small to be experimentally appreciable; but this was distinctly stated by Professor Maxwell himself, at the foot of p. 256.

As to the second limit, I must remark, in the first place, that I cannot find that Graham made any assumption that porous plates act as apertures in thin plates. The result that the time of passage varies, *cæteris paribus*, as the square root of the density in the case of fine porous plates, was obtained by pure experiment; and though he could not fail to notice the accordance of this result with that of the mere hydrodynamical passage through a small aperture, he has carefully distinguished between the two. Nor can I agree with Professor Reynolds in regarding the explanation given by Professors Thomson and Maxwell of the phenomenon of thermal transpiration or thermal effusion, whichever it be called, afforded by assimilating a fine porous plate to a thin plate pierced by apertures of ideal fineness as erroneous, even though it should be shown that such assimilation is unnecessary. Professor Maxwell did not profess to treat in his paper the intermediate cases between the two extreme limits.

Perhaps I should mention, that the foot-note at p. 281 in Professor Maxwell's paper was added as the paper passed through the press. I recollect noticing the thing as, in my capacity of Secretary, I looked over the paper before sending it to be printed off, and considering whether I should affix a date. As, however, it seemed to me to contain merely an explanation of an expression in the text, and as Maxwell, who had carefully added the dates of fresh matter in other parts, did not seem to have thought it necessary to do so in this case, I left it as it was. In a letter I received from him at the time, he informed me that he felt very ill, and was hardly fit even to go through his own paper; though a subsequent letter, in which he entered into some scientific matters, was written in his usual cheerful style. No one had, I believe, at that time any notion of the very serious nature of his illness.

March 13, 1880. G. G. Stokes.

II. "On the Sensitive State of Vacuum Discharges. Part II." By William Spottiswoode, D.C.L., LL.D., Pres. R.S., and J. Fletcher Moulton, late Fellow of Christ's College, Cambridge. Received March 11, 1880.

(Abstract.)

This paper forms a sequel to that published under the same title in the "Phil. Trans.," 1879, p. 165. It describes a continuation of the research into the nature and laws of the disruptive discharge, or elec-

tric spark. The methods of the earlier paper have been extended, and others adapted to the new circumstances have been devised, in order to carry the investigation into high vacua. In particular, independent sources of electricity have been used for affecting the discharge, whether in the sensitive or in the non-sensitive state; and the results have been confirmatory of the conclusions derived from the more limited means formerly described. Further, the effects of various tubes containing discharges in the sensitive state upon a tube containing a discharge in the non-sensitive state have been observed and compared; and the tube so used as a test has been called the standard tube, and the method of its use the standard tube method. By this means, principally, the laws of the discharge in comparatively moderate vacua have been extended to high vacua.

In the higher vacua, the phenomena of molecular streams, and the phosphorescence consequent on them, that have been studied and described by Mr. Crookes, present themselves. These derive great importance for the purposes of the present paper from the fact that in high vacua the ordinary luminous discharge becomes so feeble in appearance that it is often difficult to observe. Under these circumstances the phosphorescence, which like the ordinary luminous effects may exist either in a sensitive or in a non-sensitive state, forms the best index of what is going on within the tube. Much information as to the nature and procedure of the discharge may be derived from the mode of interference of one molecular stream with another, from the direction and character of shadows cast by these streams, and by a form of interference which has here been called that of virtual shadows.

The conditions of pressure and of electrical violence, under which phosphorescence is produced, have been carefully studied; and it has been found that, with a suitable adjustment of the discharge, the phenomena are not confined to high vacua, but can be obtained under pressures much exceeding those of ordinary vacuum tubes. The phenomena of these molecular streams have also been compared with those exhibited by the projection of finely divided solid conducting matter when heaped up over the negative terminal, with the view of ascertaining the nature of the phenomenon and its position in the discharge.

At the close of the paper the authors have discussed some of the general conclusions which they think may be fairly drawn from their present researches. First, as to the relative order of magnitude of the time-quantities entering into the discharge; *e.g.*, the times occupied by the discharge of positive or negative electricity, or of molecular streams, in leaving a terminal; the time occupied by the same elements in passing along the tube, &c. Secondly, as to the durational character of the negative as compared with the positive discharge, which appears to increase with the degree of exhaustion. Thirdly, as

to the mode of formation of the positive column; and fourthly, as to the relation of the molecular streams to the discharge proper.

But for the details of these conclusions the reader must be referred to the paper itself.

April 15, 1880.

THE PRESIDENT in the Chair.

The Presents received were laid on the table and thanks ordered for them.

The following Papers were read:—

I. "Description of some Remains of the Gigantic Land-lizard (*Megalania prisca*, OWEN) from Australia. Part II." By Professor OWEN, C.B., F.R.S. Received March 22, 1880.

(Abstract.)

Referring to a former Part ("Phil. Trans.," 1858, p. 43) the author gives, in the present, descriptions of subsequently received fossils of *Megalania prisca*, advancing the knowledge of that species of large extinct lizard. Characters of the dorsal, sacral, and caudal vertebræ, with those of a considerable portion of the skull, are detailed. So much of the upper jaw as is preserved shows the species to have had that part sheathed with horn, as in the tortoise. Upon the head were seven horns, three in pairs and one single; they are defined as the "supraparietal," "supratemporal" and "post-orbital" pairs; the single and symmetrical horn is "nasal."

In the comparison of this character with the known genera of lizards, the author finds the closest correspondence in the diminutive existing Australian species, *Moloch horridus*, Gray. He concludes with remarks on the probable habits and conditions of extinction of the subject of his two papers.

The cranial fossils were discovered by George Frederic Bennett, Esq., Corr. Member of the Zoological Society of London, in the bed of "King's Creek," Queensland, Australia; and were transmitted to the author by George Bennett, M.D., F.L.S.