panied by his brother, Dr. *Ball*, *October* 13. 1665. at ſix of the Clock, at *Mainhead* near *Exeter* in *Devonſhire*, with a very good *Teleſcope* near 38 foot long, and a double Eye-glaſs, as the obſerver himſelf takes notice, adding, that he never ſaw that *Planet* more diſtinct. The obſervation is repreſented by *Figure* 3. concerning which, the Author ſaith in his letter to a friend, as follows; This appear'd to me the preſent figure of *Saturn*, ſomewhat otherwiſe, than I expected, thinking it would have been decreaſing, but I found it full as ever, and a little hollow above and below. Whereupon the Perſon, to whom notice was ſent hereof, examining this ſhape, hath by Letters deſired the worthy Author of the *Syſteme of this Planet*, that he would now attentively conſider the preſent *Figure* of his *Anſes* or *Ring*, to ſee whether the appearance be to him, as in this *Figure*, and conſequently whether he there meets with nothing, that may make him think, that it is not *one* body of a Circular Figure, that embraces his *Diske*, but *two*.

And to the end that other Curious men, in other places might be engaged, to joyn their Obſervations with him, to ſee, whether they can find the like appearance to that, repreſented here, eſpecially ſuch Notches or Hollowneſſes, as at A and B, it was thought fit to inſert here the newly related Account.

A Relation of ſome Mercurial *Obſervations, and their Reſults.*

Modern *Philoſophers*, to avoyd Circumlocutions, call that Inſtrument, wherein a Cylinder of Quickſilver, of between 28. and 31. Inches in Altitude, is kept ſuſpended after the manner of the *Torricellian* Experiment; a *Barometer* or *Baroſcope*, firſt made publick by that Noble Searcher of Nature. Mr. *Boyle*, and imployed by Him and others, to detect all the minut variations in the Preſſure and weight of the Air. For the more curious

curious and nice diſtinguiſhing of which ſmall changes, Mr. *Hook* in the *Preface* to his *Micrography*, has deſcribed ſuch an Inſtrument with a *Wheel*, contrived by himſelf, and, by theſe two laſt years trials of it, conſtantly found moſt exact for that purpoſe: which being ſo accurate, and not difficult to be made, it were deſirable, that thoſe who have a Genius and opportunities of making Obſervations of this kind, would furniſh themſelves with ſuch of theſe Inſtruments, as were exactly made and adjuſted according to the Method, delivered in the newly mentioned place.

To ſay ſomething of the Obſervations, made by this Inſtrument, and withal to excite ſtudious *Naturaliſts* to a ſedulous proſecution of the ſame, the *Reader* may *firſt* take notice, that the lately named Mr. *Boyle* hath (as himſelf not long ſince did intimate to the Author of theſe *Tracts*) already made divers Obſervations of this kind in the year *1659.* and *1660.* before any others were publick, or by him ſo much as heard of; though he has hitherto forborn to divulge them, becauſe of ſome other Papers (in whoſe Company they were to appear) which being hindred by other ſtudies and employments, he hath not as yet finiſhed.

Next, that, beſides ſeveral others, who, ſince have had the curioſity of making ſuch obſervations, the Worthy and Inquiſitive Dr. *John Beal*, is doing his part with much aſſiduity (of which he hath by ſeveral Letters acquainted his Friends in *London*) both by obſerving himſelf, and by procuring many Correſpondents in ſeveral places in *England* for the ſame purpoſe; judging it of great importance, that Obſervations of this kind be made in parts ſomewhat diſtant from one another, that ſo from many of thoſe, accurately made and then compared, it may be diſcovered, whether the Aire gravitates more in the parts of the Earth lying more *Eaſt* or *Weſt*, *North* or *South*? whether on ſuch as lie neerer to the *Sea*, or further up into the *Main land*? in hotter or colder weather? whether in high

high Winds or Calms? whether in wet weather or dry? whether moſt when a North, or when a South, when an Eaſt or a Weſt wind blows? and whether it keeps the ſame ſeaſons of Changes? and whether the ſeaſons and changes of the Air and Weather can be thereby diſcover'd, and the now hidden cauſes of many other *Phænomena* detected?

