a partial depolarisation of light would give a similar effect. We have therefore determined directly the amplitude of magnetorotation for a high frequency magnetic field using the following procedure. Polarised light passes first through a tube containing a liquid, such as benzene, which gives the usual diamagnetic rotation, and then through a nicol at 45° with respect to the first. The tube is placed on the axis of the coil supplying the magnetic field. The small magnetic rotation causes a very feeble periodic variation of the intensity of light, which is superimposed on the continuous intensity. The beam then falls on a photoelectric cell connected to a powerful resonance amplifier, the imput circuit of which is tuned to that of the magnetic field. Only the very slight modulation of the photoelectric current is amplified, whilst the great intensity of the continuous light does not affect the readings of the compensated microammeter in the output circuit.

As the amplification depends to a large extent on the frequency, an optical calibration method has been developed, using as source of light a Kerr cell with a definite alternating potential on its plates. The magnetic field frequencies ranged from 0·15 to $4{\cdot}0 \times 10^6$ c.p.s., whilst the peak values of the magnetic field employed were 0·97 and 0·29 gauss, the corresponding maximum Larmor frequencies being 1·36 and $0{\cdot}49 \times 10^6$ respectively. Within experimental error, no diminution of rotation was observed when the frequency n exceeded the Larmor frequency O_L.

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[1] Bretscher and Deck, *Helv. Phys. Acta*, **6**, 229; 1933.

Paper Hygrometers

DR. GRANT and Mr. Mellanby[1,2] have commented on the different periods required for paper to attain stretch equilibrium when this property is being used for hygrometric measurement. The following curve (Fig. 1) which is included in the paper quoted under

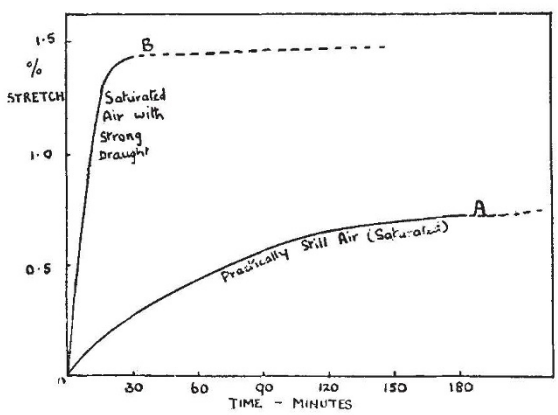

FIG. 1. Rate of attaining stretch equilibrium.

my name by Dr. Grant, may throw some light on the difficulty.

It will be seen that air velocity has a very great effect and that in comparatively still air the rate of change, after an initial period, may become so small that conditions resemble those of equilibrium. The paper used in this case was a rosin sized mixed wood furnish and rather thicker than those advocated by Dr. Grant, being 100 gm./sq. m., but nevertheless the air velocity factor should be carefully watched.

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Oct. 30.

[1] NATURE, **132**, 66, July 8, 1933.
[2] NATURE, **132**, 677, Oct. 28, 1933.

IN connexion with Dr. J. Grant's letter[1], on paper hygrometers, some experiments made some months ago on an experimental paper-operated indicating hygrometer may be of interest. The instrument, in aspect similar to the 'Edney' paper-metal hygrometer, was made by causing two pieces of the same paper to adhere together, the grain of one being at right angles to that of the other. A light pointer attached to the free end of a strip of this double paper indicated the movement as the strip curled due to differential expansion.

This instrument gave quite good results provided extreme humidity was not encountered, but if one attempted to calibrate at 100 per cent R.H., then the other scale points always moved to different positions. Probably cyclic 'ageing' would provide reliable movements.

Very rapid initial indication was obtained with this instrument, but final steady values could only be obtained after ten or fifteen minutes, even using very thin Japanese rice paper. It was mainly for this reason that further experiments were abandoned, and also because it was found that until the case had reached the air temperature of a fresh atmosphere, discrepancies resulted due to the slight warming or cooling of the air which was operating the element as it passed through the case.

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Nov. 6.

[1] NATURE, **132**, 677, Oct. 28, 1933.

X-Ray Investigation of Tridymite-glass

THERE has been a lengthy controversy between G. W. Morey[1] and A. Dietzel[2] concerning the nature of the crystallites in devitrified glass in region *B* of the phase diagram of the system: SiO_2 Na_2O CaO (see [2]). Morey, from microscopic investigations, thought that tridymite was present in this devitrified glass, whereas Dietzel, with the further help of expansion curves, decided in favour of cristobalite. Microscopic work on such a problem is very difficult, especially when dealing with crystallites incrusted in a vitreous mass. On the other hand, expansion curves are quite useless. There are three anomalies in the expansion of pure tridymite. The first occurs about 120° C., the second around 165° C. and the last at 420° C. A solid rod of 36 mm. of glass *B* does not give any appreciable anomaly of expansion. A rod of the same dimensions made from a powder of this devitrified glass also gives a negative result. X-ray powder analysis on the contrary gives a definite solution of the problem. A devitrified glass of the initial percentage composition: SiO_2 78, CaO 12, and Na_2O 10 (glass *B*) gives an unmistakable pattern of *tridymite* (Co-Kα-50 m.a.h.).

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It is necessary to emphasise the unreliability of thermal expansion curves, so far as tridymite and cristobalite, in glass or in mixtures, are concerned. The transition $\alpha \rightarrow \beta$ cristobalite is a very capricious one. Cristobalites of different origin will give various temperatures of transformation between 200° and 280° C. Some investigators[3] have even suggested the existence of β cristobalite at 170° C. Because of the fact that tridymite is obtained with difficulty in artificial preparations or because of the rather peculiar aspect of an occasional expansion curve, many workers have, in doubtful cases, decided in favour of cristobalite instead of tridymite[4]. X-ray work has been handicapped by the use of too short wave-lengths. In a note to be published elsewhere, in collaboration with Dr. Hägg, of Stockholm Hogskola, we give experimental evidence of the existence of *tridymite*, and not cristobalite, for example, in artificial mullites (bauxites calcined at 1,300° C.) containing free silica[5]. This proof has been made possible by the use of the appropriate wave-length, that is, calcium *K*, and with a camera of very high dispersion *in vacuo*.

