

If any experimenter is willing to collect samples of the rocks from the principal borings and mines where temperature gradients have been measured, being careful to retain any moisture they may contain, and to determine their conductivities, he will achieve a great service to geophysics.

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The Aston Dark Space.

SIR J. J. THOMSON'S comment in the November *Philosophical Magazine* upon the similarity between the non-luminous layers which cover cold surfaces in a high-frequency electrodeless discharge, and the intensely dark region within the cathode dark space and immediately adjacent to the cathode of a Geissler discharge, discovered by Dr. F. W. Aston in 1907, points to a fresh way for finding the respective contributions of positive ions and electrons to the current in the latter case. Both have the appearance of the positive ion sheaths which have recently become important through their application by Langmuir to the theory of exploring electrodes. Since there is good evidence that the fall of potential across the Aston dark space is the ionisation potential of the gas, the current density of positive ions can be calculated by inserting in Langmuir's equation for a plane collector the appropriate observed thickness of the layer, and when compared with the total current density, this will give the required information, without, of course, affording any idea as to exactly how the electrons are produced at the metal surface.

Unfortunately, the Aston dark space can be seen in only a few gases, and the experimental data by which any theory of its origin can be tested are meagre. Langmuir's analysis does, however, explain why its thickness is independent of pressure, if the effect of collisions made by the positive ions in traversing the sheath can be neglected, and also why its thickness is approximately inversely proportional to the square root of the current density, on the assumption that the relative contributions of the two types of carriers do not depend on the total current. Somewhat similar ideas seem to have been first proposed by Prof. Güntherschulze in 1925, to explain why it does not appear in heavy gases, where it should theoretically be too thin to be seen. As regards numerical agreement, we do not feel justified in saying more at present than that the quantities involved are of the right order of magnitude, but we feel that the conception of a space-charge sheath on the cathode, separating it from the main cathode dark space, does at least partly remove the somewhat arbitrary distinction between this electrode and any other type of collector which had to be made previously.

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Dec. 3.

Use of the Term 'Self-Adaptation' in Biology.

THE letter from Mr. A. G. Lowndes, published in *NATURE* of Dec. 24, raises a question of great and increasing importance. We all know that the old controversy between materialism and vitalism has entered on a new phase, and a decision is once more in the balance. It is, therefore, premature to clear our biological language of all terms savouring of vitalism, more especially as materialism has definitely failed to account for certain well-defined phenomena of development. The modern tendency is distinctly against ignoring mental phenomena, and making a

sharp line of demarcation between humanity and the rest of the world of life. Biologists with a philosophic training prefer to explain unknown things in terms of the known, and nobody can deny that mental processes are much more amenable to cognition than any material processes whatever. We know what we mean by the term 'self-adaptation,' and we have no reason to exclude the animal world, or even the vegetable kingdom, from the working of a process familiar to our own experience.

Materialistic biology has had its day, and has done useful work in clearing the ground of mystical conceptions. Paracelsus, the first materialist, proclaimed man to be a chemical compound. In doing so, he killed at one blow all the demons and spirits which had encumbered the art of medicine. There is no necessity now to hug obsolete bio-chemical theories for fear that if we yield an inch to the vitalists the hosts of pandemonium will be let loose upon us. We can, therefore, give due regard to the psychological factor which, on any philosophically sound view, must be co-extensive with life.

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ONE may hope it will not be assumed by readers of the editorial in *NATURE* of Oct. 15 (p. 539) that anything approaching complete failure has attended the efforts of the trustees of the Science and Industry Endowment Fund to attract post-graduate students to the biological services of the Commonwealth Government. It is true that no candidate of sufficient standing came forward for the first scholarship offered in mycology. Possibly the trustees made a mistake in insisting on first-class final honours and definite proof of capacity for research, though it will be a pity if it is found necessary to lower the standard. There are, however, quite a number of graduates at present in training abroad in other branches of work, including three in entomology, two in food preservation, two in forest products, and one (recently appointed) in plant pathology. In addition, three are gaining experience in fuel research. So far no studentships in genetics have been offered.

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Commonwealth Council for Scientific
and Industrial Research,
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Nov. 23.

'Greasy' Burettes.

BURETTES employed in volumetric analysis to contain standard acid usually present, after short use, a greasy appearance, and considerable inaccuracy in measurement may result from the adherence of small drops of the solution to the surface of the glass above the liquid.

The necessity for frequent cleansing with a brush may be obviated by the addition of a minute trace of saponin to the standard acid, and, provided that the amount added be very small, and the solution not unduly shaken, there need be no inconvenience due to frothing.

A burette containing decinormal hydrochloric acid, thus treated, has been in use for several weeks, without any necessity for cleansing, and the device is no doubt capable of more general application to other solutions.

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