

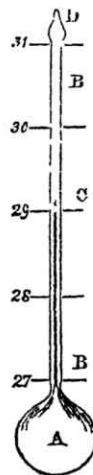
II.—*Description of an hermetically sealed Barometer.*

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WHEN mounted on an ivory scale, this instrument resembles in size and portability a pocket thermometer of the medium or larger class.

It is constructed from a piece of thermometer tube, in which, in lieu of the spherical or cylindrical bulb formed for a thermometer, a cistern is made in the form of the section of a cylinder, 1·4 inches diameter and 1-10th of an inch thick, varying these measures according to circumstances; but generally the bulb has nearly the shape and dimensions of a half-crown. On the top of the tube there is an air cavity similar to that used in Dr. Rutherford's registering thermometer.

- A. The cistern containing alcohol.
- BB. The tube in which the height corresponding to the barometer is read.
- C. The top of the alcohol column.
- D. The air-cavity for correcting for temperature.
- 31 to 27. The figures to represent the height of the column C. with reference to the mercurial column.
- Sub-divisions between each inch are added so as read off to ·02.



The influence of change of temperature is got rid of by trial and adjustment of each instrument; so that the expansion of the air in the upper cavity will counterbalance the expansion of the liquid in the cistern. This correction for temperature applies only to the condition of equal heating of the instrument throughout. When it is well done, an instrument is obtained, which is extremely sensitive to any change of atmospherical pressure.

If dipped in water at the temperature of the air, the column in the tube immediately rises to show the increase of pressure. When carried from one story of a house to another, the change is noticed as the stairs are ascended. In the beginning of last April, I put one of the barometers in the corner of the compartment of the railway carriage in which I was travelling, from Liverpool to Edinburgh, where it indicated regularly the extensive changes from the sea level which that line of route contains.

The hermetically-sealed barometer which I have found to work best is filled with coloured alcohol; the column in the tube moving through about 1·5 inches for every inch of the mercurial barometer.

Filled with mercury, instruments corrected for temperature were obtained to move through half an inch for every inch of the barometer; but, in point of mobility, they were much inferior to alcohol-filled tubes.

Filled with ether, an instrument corrected for temperature could not be obtained in combination with delicacy of indication; but if the correction for temperature be dispensed with, and a place can be found for the barometer where the changes of temperature are small, ether, in an hermetically-sealed tube of the kind described, would furnish a most minute measure of changes in atmospheric pressure.

A tube filled with water did not act with delicacy, from the want of mobility in the fluid.

In the hermetically sealed barometer, the reading may be much disturbed by unequal heating, when the instrument is held in the hand, or the sun allowed to shine on a portion of it. This can in a degree be prevented by the skill of the observer, with the interposition of non-conductors, and when carried by holding the instrument suspended by a cord, rather than keeping it in the pocket or hand. When the indication has been disturbed by unequal heating, it must remain suspended fifteen or twenty minutes before a reliable reading can be made.