

Fig. 4 shows that the isotherm given by the classical theory is a fairly good representation of the behaviour of the heavy gases  $N_2$  and A, and that the predicted differences between the quantal isotherms are in good agreement with the experimental differences between the light gases.

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## THE VAPOUR PRESSURE AND ORTHOBARIC DENSITY OF NITROUS OXIDE

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The vapour pressure of nitrous oxide has been determined from 12° C to the critical point, and the orthobaric densities from 20° C to the critical point. The apparatus consisted of a calibrated, heavy-walled, hard-glass pressure tube containing the gas sample, confined over mercury, and thermostated with a vapour bath. Visual observation of the dew points, boiling points and critical points was thus possible. Pressures were determined with a free piston gauge to 0.01 atm, and temperatures to 0.01° C with mercury-in-glass thermometers. A cathetometer capable of reading to 0.001 cm was used to make the volume measurements.

The vapour pressures obtained are substantially lower than the I.C.T. values and are represented by the equation

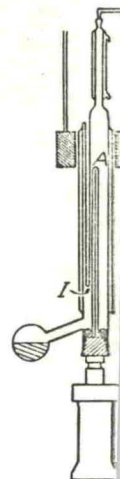
$$\log_{10} p \text{ (atm)} = 4.6258 - (858.63/T).$$

The results are compared with other determinations on the vapour pressure and orthobaric densities of  $N_2O$ .

In the course of measuring the vapour pressure and orthobaric densities of mixtures of  $CO_2$  and  $N_2O$ , these properties of pure  $N_2O$  were determined. The vapour pressures obtained were consistently lower than the I.C.T. values,<sup>1</sup> while the orthobaric densities showed only slight differences. The I.C.T. vapour

pressures at high temperatures from 15° C to the critical point were made by observations were made by them from -100° C to -30° C. Systematic deviations from the I.C.T. values and support the present

APPARATUS.—(a) High pressure cell, the central feature of which is a pressure tube confined over mercury. (b)  $CO_2$ . Observations were made corresponding to the liquid air region at 20° and 28° C. This length of meniscus was correlated with the work of Michels, Blaisse and Michels, and a soft iron stirrer actuated



a steel compressor block also filled with mercury was connected to a Bourdon gauge with oil. H was a rounded head of mercury in the pressure tube. The heads in the apparatus were made to make the piston revolve. The  $CO_2$  at the ice point. The pressure tube A was wrapped with aluminium foil, ethyl alcohol and water. The top of the vapour bath was a pure liquid, which was heated to boiling. The pressure was constant, and can be easily maintained at the boiling liquid. The temperatures from 34.6° C to 100° C were required, being achieved by a water bath. The system was used to produce the smooth curves of the type used by Wad-