10. Magnesium wire, presented suitably to the focus, burns with its intensely luminous flame.

In all these cases the effect was due, in part, to chemical action; this, however, may be excluded.

11. A plate of any refractory metal, sufficiently thin, and with its reflective power suitably diminished, is raised to incandescence in the dark focus. Gold, silver, copper, aluminium, and platinum have been thus rendered incandescent.

12. Platinized platinum shows the effect best: in a thin leaf it may be rendered white-hot, and on it is depicted an incandescent image of the coal-points. When the points are drawn apart, or caused to approach each other, their incandescent images conform to their motion.

The assemblage of phenomena here described, and others to be referred to in my completed memoirs, may, I think, be properly expressed by the term *Calorescence*. This word involves no hypothesis, and it harmonizes well with the term fluorescence, now universally employed with reference to the more refrangible end of the spectrum*.

III. "Note on a New Object-glass for the Microscope, of higher magnifying power than any one hitherto made." By Lionel S. Beale, M.B., F.R.S., F.R.C.P., Professor of Physiology and of General and Morbid Anatomy in King's College, and Physician to King's College Hospital. Received December 30, 1865.

I desire to record the completion of a new objective, with a magnifying power double that of the twenty-fifth. This glass is a fiftieth, and magnifies nearly three thousand diameters with the low eyepiece. Messrs. Powell and Lealand, the makers, to whom science is indebted for this the highest power yet made, produced a sixteenth in the year 1840, and the twenty-sixth in 1860.

The fiftieth defines even better than the twenty-fifth, which is now made instead of the twenty-sixth. Plenty of light for illuminating the objects to be examined is obtained by the use of a condenser provided with a thin cap, having an opening not more than the $\frac{1}{30}$th of an inch in diameter. The preparation may be covered with the thinnest glass made

* On the 5th of last December I tried the passage of the rays from the electric lamp through a great number of differently coloured glasses. Incandescence was obtained through almost all of them; and in one instance, the radiation passing through a blue glass, the thermograph of the coal-points was *of a pink colour*. A thick black glass, obtained from Mr. Ladd, when held in front of the lamp, was found to be not perfectly opaque; still the platinum could not be raised to incandescence a tall when placed in the focus. Being called away from the Royal Institution early in the afternoon, I gave directions to my assistant, Mr. Barrett, to continue the experiments. He informs me that on placing in the path of the rays a combination of two thin plates of black glass, one transmitting a whitish-green, and the other a deep red, the light was entirely intercepted, and feeble though distinct incandescence was obtained at the focus. With radiation through the solution of iodine, the thermograph on this day rose to a white heat.

by Messrs. Chance, of Birmingham, or mica, and there is plenty of room for focusing to the lower surface of thin specimens, which can alone be examined by high powers as transparent objects. I beg to draw attention to these very high powers at this time more particularly, because the facts recently urged in favour of the doctrine of spontaneous generation lately revived may be studied with great advantage. Not only are particles, too small to be discerned by a sixteenth, well seen by a twenty-fifth or a fiftieth, but particles too transparent to be observed by the twenty-fifth are distinctly demonstrated by the fiftieth. I feel sure that the further careful study, by the aid of these high powers, of the development and increase of some of the lowest organisms, and the movements which have been seen to occur in connexion with certain forms of living matter (Amœba, white blood-corpuscle, young epithelial cells, &c.), will lead to most valuable results bearing upon the much debated question of *vital actions*.

Another very great advantage resulting from the use of the highest powers occurs in minute investigations upon delicate structures which occupy different planes, as is the case in many nervous organs. In studying the distribution of the nerves in some of the peripheral organs of vertebrate animals, very fine fibres can be followed as they lie upon different planes.

The most delicate constituent nerve-fibres of the plexus in the summit of the papillæ of the frog's tongue (New Observations upon the Minute Anatomy of the Papillæ of the Frog's Tongue, Phil. Trans. for 1864), can be readily traced by the aid of this power. The finest nerve-fibres thus rendered visible are so thin, that in a drawing they would be represented by fine single lines. Near the summit of the papilla there is a very intricate interlacement of nerve-fibres, which, although scarcely brought out by the twenty-fifth, is very clearly demonstrated by this power. In this object the definition of the fibres, as they ramify in various planes one behind another, is remarkable; and the flat appearance of the specimen as seen by the twenty-fifth, gives place to that of considerable depth of tissue and perspective. The finest nerve-fibres ramifying in the cornea and in certain forms of connective tissue are beautifully brought out by this power, and their relation to the delicate processes from the connective-tissue corpuscles can be more satisfactorily demonstrated than with the twenty-fifth. The advantage of the fiftieth in such investigations seems mainly due to its remarkable power of penetration. The angular aperture of this glass is 150°. Many twelfths have been made with a higher angular aperture, amounting to 170°.

It should be stated that the specimens of animal tissues which I have subjected to examination by very high powers are mounted in strong syrup, or in the strongest glycerine, according to the process detailed in 'How to work with the Microscope,' 3rd edition, p. 204. It is perfectly true that no advantage results from examining by the aid of very high powers the tissues of man and the higher animals immersed in water, or in fluids of which water is the chief constituent; nor is it possible to make the specimen sufficiently

thin for examination with very high powers if immersed in a limpid fluid. The arrangement of the nerve-fibres I have referred to is not to be demonstrated in tissues immersed in water. The finer branches of the nerves are in fact quite invisible until the specimen is well impregnated with a highly refracting fluid. The imperfect methods of preparation usually employed for examining the higher tissues have given rise to a prejudice against the employment of high powers. I have not referred to the use of very high powers in studying the characters of the Diatomaceæ, because it is a branch of microscopic investigation which I have very little studied. Other observers will probably state very shortly if anything is gained by the use of these high powers in this department. It is probable that, by improved means in illuminating the objects, many new and important points will be made out by the use of very high magnifying powers. Mr. Brooke has already suggested possible improvements in the condenser, some of which, I believe, he will carry out shortly.

January 26, 1865.

Major-General SABINE, President, in the Chair.

The following communications were read:—

I. "Researches on Solar Physics.—Series I. On the Nature of Solar Spots." By WARREN DE LA RUE, Ph.D., F.R.S., BALFOUR STEWART, A.M., F.R.S., Superintendent of the Kew Observatory, and BENJAMIN LOEWY, Esq. Received January 10, 1865.

(Abstract.)

After giving a short sketch of the history of their subject, the authors proceed to state the nature of the materials which had been placed at their disposal. In the first place, Mr. Carrington had very kindly put into their hands all his original drawings of sun-spots, extending from November 1853 to March 1861. In the next place, their materials were derived from the pictures taken by the Kew heliograph. A few pictures were taken by this instrument at Kew Observatory in the years 1858 and 1859. In July 1860 it was in Spain doing service at the total eclipse. In 1861 a few pictures were taken at Kew, while from February 1862 to February 1863 the instrument was in continuous operation at Mr. De la Rue's private observatory at Cranford, and from May 1863 until the present date it has been in continuous operation at Kew under Mr. De la Rue's superintendence. A Table was then given, from which it was deduced that the number of groups observed at Kew from June to December 1863 inclusive was 64, while that observed by Hofrath Schwabe during the same interval was 69. In like manner, the number at Kew between January and November 1864 inclusive was 109, while during the same interval Hofrath Schwabe observed 126. It thus appears that Schwabe's numbers are somewhat larger than those of Kew; but probably, by means of a constant corrective, the one series may be made to dovetail with the other.