

The Generalized Kaleidoscope

A RECENT communication from Sidney Melmore¹ has refuted my statement² "that a kaleidoscope cannot have more than six mirrors". The statement should be "that any kaleidoscope is effectively equivalent to one having at most six mirrors". In the case of Melmore's octahedral kaleidoscope, every pattern produced is symmetrical about either of the planes which bisect the dihedral angles of 120°. Hence two extra mirrors may be placed in those positions without affecting the pattern. Six of the eight original mirrors then become superfluous, and we are left with the four faces of the tetragonal bisphenoid³ $AB'CD'$. The rectangle $BB'D'D$ is one half of the common base of Melmore's two square pyramids, with apices A and C ; hence E (the midpoint of AC) is the point-object which gives rise to the solid tessellation of cuboctahedra and octahedra.

H. S. M. COXETER.

Department of Mathematics,
University of Toronto.
June 7.

Melmore, S., NATURE, 145, 778 (1940).

² Ball, W. W. R., "Mathematical Recreations and Essays", 160 (1939).
³ *Op. cit.*, 159.

I AGREE with Prof. Coxeter's conclusion that no more than six mirrors need be used to produce the solid tessellations. It is now clear that two of his tetragonal bisphenoids, interpenetrating, bear the same relation to my octahedron which two interpenetrating regular tetrahedra bear to the regular octahedron.

SIDNEY MELMORE.

61 Carr Lane,
Acomb, York.
June 24.

Growth of Aggregates in Suspensions

ON reading through the D.S.I.R. report of the Water Pollution Research Board for the year ended June 30, 1938, I was much interested to notice the account of the settling of silt in estuarial waters of the River Mersey. In the course of a study of the effect of sewage upon the rate of sedimentation of mud, it was found (p. 49) that sedimentation occurred only at slack water. The scour during the ebb and flow of the tide erodes fine particles from the bottom so that they disperse more or less uniformly in the water. During slack water, practically the whole of the suspended matter is deposited. It was found that large, fragile aggregates form and then settle at a rate of about 0.011 ft. per sec.

I find that this is approximately the maximum velocity at which these particles obey Stokes's law, that is to say, the settling occurs at the point at which the flow round the aggregate ceases to be wholly streamline. Thus it appears that the mechanism of such settling is that the aggregates continue to grow until their falling speed increases to the point at which the flow becomes turbulent. This prevents further increase of size, so that when full grown their falling speed will be substantially constant.

W. F. CAREY.

Engineering Department,
I.C.I. (Fertilizer and Synthetic Products) Ltd.,
Billingham.
July 11.

Radiation and 'Stuffiness'

IN discussing the spectral transmission of human stratum corneum¹, Messrs. Yarnold and Kirkpatrick have overlooked the measurements of Pearson and Norris² which show only a very faint suggestion of the absorption band at 4.1-4.2 μ to which they refer.

In connexion with Yarnold and Kirkpatrick's work on the effect of spectral distribution on the comfort of radiant heat, I may mention that some years ago I measured the time of tolerance of radiation of a fixed intensity falling on a given area of the hand, arm or face, for six subjects. In every case the emission from a 'bright' source such as an ordinary gas fire was tolerated considerably longer than an equal intensity from a box kept at barely visible red heat and filled with coal gas flame.

A. R. PEARSON.

Winfrith,
White Knowle Road,
Buxton.
July 13.

¹ NATURE, 146, 62 (1940).

² Brit. J. Radiology, 6, 480 (1933).

Depression of Neuro-Muscular Transmission in a Crab by Phenothiazine

SINCE phenothiazine is a new and valuable vermifuge, its effect on animal tissues is of some general interest. Its effect on crustacean neuro-muscular function can readily be observed in the shore crab (*Carcinus maenas*), from which the nerve-muscle preparation is one of the most readily obtainable among invertebrates.

The transmission of excitation from nerve to muscle in the walking leg of the shore crab is characterized by the existence of a natural 'block' at the

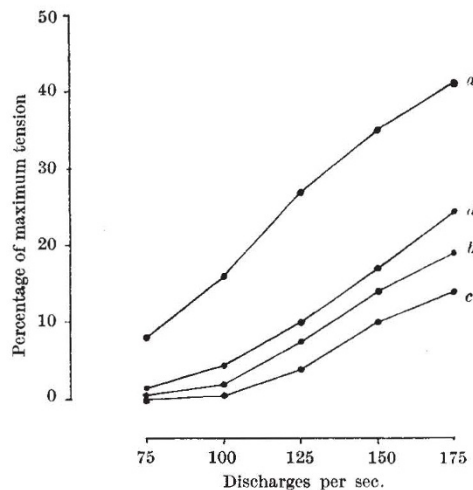


Fig. 1.

PERCENTAGE OF MAXIMUM ISOMETRIC TENSION DEVELOPED AT GIVEN FREQUENCIES. CONSTANT STIMULUS DURATION OF 0.4 SEC.

a, Perfusion with crab's Ringer; b, 18 min. after perfusion with 1 part in 5,000,000 phenothiazine; c, 11 min. after perfusion with 1 part in 2,000,000 phenothiazine; d, 35 min. after return to crab's Ringer.