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Nov. 1.

[1] *J. Amer. Cer. Soc.*, 683, 713, 922; 1930.
[2] *Glass Ber.*, 307; 1931.
[3] Heindl, P. and M., *Bur. of Stan. J. of Res.*, Feb. 1932, 199.
[4] Randall, R. and C., *Z. Kr.*, **75**, 196; 1930.
[5] M. E. Nahmias, *Z. Kr.*, **85**, 355; 1933.

Occurrence of *Dolioletta gegenbauri* (Uljanin) in the North Sea

IN a recent issue of NATURE, Delsman[1] refers to the appearance of large numbers of *Doliolum nationalis* at Den Helder in 1910–12, presumably carried there from the English Channel. It may be of interest to record the presence of another doliolid in the North Sea this year. The material was collected in the course of investigating the relations between herring and the plankton by means of the Hardy plankton indicator[2], and was forwarded to Prof. Garstang, who kindly identified phorozoids and gonozoids as *Dolioletta gegenbauri* (Uljanin). Oozoids were also present, but the identification of these is as yet uncertain.

The importance of the appearance of either doliolids or salps in the North Sea or Channel as indicators of exceptionally strong Atlantic drifts and high temperatures has been repeatedly stressed: in particular by Schmidt[3], Garstang[4], Bowman[5], Russell and Hastings[6] and Fowler[7]. In addition to Delsman's record, Schmidt[3] and Bowman[5] record large swarms of *Salpa fusiformis* passing into the northern North Sea in 1905 and 1920 respectively.

The present doliolids were obtained from two positions: (*a*) 125 miles east of Aberdeen (57° 35′ N., 1° 40′ E.) and (*b*) 67 miles N. 5° W. (mag.) of position *a*. They were more abundant at the northern station, where on September 10 and 11 nine samples yielded an average of 452; at position *a* on September 8 and 9 ten samples yielded an average of only 44, and none was taken there in twenty-two samples between September 1 and 5.

Doliolids are considered to be indicative of warmer water than salps. The fact that *D. gegenbauri*, which is normally found in Indian, Mediterranean and Atlantic waters, had penetrated into the North Sea, presumably from the north, to a position much farther south than that in which *S. fusiformis* has been recorded, appears to show a very considerable Atlantic inflow. The similarity in the climatic conditions of 1910–12, 1921 and 1933 is striking; all have been characterised by dry summers and high temperatures in the North Sea (the chief engineer of the trawler taking these samples recorded in September of this year the highest temperature he has observed in the North Sea—16·7° C.).

It may be of interest too to record a diurnal variation in the numbers of *D. gegenbauri*. In the northern position the following catches were obtained for 20-minute hauls with an indicator having an opening of only 1¼ in. diameter:

0800 hours		375	caught	0800 hours		275	caught
1100	,,	580	,,	1100	,,	1050	,,
1400	,,	790	,,	1300	,,	450	,,
1700	,,	125	,,	1500	,,	325	,,
2000	,,	100	,,				

This variation would appear to indicate a vertical migration in which the animals are to be found near the surface at night and sink during the day; all the samples were taken from a depth of approximately 30 metres.

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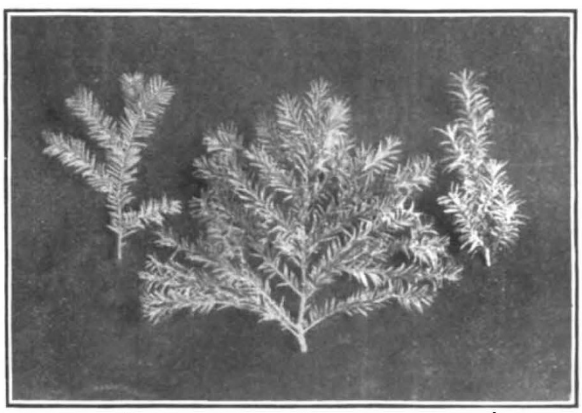
Nov. 7.

[1] Delsman, NATURE, **132**, 640, Oct. 21, 1933.
[2] Hardy, *Min. Agric. and Fish., Fish. Invest.*, **2**, **8**, No. 7; 1925.
[3] Schmidt, *Rapp. Cons. Explor. Mer.*, **10**, No. 4; 1909.
[4] Garstang, *J. Mar. Biol. Ass.*, N.S., **3**, 210; 1894.
[5] Bowman, *Rep. Brit. Assoc.*, 1922, p. 367.
[6] Russell and Hastings, *J. Mar. Biol. Ass.*, N.S., **18**, 635; 1933.
[7] Fowler, *Proc. Zool. Soc.*, **10**, 580; 1898.

Types of Foliage of Yews

I HAVE recently examined the very old, I think the second largest, yew tree in England, in the churchyard at Stoke Gabriel in Devonshire. This tree shows the horizontally spreading type of growth characteristic of the English yew, *Taxus baccata*, though the



c *a* *b*

FIG. 1. *a*, Stoke Gabriel yew; *b*, Irish yew; *c*, English yew.

drooping branches suggest the 'weeping' character found in some ash, birch and other trees. The arrangement of the twist of the leaves on the secondary branches, however, is not strictly parallel and horizontal, but more nearly resembles that seen in the Irish yew (*T. fastigata*).

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