Surface Migration of Barium

J. A. BECKER[1,2] has described experiments from which he concluded that barium, deposited on one side of a flat tungsten ribbon, could, under given conditions, move to the opposite side. The thermionic emission measurements from each side of the ribbon indicated that barium deposited on one side migrated until each side was covered with half the original amount.

We have been engaged in observing the behaviour of oxide-coated emitters on nickel and tungsten, for which purpose we have used an electron microscope. In the light of Becker's results, we were surprised to find that, although barium could spread across a nickel or tungsten surface on which it had deposited, it could do so only when evaporation was possible. Our results did not, therefore, provide any direct evidence of surface migration.

We have since repeated Becker's experiments with both nickel and tungsten. The apparatus used by Becker is only briefly described in the references[1,2] given, but in his paper[3] on the diffusion and migration of thorium on tungsten, he describes in detail the apparatus employed. In our experiments, we used an apparatus similar to that described there. In this apparatus, precautions are taken to separate the thermionic emission from each side of the ribbon.

Our results have failed to reveal any evidence of surface migration of barium either on nickel or tungsten. In each case, the thermionic current measured at any time from the clean side was considerably less than one per cent of that obtained from the contaminated side, even after 16 hours' running at 1,100° K., the temperature at which Becker concludes migration rapidly takes place.

We hope to publish full details of both our electron microscopic and thermionic investigations in the near future.

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[1] *Trans. Amer. Electrochem. Soc.*, **55**, 160 (1929).
[2] *Trans. Faraday Soc.*, **28**, 155 (1932).
[3] *Phys. Rev.*, **43**, 428 (1933).

The Ground State of the Se_2 Molecule

THE diatomic molecules of the lighter elements of the sixth family of the Periodic Table, like O_2, S_2, SO, have $^3\Sigma$ terms as their ground states. There is some doubt if this still prevails with the heavier elements of that group. Spectroscopic investigations have so far not been able to show whether the ground states of Se_2, Te_2, SeO, etc., are $^3\Sigma$ or $^1\Sigma$ states.

So it appeared worth while to ascertain the magnetic properties of Se_2 vapour. With all precautions necessary to avoid contamination by oxygen, selenium was sealed in a silica tube under vacuum, and the influence of a magnetic field on it was determined at different temperatures between 20° C. and 1,100° C. The vapour in the tube consists of Se_6 and Se_2, being practically all Se_6 at low temperatures and changing more and more to Se_2 as the temperature rises. Along with the formation of diatomic molecules, a strong paramagnetic influence appeared, rapidly increasing as the quantity of diatomic vapour increased. This establishes the fact that the ground level of Se_2 is $^3\Sigma$.

A full account will be given in the *Proceedings of the Indian Academy of Sciences*, Bangalore.

Experiments on tellurium to the same effect are in progress.

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A Psycho-geometrical Representation of Personnel Organization

LARGE industrial and other concerns represent their personnel organization diagrammatically by means of a chart having the form of a genealogical table. Properly constructed, this chart gives concise information as to individual rank and duties and relations, but no information regarding fundamental functions and mentality types at different levels. Moreover, the chart conveys the impression of descent instead of growth, differentiation and organic unity. It is therefore biologically unscientific and inadequate for administrative educational purposes.

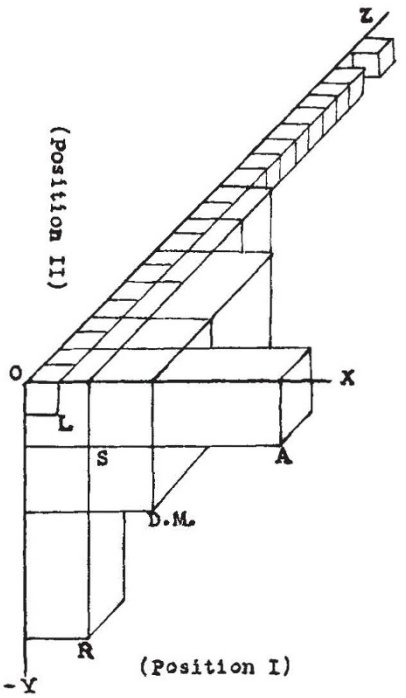

Fig. 1.

The above defects can be remedied by employing the co-ordinate system. In Fig. 1 (of which a solid model in colours has also been constructed), the *OX* axis represents breadth of knowledge or the administrative function, and *O–Y* depth of knowledge or the research function. It will be apparent that the administrative mind is represented by a horizontal rectangle (*A*), the research or advisory mind by a vertical rectangle (*R*), and departmental management, supervision and labour by squares of decreasing size (*D.M.*, *S* and *L*). *A*, *R* and *D.M.*, though always different in form and function, *may* be equal in area or total knowledge and ability. These conceptions