has been suggested by Barthel⁴ that in the case of heavy ions the velocity of Brownian motion is much less and this may result in a decrease in velocity, Brownian motion being regarded as one of the factors that contribute to the sound velocity.

(3) It is noteworthy, however, that the adiabatic compressibilities are quite normal in all these cases, being always less than that of water at all concentrations and temperatures.

(4) One more striking feature is that in spite of the anomalous variation in sound velocity a linear variation of apparent molar compressibility with square root of concentration is found in all cases as predicted by the Debye-Hückel theory.

(5) The slopes of the apparent molar compressibility versus square root of concentration curves and the values of apparent molar compressibility at infinite dilution do not show any marked correlation with decrease in velocity with increasing concentration.

(6) On the other hand, these properties seem to be related more to the state of dissociation of the electrolytes and the existence of complex ions.

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Perceptual Anomalies associated with a Single Contour

IN the course of an investigation into the basis of 'complementary images'¹ evoked by patterns of near-parallel lines, I have observed some striking phenomena which, together with some confirmatory tests that they suggested, indicate that a single contour can be sufficient to excite a complementary image.

Two 300-W. projectors were focused on a screen at a distance of 1 metre. One of these, *A*, projected a plain bright field, while the other, *B*, projected a bright field with a black disk 10 cm. in diameter in the centre. By means of a rotating circular mask with two 10° apertures on opposite sides, these images were presented alternately, at intervals *AB* and *BA*, which could be varied by raising and lowering the axis of the mask. When the time-interval *AB* was about 30 per cent of the total cycle the following phenomena were observed. (1) Fine radial spokes extended about 2 cm. inwards from the edge of the dark disk. These were sharpest and brightest at the circumference, becoming more diffuse towards the centre. There were about 40 of them when viewed at 1 metre; (2) the disk appeared to be in continuous rotation of variable speed; (3) the disk gave the impression of slow continuous expansion; (4) the background was rather brighter and the disk considerably darker in the neighbourhood of the edge.

When the interval *AB* was 50 per cent of the cycle: (1) the radial effects were broader in appearance;

(2) rotation was seen as before; (3) the disk remained constant in size; (4) the disk again appeared dark, but there were no variations in brightness towards the edge.

When the time-interval *AB* was increased to 70 per cent of the cycle: (1) The strongest radial effects were now on the outside of the disk and were described by most observers as spiky, but the disk showed diffuse internal rays. Again when viewed at 1 metre the effects extended about 2 cm. from the edge; (2) rotation was seen as before; (3) the disk now gave a compelling impression of continuous contraction; (4) the background was much brighter in the neighbourhood of the edge whereas the disk appeared uniform and considerably brighter than previously and was olive in hue.

With simultaneous presentation of *A* and *B* the disk was again of an olive shade and both this and its background appeared much brighter than in the other cases. Pattern and movement, however, were scarcely visible.

In all cases Fechner colours and 'stroboscopic' patterns² associated with flashing light (but unrelated to the pattern of the disk) were frequently noticed.

The phenomena were strongest for frequencies in the range of 15–25 cycles per sec. but persisted to some extent through the range of 5–40 cycles per sec.

Corresponding effects were observed using a bright disk on a dark ground and using a single straight edge, and again when a negative of the disk pattern was substituted for the plain field.

The effects were the same whether one or two eyes were used. The presentation of the plain field to one eye and the disk to the other, however, gave no comparable results.

In view of the apparent relation between these phenomena and the complementary image, a series of tests were undertaken to find out whether other methods used to evoke complementary images¹ might also be effective with a single circular contour.

As might have been expected, no convincing complementary pattern was seen as an after-image, though a few subjects have reported a very faint radial pattern. A more effective technique was found in altering the pattern brightness cyclically about once per sec., when at times a radial pattern could be seen clearly.

Simple stroboscopic illumination was also found to give unconvincing results with a single contour. When, however, flashing light was superimposed on a bright continuous image, corrugations could be seen on the darker side of the contour.

The movement seen in spatio-temporally random visual 'noise'¹ appeared more organized at the contour, although this effect was not comparable in magnitude to that produced by patterns of many lines.

Double flash stimulation of the type described above has also been found more effective in producing vivid and continuous complementary images of more complex patterns. The reason for this is not yet understood. It seems, however, that any theory of the complementary image must now account for its production at a single contour.

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