May 13, 1897.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

In pursuance of the Statutes, the names of the Candidates recommended by the Council for election into the Society were read as follows:—

Bell, Robert, LL.D.
Broadbent, Sir William Henry, Bart.
Chree, Charles, M.A.
Elwes, Henry John, F.L.S.
Haldane, John Scott, M.D.
Haswell, Professor William A., D.Sc.
Howes, Professor George Bond, F.L.S.
Kipping, F. Stanley, D.Sc.
Mathews, George Ballard, M.A.
Murray, George Robert Milne, F.L.S.
Neville, Francis Henry, M.A.
Nicholson, Professor H. Alleyne, M.D.
Thomson, Professor John Millar, F.C.S.
Trouton, Professor Frederick Thomas, M.A.
Turner, Professor Herbert Hall, M.A.

The following Papers were read:—

I. "An Attempt to cause Helium or Argon to pass through Red-hot Palladium, Platinum, or Iron." By WILLIAM RAMSAY, F.R.S., and MORRIS W. TRAVERS.

II. "On the Negative After-images following brief Retinal Excitation." By SHELFORD BIDWELL, M.A., LL.B., F.R.S.

III. "A Dynamical Theory of the Electric and Luminiferous Medium. Part III. Relations with Material Media." By JOSEPH LARMOR, F.R.S., Fellow of St. John's College, Cambridge.

IV. "On a new Method of Determining the Vapour Pressures of Solutions." By E. B. H. WADE, B.A., Scholar and Coutts-Trotter Student of Trinity College, Cambridge. Communicated by Professor J. J. THOMSON, F.R.S.

V. "On the Passage of Heat between Metal Surfaces and Liquids in Contact with them." By T. E. STANTON, M.Sc. Communicated by Professor OSBORNE REYNOLDS, F.R.S.

VI. "On the Magnetisation Limit of Iron." By HENRY WILDE, F.R.S.

"An Attempt to cause Helium or Argon to pass through Red-hot Palladium, Platinum, or Iron." By WILLIAM RAMSAY, F.R.S., and MORRIS W. TRAVERS. Received April 9,—Read May 13, 1897.

To chronicle experiments which produce no result is a necessity, although not entirely an agreeable one. Whatever the reason of the passage of hydrogen through red-hot iron, and through moderately heated palladium, and platinum—whether it be due to the solubility of the gas in the metal, or to the formation of an easily decomposable compound—neither argon nor helium is able to pass through any one of these metals, even at a fairly high temperature. This would imply their inability to form any compound, however unstable, with these metals, or to dissolve in them at a red heat. Such inactivity is in accordance with their general behaviour, and is still another proof of their inertness.

The experiment was made in the following manner:—A tube of hard, infusible glass was connected at one end with the reservoir of the gas under experiment, helium or argon. Into its other end was corked a tube of platinum, closed with a palladium cap, or, if iron was the metal under experiment, with a tube of thin wrought iron, also closed at the end; the closed end of the interior tube was placed so that it could be raised to a bright red heat by bringing a blow-pipe flame to bear on the hard glass tube. The open end of the metal tube was cemented to a glass tube, attached to a Töpler's pump, and provided with a Plücker's vacuum tube, so that the spectrum of any gas passing through the metal could be observed. This afforded, at the same time, a most delicate test of the presence of the gas under experiment. The metal tube was exhausted, until green phosphorescence appeared in the vacuum tube, and the gas, helium or argon, was admitted into the space between the glass and the metal tube, at atmospheric pressure. The glass tube was then heated to the highest temperature attainable with a blow-pipe—perhaps 900° or 950° C. In no case, whether the metal tube consisted of palladium, platinum, or iron, was there the smallest transpiration of gas, even after half an hour. The phosphorescent vacuum remained in all experiments quite unimpaired.