

with variable radio emission having a period of hours or days and also a short period of a few minutes. Of course, the fluctuations may be due to both scintillations and variability, in which case the short-period fluctuations may be true scintillations that are observed only when the source is at or near maximum intensity and the ionospheric conditions are also suitable.

Whatever the explanation, the observations suggest that the source may be a true star or a new class of radio object. Attempts to identify the source with an optical object have not yet been successful. More observations are needed to improve the accuracy of the position and to follow the fluctuation periods. Unfortunately, this source is observable now only during the day at times at which severe radio interference is encountered on most days. Accordingly, more detailed observations may have to wait until the source is again in a favourable observing position.

J. D. KRAUS  
H. C. KO  
D. V. STOUTENBURG

Radio Observatory,  
Department of Electrical Engineering,  
Ohio State University,  
Columbus 10, Ohio.  
May 20.

<sup>1</sup> Ryle, M., and Hewish, A., *Mon. Not. Roy. Astro. Soc.*, **110**, 381 (1950).  
Bolton, J. G., Slee, O. B., and Stanley, G. J., *Aust. J. Phys.*, **6**, 434 (1953).

<sup>2</sup> Kraus, J. D., Ko, H. C., and Matt, S., *Astro. J.*, **59**, 439 (1954).

### Liquid Immiscibility in a Silicate Melt

THE formation of immiscible liquids in silicate melts has been suggested as one of the possible methods by which natural magmas may produce a variety of rock types. This theory has, however, not found much favour among petrologists, because of the lack of observational and experimental evidence. Bowen<sup>1</sup> pointed out that direct evidence of this phenomenon, if it existed in rock melts, should be found in glassy lavas such as obsidian; in these lavas would be found discrete spheres of one glass embedded in another glass of different composition. No such phenomena have been observed. Greig<sup>2</sup> conducted extensive laboratory investigations on immiscibility in binary and ternary silicate systems. The areas of liquid immiscibility which he found lay well away from those representing even abnormal rock compositions. More recently, however, Roedder<sup>3</sup> found an extensive region of low-temperature immiscibility in the system  $\text{FeO}-\text{K}_2\text{O}-\text{Al}_2\text{O}_3-\text{SiO}_2$ . This new region of immiscibility fell much closer to the compositions of some abnormal rock types. Direct evidence of the existence of silicate immiscibility in Nature has still been lacking, however.

In a recent study of tektites directed towards a theory of their origin, we considered the possibility that the so-called 'lechatelierite' inclusions frequently reported in these glassy bodies might really represent liquid immiscibility. This idea is not original; it has been put forward, but for various reasons discarded, by Barnes<sup>4</sup>.

A series of experiments using the quenching method was carried out on an artificial mixture of soda, lime, magnesia, alumina and silica approximating in composition to an iron-free tektite. Certain quenched charges consisted of small spheres of one glass embedded in much larger quantities of a

second glass, thus giving evidence of immiscibility in the liquid state. This prompted a further test on actual tektite material sealed in a platinum envelope in a small evacuated silica tube to prevent oxidation of the ferrous iron. The quenched sample again showed the same phenomenon—small spheres of glass embedded in the greater mass of glass of slightly higher refractive index. The phase represented by the spheres made up something less than one per cent of the whole.

From this evidence we conclude that the so-called 'lechatelierite' inclusions in tektites most probably represent a state of liquid immiscibility in a silicate melt. It appears to be the only evidence of this phenomenon yet found in Nature.

W. A. CASSIDY

South Australian Museum.

E. R. SEGNI

Department of Geology,  
University of Adelaide.

<sup>1</sup> Bowen, N. L., "The Evolution of Igneous Rocks" (Princeton, 1928).

<sup>2</sup> Greig, J. W., *Amer. J. Sci.*, **13**, 1 and 133 (1927).

<sup>3</sup> Roedder, E. W., *Amer. Mineral.*, **36**, 282 (1951).

<sup>4</sup> Barnes, V. E., Univ. of Texas Pub. 3945 (1940).

### Observations of Spiral Growth Steps in Ethylene Polymer

THE role of dislocations in crystal growth has been discussed by N. F. Mott<sup>1</sup>, and later, evidence was given by Griffin<sup>2</sup> to support the mechanism suggested by Frank<sup>3</sup>. Since that time there has been striking examples of this type of growth, described by Dawson and Vand<sup>4</sup>, and Forty<sup>5</sup> along with Verma<sup>6</sup>, to mention a few.

No report, however, seems to have appeared indicating that growth by a dislocation mechanism can take place in a polymer. All evidence of crystallization of polymers seems to be of a different character.

Recently, growth by a dislocation mechanism has been observed in 'Marlex 20\*' (trade name of Phillips Petroleum Co.), a predominantly polymethylene structure with limited branching along the polymer chain. Preliminary work indicates the distribution of molecular weights to be approximately linear from 2,000 to 28,000, with a mean molecular weight of 10,000. These small crystals were grown from hot solution in xylene, were shadow cast<sup>7</sup> ( $\times 2:1$ ) and examined

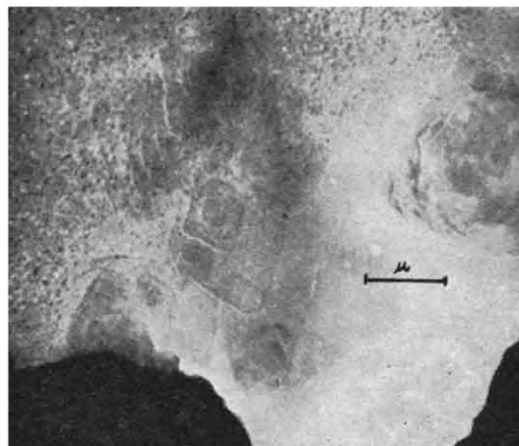


Fig. 1