Mr. BRUNEL, *V. P.*, said he had tried these instruments on the Great Western Railway, and had every reason to be satisfied with their accuracy, both as Manometers, and as Pressure Gauges, and he was of opinion, that the principle might be advantageously extended to other indicating instruments. The Barometer was not only a very ingenious instrument, but it was very correct in its indications; its sensibility was remarkable, for in merely going upstairs in any house, a variation would be observed, and in travelling along a railway, every elevation, or depression was correctly indicated to within 10 feet of the actual level. He had compared one of Bourdon's instruments, with a very accurate barometer made by Troughton, and after the necessary allowance for the constant deviation, he found a remarkable coincidence in the mean of the indications, extending over a considerable period.

In applying these instruments to steam-boilers, it would be advisable to isolate them by some good non-conductor, as the heat should be kept as much as possible from them.

Mr. Bourdon had omitted to state in the paper, that the variation in the barometer, occasioned by change in position, was remedied by a small bulb counterpoise, and since this addition, the instrument might be considered almost perfect.

In answer to a question from Mr. Gordon, Mr. Brunel said, that the principle had not hitherto been used in making instruments for deep-sea sounding, but there was every appearance of its being applicable for such purposes.

Sir E. BELCHER said the invention of a good instrument for deep-sea sounding, would be a great benefit, as not even Ericsson's could be entirely relied upon. The principle of Bourdon's instruments appeared to be simple, and easily adaptable to sounding instruments.

Mr. SIMPSON, *V. P.*, had used these instruments for pressures equal to a column of water of 350 feet, and for steam, up to 40 lbs. or 50 lbs. per square inch, and had found them indicate very accurately; indeed he thought they were likely eventually to supersede the ordinary pressure gauges.

Mr. POLE stated, that having been requested, during the discussion, to try an experiment with the instrument as made by M. Bourdon, in the form of a barometer, he could fully confirm Mr. Brunel's statement as to its sensitiveness. He had placed it first upon the basement floor of the Institution building, and had afterwards taken it up to the second floor. The difference in the indication of the instrument at these two levels, was very decided, amounting to two of the large divisions on the dial plate, each of which corresponded in value

to $\frac{1}{4\cdot5}$th of an inch fall of the mercury in an ordinary barometer tube. The total fall was therefore equal to $\frac{2}{4\cdot8}$ths of an inch (equal to 0·0416 inch;) and as the height of the second floor above the basement, was found by actual measurement to be 35 feet, this agreed very well with the ordinary rule, namely that $\frac{1}{1\cdot0}$th of an inch fall, corresponded to about 85 to 90 feet difference of altitude, according to the conditions of the atmosphere at the time.

No. 861.—"Description of the Prismatic Clinometer; a new pocket instrument for measuring Vertical Angles." By WILLIAM POLE, Assoc. Inst. C. E.

IN the course of various investigations of a topographical nature, particularly in hilly countries, the Author has often found the want of some simple contrivance for measuring, with tolerable accuracy, angles of elevation above, or depression below, the horizontal line; it being necessary, at the same time, that the instrument should be sufficiently light and portable for the pocket; simple and convenient in use; and not liable to injury, or derangement in carriage.

Hitherto no instrument appears to have been contrived for fulfilling all these conditions. The Theodolite and the Altitude and Azimuth instrument, are, of course, out of the question for this purpose, as their size, their delicacy, and the necessity of carrying a stand with them, deprive them of the indispensable qualification of portability; besides which, the accuracy obtainable by such large instruments is not required in those observations wherein a portable instrument would prove most useful.

The Sextant (perhaps the most valuable angular instrument that has ever been contrived) has the power of taking angles in any plane, vertical as well as horizontal; and at sea, as is well known, the measurement of altitudes, or angles of elevation, is the principal use to which this instrument is applied. But on shore, where no sea horizon can be obtained, the sextant fails in this application, unless it is accompanied with another instrument, the Artificial Horizon, the management of which is, however, so troublesome, that it is seldom, or never employed for any other purpose than astronomical observations. Moreover, the use of the sextant in conjunction with the artificial horizon, is limited to angles of elevation; it will not show a level line, nor measure angles of depression; perhaps as frequently wanted as those of elevation. For example, an observer standing on a hill might wish to find its height by taking the angle of depression of some object in the plain, or valley below: this, with