·3 p.p.m. By this method 10^{-3} p.p.m. oxygen can be determined. This method appears to be the most sensitive method for the determination of oxygen and is useful for the analysis of a solid sample having a high melting point and a low vapour pressure. The recoil effect, the evaporation of fluorine during irradiation and other details will be reported elsewhere.

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GEOLOGY

Analysis of a Supposed Clay Fulgurite from Ontario

The existence of 'clay fulgurites' from Kingston, Ontario, was reported recently by Hawkins[1]. These were described as "partially fused ellipsoids" resulting from lightning striking clay sediments. The report was of considerable interest to us because it suggests that lightning may be responsible for the formation of tektites. At our request, Dr. Hawkins kindly sent us a sample of this material. The composition is as follows:

SiO_2	29·69
Al_2O_3	12·45
Fe_2O_3	30·97
FeO	1·63
CaO	0·47
MgO	1·72
H_2O	15·50
MnO	0·31
TiO_2	0·21
Na_2O	0·44
K_2O	1·84
Organic matter	4·18
	99·41

The specimen analysed was an irregular lump 3 cm. long with a yellowish-brown colour and streak, earthy lustre, and hardness of about 1 (Mohs). Portions of the specimen were covered with a shiny brown coating which was soluble in acetone and presumed to be organic (Fig. 1). In the analysis total water was determined by the Penfield tube method and organic matter by difference between loss on ignition and total water. The chemical analysis indicates that the specimen may be mostly a hydrated iron aluminium silicate or oxide. An X-ray powder diffraction pattern showed the specimen

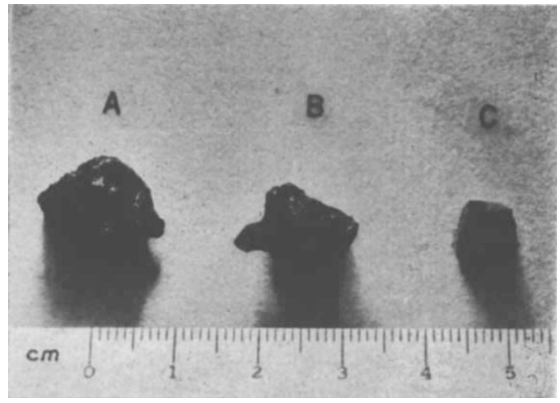

Fig. 1. Portions of the specimen marked *A* and *B* are untreated, showing their shiny coating of organic matter. The portion marked *C* was treated by immersion in acetone, exposing its dull surface

to contain some quartz, kaolinite, and additional material as yet unidentified. Petrographic examination disclosed no lechatelierite or glass. This specimen has no resemblance to any known fulgarite or tektite in composition. Therefore it appears to have no relation to the origin of tektites.

Thanks are due to E. C. T. Chao of the U.S. Geological Survey for furnishing X-ray data and to J. I. Dinnin, also of the U.S. Geological Survey, for determination of the alkalis.

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Karroo Igneous Activity and Tectonics in south-east Southern Rhodesia

During the period 1956–60, members of the University of Leeds Research Institute of African Geology, under the direction of Prof. W. Q. Kennedy, have been investigating Karroo (early Mesozoic) igneous activity and tectonics in the south-east of Southern Rhodesia. Field-work has now been completed and it is intended in due course to publish the results in detail. In the meantime, we present here some aspects of the geology of the area which may be of general interest.

The Basement Complex underlying the area investigated (see Fig. 1) consists of highly folded gneissose rocks and represents part of the east-north-east trending Limpopo orogenic belt (*circa* 2,000 m.y.)[1], which separates the stable blocks of Southern Rhodesia and the Transvaal.

Warping and fracturing of the Dominion Reef, Loskop and Waterberg systems in the northern Transvaal indicate that the Limpopo belt continued to mark an important tectonic line at a later period (? late-Precambrian).

In the Karroo period, a relatively thick succession of sandstones, mudstones and shales, with some coal, was deposited in the vicinity of the present-day

(*Continued on page* 77)