obtained. The ratio of length to breadth in Fig. 4 is 1.93. I estimate that a combination between the nodal systems of Figs. 2 and 6 should occur when this ratio is about 3.9.

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¹ Waller, M. D., *Proc. Phys. Soc.*, **50**, 77 (1938).

Relation between Specific Heat and Temperature for Nitrobenzene

THEORETICAL considerations lead to the conclusion that traces of impurities can have an influence on the dielectric constant and density of a substance, but the changes of energy are only very slightly affected by them. For these reasons, the relation between specific heat and temperature for nitrobenzene has been investigated, with special attention to the neighbourhood of the solidification point of this substance.

This work is analogous to that carried out at the Kamerlingh Onnes Laboratory in Leyden on helium. It was then found that at the transition point of helium the change of density was 0.3 per cent, that of the dielectric constant 0.1 per cent, but the change of specific heat was as much as 79 per cent in certain temperature limits.

Two samples of nitrobenzene were used. One was purified by Dr. W. Kessel, of the Joseph Pilsudski University in Warsaw, the second by myself. The apparatus was similar to that used by Prof. W. H.

Keesom and Dr. Clusius¹ in Leyden. Before measurement, the nitrobenzene was distilled directly into the calorimeter. The energy increments were made small so as to be able to observe the possible transition point.

The experimental results show that the change of the specific heat of nitrobenzene with temperature is linear and this relation can be represented by the following equation :

$$C = 0.33830 + 0.000556 t.$$

It should be emphasized that observations in the neighbourhood of 9.5° C. were made with especial care, the points of the curve being 0.3° C. from each other, all lying on a straight line. The results obtained are in perfect agreement with those of other authors², especially with the data of Williams and Daniels³.

The relation of the refractive index to temperature and the heating curve were also investigated in the temperature limits 5.7–20° C., but no anomalous behaviour was observed.

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¹ Keesom, W. H., und Clusius, K., *Comm. Leiden*, No. 219.

² Parks, G. S., and Todd, S. S., *J. Chem. Phys.*, **2**, 440 (1934).

³ Williams, J., and Daniels, F., *J. Amer. Chem. Soc.*, **46**, 903 (1924).

After-Image Phenomena

If in a dark room a light be attached to a scale, and a point three feet on the right is marked with a peg and the light be looked at with one or both eyes for one or two seconds from a distance of ten feet and then the eyes be directed at the peg, it will be noticed that the negative after-image of the light is seen on the peg but the positive after-image has rapidly passed it to the right. The eyes being firmly directed towards the peg, it will be noticed that the positive after-image comes rapidly back towards the peg.

The first part of the experiment I have described before; it is evidently due to the contraction of the eye muscles pressing on the eye and moving the photo-chemical fluid, thus causing a separation of the positive and negative after-images. The second part of the experiment appears to be due to the cessation of the pressure on the eye causing the photo-chemical fluid to flow in the opposite direction. It should be noted that the pressure is in the opposite direction to the movement of the image; thus when the pressure is to the left, the image moves to the right, corresponding to the new position of the fluid in the retina.

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Ultra-Violet Spectrum of Thiophosgene

WE have tried to solve the problem of the fundamental vibrations of thiophosgene by analysing one of the three band systems found by one of us¹ previously in the ultra-violet spectrum of the vapour. The first system is composed of more than five hundred bands distributed between 5712 and 3989 Å. at ordinary temperature. A second and a third