

A Description of an Invention, whereby the Divisions of the Barometer may be enlarged in any given proportions; produced before the Royall Society by Mr. Robert Hook R. S. Soc. and Profefs. Geom. Gresham.

Since the discovery of the Alterations, that are in these parts of the World, in the weight of the *Atmosphere*, by the means of the *Torricellian Tube*, there has been several contrivances thought on, to make the more minute variations in the Airs pressure sensible.

And first, the *Wheel-Barometer* was invented and Published by Mr. *Hook*, Anno 1665, in his *Micrography*: (where it is described at large) but this did not answer fully the designed exactness, both for that the Mercury being apt to stick against the sides of the Glass, would rise and fall *per saltum*, all at once, and because it is very difficult to adjust the Ball and Thread and other *apparatus* of this Instrument, as also that it is exceeding apt to be out of order, for which reason it is at present almost wholly laid aside.

Upon this in *June* 1668 (as appears on the Journal of the Royal Society) he bethought himself of an other device to do the same thing, which was to encrease the divisions by putting coloured Spirit of Wine, or some other Liquor not capable of Freezing, on the Mercury, which Liquor was made to rise as the Mercury fell, and fall as it rose, in a narrow Cane, so as to make the utmost limits about two foot asunder. This invention was afterwards in the Year 1673 Published in *France* by Mr. *Hubin*, who neatly performed the Glass-work; but the Cane being necessarily small and apt to be obstructed with bubbles, (whereby the intercourse of the outward Air would be intercepted) and besides the utmost limits of rise and fall scarce reaching two foot and a half, Mr. *Hook* was not yet satisfied, till he had found out
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the means of increasing the Divisions of the *Barometer ad libitum*, by a way free from such Objections, which finally he produced before the R. Society at their meeting on *Feb. 3d. 1685* *ſt. vet.* The contrivance whereof is this.

Figure I. Tab. II. Represents the Glaſs of this *Baroſcope*: the Cylinder A may be of what Diameter you pleaſe, the bigger the better, but it need not be above 2 inches long, the Cane AD muſt be ſo long, that the upper part of the Cylinder B may be 29 inches + ſuch a part of the height of the other Cane BC, as the weight or ſpecifick Gravity of the Liquor that is to fill that Cane is to the ſpecifick Gravity of Mercury below the line *a b* in the Cylinder A. The third Cylinder C may be as high as you pleaſe above the Cylinder B, but is moſt conveniently made, ſo as the ſquare of the Diameter of the Cane BC be to the ſquare of the Diameter of the Cylinders B or C, (which muſt be exactly equall) as the riſe of the Mercury in the Cylinder B, is to the whole Length of the Cane BC: for in this caſe there will be nothing Superfluous, but the diviſions enlarged to the utmoſt advantage.

As to the method of filling this *Baroſcope*, though the Inventor hath not yet declared his own contrivance for the doing it, yet it will not be unneceſſary to ſhew here how it may be done. One way, (and the beſt that occurs at preſent) is to leave a ſmall hole at the top of the Cylinder A, and another near the top of the Cylinder B: this latter being well ſtopt, pour in as much Mercury, at the other hole in A, as ſhall fill both Canes as high as the Level of the ſaid hole; which done, ſtop either by Hermetically ſealing it, or elſe by a drop of ſeal-wax (the glaſs being firſt ground rough to make it ſtick) the hole in A; then opening the hole in B, draw off as much of the Mercury of the Cane B C till it will run no longer: which done, ſtopp firmly the hole in B (which may be done as you pleaſe, there being no preſſure againſt you) and you will have the Cylinder A evacuated of Air for your purpoſe; and the height of the Mercury will be as is uſual in the ordinary plaine and Wheel-*Barometers*.

Then

Then pour into the Cane B C as much Spirit of Wine tinged with *Cochineele*, and Oyle of *Turpentine*, equal parts of each, as shall stand above the surface of the Mercury so many feet as you make the enlarged scale of your Barometer, or as is between the middle of the Cylinders B and C, and you will find the Mercury sink in the Cane B C, and rise in the other Cane A D, in such proportion, that each 13 foot of Oyle and Spirit, will raise the Mercury ten Inches: This done, you must pour on, by the Cane B C, so much Mercury as may fill up the Cylinders A & B to such hights, considering the present weight of the Atmosphere, that the surface of the Mercury in both, may, at the utmost limits, (which have not in *England* been found to exceed 30, 6 and 28, 6. Inches) always fall within the bodies of the Cylinders, and never enter into the Canes.

Here note that these Liquors are chosen upon two accounts, First they are exceeding near of a weight, and Spirit of Wine highly rectified is somewhat lighter than Oyle of Turpentine, but by a very small addition of Phlegme or Water, the Spirit will præponderate and be undermost; so that you may make them as near of a weight as you please, and consequently a Cylinder of the Oyle insensibly differing from an equal Cylinder of the Spirit of Wine. Secondly they are Liquors that will not mix; so that the Oyle of Turpentine swimming on the top, will be divided by a line only from the tinged Spirit of Wine, which the Oyle will keep from Evaporating.

The effect of this Baroscope will be, that when the Atmosphere is heavy, and the Mercury raised high in the Cylinder A, and retired out of B, the spirit of Wine will descend into the Cylinder B, and the Oyle of Turpentine will fill the Cane, so as to make the partition of the two Liquors near the Cylinder B. But on the contrary when the Air is light, the Mercury will sink in A and rise in B, so as to drive the Spirit of Wine into the Cane, and the Oyle of Turpentine into the Cylinder C, so that the section of the 2 Liquors will be near C, and the Variation of the hight of the Mercury will be ena

larged into almost the length of the Cane, without that the Counter-pressure from the Liquors will be in the least altered, the height and weight of the incumbent Cylinders being always the same.

That little alteration that may happen by the dilatation and contraction of the Spirit of Wine by heat and cold, which ought to be accounted for, may be best discovered by a Thermometer hanging by it (containing the same quantity of Spirit of Wine, and whose Cane is, as near as may be, of the same Diameter with the Cane BC in the Barometer) whose descent and ascent must be added and subtracted to reduce it to a rigorous exactness; but it is still worth while to enquire if the Mercury it self do not shrink and swell with cold and heat, so as not to need this correction.

Thus is a remedy found out for the defects and inconveniences of the Barometers hitherto produced, and an Instrument discovered which like a new Sence, will most nicely shew those alterations in the Air, which without it would by no means be perceptible, and of which undoubtedly very great uses might be made in order towards a perfect *Meteorologie*, which, without some such help as this, can hardly arrive at any great point of certainty.

But I forbear to say more about it, least (by omission of some material circumstance) I should prejudice the Ingenious Author of this discovery, who has promised to publish a more particular Account thereof; what is here said being only intended to assert the Right of the first Invention of this Useful and Subtile Instrument to its proper Author, from the pretensions of all others.

Tab. II



