

There can, therefore, be no doubt that Newton started his inquiry by reasoning quite independently and in almost the same manner as Plutarch. His splendid genius was fully equal to the task of discovering anew those eternal truths that had dawned in the mind of the Greek philosopher. But there is an enormous difference between the mere conception of a scientific truth and its demonstration; and it is precisely that wonderful power of demonstration, backed, as it was, by mathematical intuition of the highest order and by an unrivalled use of induction and deduction, that has placed Newton above the men of science of all time.

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Paris, Feb. 22.

After-glow and its Life in Discharge Tubes.

DURING investigations with electrical discharges through various types of tubes, I have observed some peculiarities of the after-glow which appear to be worth recording. It is well known that the intensity and duration of the after-glow depend on the material of which the tubes are made. It is also believed that the duration of the after-glow ranges from a few seconds to a few minutes.

While working with silica tubes filled with gases at rather low pressures, I discovered quite a strong after-glow which persisted for about three-quarters of an hour. An after-glow of such a long duration appears to be very interesting, and this fact may throw some light on the proper understanding of the mechanism of the after-glow phenomenon. The tubes were excited by a small induction coil giving 400 volts for its output, and the discharge was passed for two minutes. During this time the tube did not show any appreciable rise in temperature. This phenomenon can be repeatedly observed any number of times. The after-glow in silica tubes is given not only by nitrogen and metallic vapours, as is believed by some experimenters, but also it appears to be associated with almost all gases, as well as metallic vapours. The glow is greenish when the current is switched off; but it soon develops into a yellowish white cloud filling the whole of the discharge tube, the density of illumination in the capillary portion being distinctly much higher than in the remaining portion of the tube.

The rate of decay of this glow is extremely slow, and its intensity appears to be largely controlled by the pressure of the gas—lower pressures, ranging between 0.01 mm. and 0.4 mm. of mercury, being very favourable to large intensity. The flash phenomenon recently recorded in NATURE (Nov. 8, p. 725) by Braddick is also seen in the after-glows of silica tubes; but instead of there being only a few flashes before the disappearance of the glow, as observed by Braddick, the glow in the present case shows the flickering of light for quite a long time, giving an appearance something like the scintillations observed in a spintharoscope.

Details of the above observations will be published elsewhere.

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Feb. 5.

Colours of Inorganic Salts.

IN continuation of the letter published in NATURE, vol. 125, p. 163, Feb. 1, 1930, we wish to report that absorption spectra of vapours of chromic chloride and ferrous chloride were taken at temperatures of 1000° C. to 1400° C. in the vacuum furnace in order to test the theory postulated in the above communica-

tion. These substances were chosen because, according to information available in standard chemical literature, they do not dissociate within the temperature range mentioned and still yield sufficient vapour for absorption work.

It was found that chromic chloride yields a number of absorption bands at λ 4100 A. and ferrous chloride at λ 4350 A. These bands we ascribe to Cr^{+++} and Fe^{++} , and they are due to magnetic transitions in the d^3 and d^6 shells of these elements. In addition, we obtain continuous absorption, beginning from λ 3000 A. and extending to the limit of our apparatus, namely, to λ 2200 A. We ascribe this continuous absorption to the Cl^- ion.

This later conclusion is sharply at variance with the interpretation put by Franck and his students on the absorption spectra of vapours of saturated chlorides of monovalent elements like sodium and potassium, etc. They observed that with these vapours absorption begins near λ 2900 A., and interpreted this as indicating the photo-dissociation of sodium chloride into neutral Na and neutral Cl, that is, $h\nu_a$ equals heat of dissociation of NaCl molecule, which was obtained from consideration of a Born cycle, ν_a being the frequency at which absorption begins. But vapours of almost all chlorides show absorption near λ 3000 A. (it is not possible to locate this point with any degree of precision within 200 A. units), including the vapours of magnesium, aluminium, and silicon chlorides, which show no banded absorption, and by chromic chloride vapour and ferrous chloride vapour, which show band absorption. In these cases, the energy relations (correlation between $h\nu_a$ and heat of dissociation) as obtained from consideration of a Born cycle fail entirely. We are therefore led to the conclusion that the continuous absorption is due to the vibration of the electron in the Cl^- ion, but whether it leads to dissociation of a kind postulated by Franck cannot yet be answered definitely.

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Transplantation of Portuguese Oysters into South African Waters.

IT is now well known that the accidental loss of a cargo of Portuguese oysters (*O. angulata*) in the Bay of Arcachon in 1866 resulted in this oyster establishing itself in the locality in a new environment. Arcachon now produces hundreds of millions of *O. angulata* annually. The possibility of successful transplantation of this species is therefore proved. If an accidental transplantation can be successful, it would appear that deliberate transplantation may be equally successful, provided a careful selection of the ground be made.

During a recent review of the distribution of oysters,¹ it was noted that oyster production on the South African coast appears to be infinitesimal in comparison with the apparent potentialities. The hydrographical conditions of the south-east coast of Natal would seem to be eminently suitable for the spawning and growth of the Portuguese oyster, a form which is absent from this region. It is suggested, therefore, that an experiment in the transplantation of this species might be as beneficial to South Africa as an unpremeditated one has been to France. *O. angulata* occurs on the north-west coast of Africa and possibly more southerly; its absence from South Africa may be due to the set of the relatively cold Benguela or Antarctic current on the south-westerly shores.² The Portuguese oyster