

have been plotted against the stress on the wire due to the applied load. It will be seen that, whilst the normal wire gave a straight line relationship, the work-hardened sample gave a curve of which the slope decreases rapidly with increasing stress. The

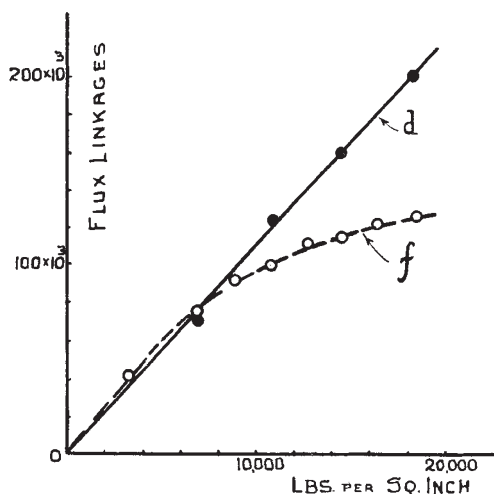


FIG. 2. Sample *d*, normal; sample *f*, work-hardened.

relationship between the slopes of these curves and the corresponding values of Young's modulus is now under investigation.

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Accuracy of the Curie-Chéneveau Magnetic Balance

ATTEMPTS have been made recently in these laboratories to measure the diamagnetic susceptibilities of inorganic salts by means of the Curie-Chéneveau magnetic balance. The results obtained have indicated that the measurements made with this instrument are influenced to a very great extent by the relative position of the specimen tube with respect to the magnet poles. For example, variations in the maximum deflection amounting to as much as 20 per cent, the figures ranging from 9.40 cm. to 7.41 cm., have been obtained when the empty specimen tube has been taken from the apparatus, the stopper removed and replaced as accurately as possible in the same position. To locate this tube exactly, special precautions were taken. Instead of using a cork to carry the hook for suspending the tube on the balance arm, as is usual, a special brass stopper covered over a short length with rubber tubing was made. This fitted the tube tightly and could always be returned to the same position by means of marks on the tube and stopper. The top of the tube was ground square to its length and a collar on the stopper fitted down on to this. With the tube empty, or containing water or salt, the maximum variation in the deflections on repeating the procedure outlined above amounted to approximately 2 cm. On repeating observations without removing the tube, merely taking successive readings, the variation in the maximum deflections rarely amounted to so much as half a millimetre.

These results are interesting in view of certain remarks made by Gray and Dakers¹. In this paper it is remarked (p. 89) “. . . a deflection for water

was obtained in most cases before each measurement of the deflection for the substance under examination. This was necessary because unaccountable changes in the deflection for water were obtained from time to time.”

It would seem possible that these unaccountable changes might be due to small variations in the location of the tube with respect to the magnet. The experimental details are very meagre, however, and no indication of the percentage variation found by Gray and Dakers is given.

In conclusion, the value for the molecular diamagnetic susceptibility found by these experimenters for rubidium bromide, namely 56.69×10^{-6} , is very different from the value 65.5×10^{-6} found by Ikenmeyer².

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¹ *Phil. Mag.*, 11, 81; 1931.

² *Ann. Phys.*, 1, 169; 1929.

Chlorine Hexoxide and Chlorine Trioxide

A RED oily liquid was detected by Bowen¹ in a study of the photochemistry of chlorine dioxide. This substance was isolated by Bodenstein, Harteck and Padelt² and was found by them to contain three atoms of oxygen to one of chlorine. Its molecular weight when dissolved in carbon tetrachloride was found to be 153–156 and it was called chlorine hexoxide (M.W. 167). The oxide has been found as a product in a large number of photochemical and thermal reactions³⁻¹², but no determinations have been recorded of its molecular weight in the gaseous or pure liquid states. During a study of the physical properties of this oxide, we have found that in the gaseous state it exists entirely as ClO_3 , and that an equilibrium between this phase and the liquid phase is readily attained. A more complete report of this work will appear shortly elsewhere.

“Chlorine hexoxide”, produced by the thermal reaction between ozone and chlorine dioxide at 0° C.¹³, was analysed by passing the vapour through a red hot quartz tube and determining the oxygen by volume and the chlorine by means of potassium iodide solution. The oxygen-chlorine ratio of three to one, found by other workers, was completely confirmed.

The molecular weight in the gas phase was determined by means of an apparatus consisting of a quartz bulb of 20 c.c. capacity, attached to a quartz spiral manometer, into which the vapour could be admitted rapidly from a reservoir of pure liquid. The pressure was read to 1/50 mm. and the reservoir sealed off. The bulb was then heated to red heat for some minutes and then allowed to cool to room temperature. As the vapour is known to be completely decomposed at this temperature, the final pressure gives the total pressure of the chlorine and oxygen in the original amount of oxide. The results of two determinations for each of two preparations are given in the accompanying table. The ratios are subject to a small correction, about 1 per cent increase, on account of the dead space in the gauge and connecting tubes. From the table it is seen that the amount of Cl_2O_6 present in the gas phase was very small.

We suggest the name ‘chlorine trioxide’ be given