

a fact sadly referred to by the author¹ of a German aeronautical book published in 1914, after pointing out the great advantage of using helium as a balloon gas.

On account of the great advances which have now been made in the commercial separation of helium from natural gas, more rapid laboratory methods of purification are required.

Most of the work on the absorptive power of charcoal has been carried out at low pressures. Dewar,² however, investigated the volumes of various gases absorbed at atmospheric pressure, the heat evolved during the absorption and the rate of absorption.

Claude³ published data on the charcoal absorption of nitrogen, hydrogen, neon and helium at pressures varying from a few hundredths of a millimeter to 247 mm. He found that the volumes absorbed increased with pressure although a considerable time was required for the complete establishment of equilibrium at the higher pressures.

In view of this work it was considered probable that cooled charcoal would be effective in removing nitrogen from impure helium, passing over its surface at atmospheric pressure at a slow rate.

As a result of successful preliminary experiments the apparatus described in the following paper was constructed.

It consisted essentially of two sets of charcoal tubes arranged in parallel so that when one set became saturated with impurity the gas flow could be diverted through the second set while the first set of tubes was revived.

DESCRIPTION OF APPARATUS

The diagrammatic sketch, Fig. 1, indicates the general arrangement of the apparatus. The impure gas passed from the gasometer (a) through a Venturi meter to approximately measure the rate of flow (b) through a drying train into (c) either set of charcoal tubes as desired, (d) past the side tubes leading to the exhaust pump, to (e) a Shakespear Hydrogen Purity Meter, which, calibrated for helium⁴, showed the purity of the treated gas and through it (b) into the receiving bottle and finally into the storage bottles. The purity was also checked by density measurements.

The appearance of the central portion of the apparatus is shown in Fig. 2, which represents the two sets of charcoal tubes arranged in parallel and the six mercury seals used instead of glass stop cocks

¹ G. Austerweil. *Die Angewandte Chemie in der Luftfahrt*.

² Dewar. *Loc. cit.* Also *Proc. Roy. Inst.* 21-240-1914.

³ Claude. *Comptes Rendus*. 1914, 158, 861.

⁴ V. F. Murray, *vide* this journal.