per min. The activity of F was found to decay with a composite period, the decay curve agreeing with that calculated from Frisch's formula[3]. With a target entirely of lead, F as well as D showed only a small effect. Replacement of the aluminium foil as a collector of fission products by pieces of ciné film did not appreciably affect the activity of F.

The magnitude of the fission effect caused by the background neutron radiation produced at the target was assessed by measuring the neutron-induced fission in a second thorium target enclosed in the side pocket and safely protected from the scattered deuterons. After identical bombardments, the activity on an aluminium collector placed in front of the second thorium target and separated from it by aluminium of 2 mm. S.P. was less than one thirtieth of that observed in the case of direct deuteron bombardment.

The maximum range of the radioactive nuclei projected from the thorium target under 9 Mev. deuteron bombardment was found to be equivalent to about 1·8 cm. of air. Excitation function measurements showed that the threshold for deuteron fission of thorium is at about 7·5 Mev. and that the fission cross-section increases rapidly between 8 and 9 Mev.

Chemical separation of the deuteron-induced fission products of thorium gave the following periods: platinum fraction, 18 min. and 2½ hr.; barium fraction, 15 min.; and lanthanum fraction, 2·5 hr.

Comparison between the fission cross-sections of uranium and thorium for 9 Mev. deuterons showed that for thorium the cross-section was about two thirds of that for uranium.

We wish to express our gratitude to Mr. D. H. T. Gant for lending us his apparatus and also for valuable suggestions.

R. S. KRISHNAN.
T. E. BANKS.

Cavendish Laboratory,
Cambridge.
May 7.

[1] Gant, NATURE, **144**, 707 (1939).
[2] Livingood and Seaborg, *Rev. Mod. Phys.*, **12**, 30 (1940).
[3] Frisch, NATURE, **143**, 852 (1939).

Change of Ultra-Violet Transparency of Glass with Temperature

THE transmission of ultra-violet light by glass in the region of 3000 A. has long been known to be reduced when the glass is exposed to light, and restored by heating to 250–300° C. Slow restoration also takes place when the glass is kept in the dark.

Another effect has been examined, not to be confused with the first, whereby the absorption coefficients of glasses are found to vary very appreciably with temperature in the region of wave-length close to the ultra-violet limits of transparency of the glass. The effect is immediately reversible, and over the range 10°–50° C., the relation absorption coefficient – temperature is strictly linear, and in all cases absorption coefficient increases with increase in temperature. The specimens of glass were kept at known temperature in a vessel with quartz windows top and bottom. Through this vessel water was passed, the temperature of which was controlled by a small electric heater.

3300 A.

Glass	Absorption coeff. per cm. thickness		Percentage variation per ° C.	
	3300 A.	3110 A.	3300 A.	3110 A.
'Vita'	0·121	0·578	0·48	0·38
Pilkington's 'White'—Sample 2	0·426	1·67	0·49	0·39
Patent plate—Sample 5	1·59	—	0·47	—
Pilkington's 'White'—Sample 4	0·482	—	0·38	—
Ordinary microscope cover glasses	1·69	6·10	0·34	0·24
Ordinary photographic plate glass	0·925	5·14	0·66	0·46

With the particular spectrophotometer used, only three wave-lengths were available, and assuming for the longest, namely, 4500 A., a negligible absorption for all the glasses used, the values of absorption coefficient per cm. thickness and percentage increase per degree centrigrade (shown in the accompanying table) were obtained for light of 3300 A. and 3110 A.

During a control experiment without glasses but with tap water at various temperatures, the spectrophotometer readings were constant.

The percentage change of absorption coefficient with temperature was found in the first three widely different glasses to be constant for a given wave-length, and it was thought that if this should hold for all glasses, then the effect might be due to a single impurity—possibly iron—present in them all in varying amounts. However, the later specimens gave results which were rather different, so it seems that more than one substance in the glass contributes to the effect.

It follows from the above results that, for work involving the absorption of ultra-violet light by glass filters, it is necessary to keep the filters at a known temperature constant to about 1° C. for reasonable accuracy to be obtained.

This effect may be known to some people, but it does not seem to be generally recognized, and little reference to it can be found in published works.

WILLIAM J. ARROL.

"Watch Hill",
The Ridings,
Shotover,
Oxford.

Surface Potential Changes of Thin Films in the Transformation Liquid to Solid

IN an investigation on the oxidation and polymerization of polymerizable glycerides, it appeared feasible to follow the polymerization accompanying the oxidation by measuring the change of potential at the gas/liquid interface, as the liquid phase passes abruptly to a solid or gel phase. This has been successfully accomplished. From this it was considered that similar changes in surface potential might attend the change from liquid to solid of pure polar materials at the melting point.

Measurements have been carried out on two typical polar materials, stearic acid and cetyl palmitate, and for comparison purposes on a relatively non-polar material, paraffin wax. These were spread in thin films, about 1 mm. thick, on a polished platinum plate kindly supplied by the Mond