III. "Description of an Improved Mercurial Barometer." By JAMES HICKS, Esq. Communicated by J. P. GASSIOT, F.R.S. Received March 16, 1864.

Having shown this instrument to Mr. Gassiot, he wished me to write a short description of it, which he thought would be of interest to the Royal Society.

Some time since I constructed an open-scale barometer, with a column of mercury placed in a glass tube hermetically sealed at the top, and perfectly open at the bottom. The lower half of the tube is of larger bore than that of the upper.

If a column of mercury, of exactly the length which the atmosphere is able at the time to support, were placed in a tube of glass hermetically sealed at the top, of equal bore from end to end, the mercury would be held in suspension; but immediately the pressure of the atmosphere increased, the mercury would rise towards the top of the tube, and remain there till, on the pressure decreasing, it would fall towards the bottom, and that portion which the atmosphere was unable to support would drop out. But if the lower half of the tube be made a little larger in the bore than the upper, when the column falls, the upper portion passes out of the smaller part of the tube into the larger, and owing to the greater capacity of the latter, the lower end of the column of mercury does not sink to the same extent as the upper end, and the column thus becomes shorter. The fall will continue until the column is reduced to that length which the atmosphere is capable of supporting, and the scale attached thus registers what is ordinarily termed the height of the barometer.

From the above description it will be evident that, by merely varying the proportion in the size of the two parts of the tube, a scale of any length can be obtained. For example, if the tubes are very nearly the same size in bore, the column has to pass through a great distance before the necessary compensation takes place, and we obtain a very long scale, say 10 inches, for every 1-inch rise and fall in the ordinary barometer. But if the lower tube is made much larger than the upper, the mercury passing into it quickly compensates, and we obtain a small scale, say from 2 to 3 inches, for every inch. To ascertain how many inches this would rise and fall for an ordinary inch of the barometer, I attach it, in connexion with a standard barometer, to an air-pump receiver, and by reducing the pressure in the air-pump I cause the standard barometer to fall, say 1 inch, when the other will fall, say 5 inches; and so I ascertain the scale for every inch, from 31 to 27 inches.

It was on this principle that I constructed the open-scale barometer, which has since been extensively used. But having been asked to apply a vernier to one of these barometers graduated in this way, I found this impracticable, as each varied in length in proportion as the bore of the tube varied, so that every inch was of a different length.

I have now remedied this defect, and made what I believe is an absolute standard barometer, by graduating the scale from the centre, and reading it off with two verniers to the $\frac{1}{1000}$th of an inch. The scale is divided from the centre, up and down, into inches, and subdivided into 20ths.

To ascertain the height of the barometer graduated in this way, take a reading of the upper surface of the column of mercury with the vernier, then of the lower surface in the same way, and the two readings added together will give the exact length of the column of mercury supported in the air, which is the height of the barometer at the time.

There is another advantage in this manner of graduating over the former, that if a little of the mercury drops out it will give no error, as the column will immediately rise out of the larger tube into the smaller, and become the same length as before; but by the former scale the barometer would stand too high, until readjusted, which could only be effected by putting the same quantity of mercury in again.

I have introduced Gay-Lussac's pipette into the centre of the tube, to prevent the possibility of any air passing up into the top.

The Society then adjourned over the Easter Recess to Thursday, April 7th.

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## "On Mauve or Aniline-Purple." By W. H. Perkin, F.C.S. Communicated by Dr. Stenhouse. Received August 19, 1863*.

The discovery of this colouring matter in 1856, and its introduction as a commercial article, has originated that remarkable series of compounds known as coal-tar colours, which have now become so numerous, and in consequence of their adaptibility to the arts and manufactures are of such great and increasing importance. The chemistry of mauve may appear to have been rather neglected, its composition not having been established, although it has formed the subject of several papers by continental chemists. Its chemical nature also has not been generally known; and to this fact many of the discrepancies in the results of the different experimentalists who have worked on this subject are to be attributed.

The first analysis I made of this colouring matter was in 1856, soon after I had become its fortunate discoverer. The product I examined was purified as thoroughly as my knowledge of its properties then enabled me, and the results† obtained agree very closely with those required for the formula I now propose. Since that time I have often commenced the study of this body in a scientific point of view, but other duties have prevented me

* For abstract see vol. xii. p. 713.

† The substance I examined was doubtless the sulphate, of which I made two combustions:—

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| No. I. gave | 71·55 | per cent. of carbon and | 6·09 | per cent. of hydrogen. |
| No. II. gave | 71·60 | " " | 5·77 | " |
| Theory requires | 71·5 | " " | 5·5 | " |