The ſaid *Doctor* is ſo much pleaſed with the diſcovery already made by the help of this Inſtrument, that he thinks it to be one of the moſt wonderful that ever was in the World, if we ſpeak of ſtrangeneſs, and juſt wonder, and of Philoſophical importance, ſeparate from the intereſt of lucre. For (*ſaith he, in one of his Letters*) who could ever expect, that we men ſhould find an Art, to weigh all the Air that hangs over our heads, in all the changes of it, and, as it were, to weigh, and to diſtinguiſh by weight, the Winds and the Clouds? Or, who did believe, that by palpable evidence we ſhould be able to prove, the *ſereneſt* Air to be moſt heavy, and the *thickeſt* Air, and when darkeſt Clouds hang neereſt to us, ready to diſſolve, or dropping, *then* to be lighteſt. And though (*ſo he goes on*) we cannot yet reach to all the Uſes and Applications of it; yet we ſhould be entertain'd for a while, by the truly Honourable Mr. *Boyle*, as the leading perſon herein, upon the delight and wonder. The *Magnet* was known many hundreds of years before it was applied to find out *New Worlds*. To me (*ſaith he*) tis a wonderful delight, that I have alwaies in my Study before my eye ſuch a *Curious Ballance*.

Having thus in *General* expreſſed his thoughts about this Invention, and the ſingular pleaſure, he takes in the Obſervations made therewith, he deſcends to particulars, and in ſeveral Letters communicates them to his Correſpondent, as follows:

1. My *Wheel-barometer* I could never fill ſo exactly with *Mercury*, as to exclude *all* Airs and therefore I truſt more

The Excluſion of all *Air is here neceſſary, becauſe Air being ſubject to the operation of Heat and Cold, if any of it remain in the* Barometer, *it will cauſe it to vary from ſhewing the true Preſſure of the Air.*

to a *Mercurial* Cane, and take all my Notes from it, This Cane is but 35. Inches long, of a very ſlender Cavity, and thick Glaſs. This may eaſily be conveyed to any place, for Trials. The Veſſel for the ſtagnating *Mercury*, into which the ſaid Cane is immerſed, is about two *Inches* wide. The *Mercury* ſo well fill'd, that for ſome daies it would not ſubſide, but hung to the top of the Glaſs-cane. I keep it in a Cloſet pretty cloſe, 9. foot high, 8. foot broad, 15. foot long; neer a Window. This I note, becauſe poſſibly the cloſeneſs of the room may hinder, that it gives not the full of all Changes, as it might in a more paſſable Air.

2. In all my Obſervations from *May* 28. 1664 to this preſent (*December* 9. 1665.) the Quickſilver never aſcended but very little above $30\frac{1}{4}$ Inches.

3. It aſcended very ſeldom ſo high (*videl.* to $30\frac{1}{4}$ Inches) chiefly in *Decemb.* 13. 1664. the weather being fickle-fair, Evening.

4. I find by my *Calender* of *June* 22. 1664. at 5. in the Morning, in a time of long ſetled fair weather, that the *Mercury* had aſcended about half an Inch higher then 30: but I fear ſome miſtake, becauſe I then took no impreſſion of *wonder* at it; yet for 3. or 4. daies, at that time it continued high, in well-ſetled, fair and warm weather; moſt part above 30. Inches. So that I may note, the *Mercury* to riſe as high in the hotteſt *Summer*, as in the coldeſt *Winter-weather*.

5. Yet ſurely I have noted it aſcend a little higher for the Coldneſs of the Weather; and very frequently, both in Winter

ter and Summer to be higher in the cold Mornings and evenings, then in the warmer Mid-day.

Perhaps this is from ſome included Air,

6. Generally in ſetled and fair weather both of Winter and Summer, the *Mercury* is higher, than a little *before* or *after*, or *in* Rainy weather.

7. Again, generally it deſcended lower after Rain, than it was before Rain.

8. Generally alſo it falls in great winds; and ſomewhat it ſeem'd to ſink, when I open'd a wide door to it, to let in ſtormy winds; yet I have found it to continue very high, in a long ſtormy wind of 3. or 4. daies.

It ſeems theſe were Eaſtern *winds.*

9. Again, generally it is higher in an *Eaſt* and *North*-wind. (*Cæteris paribus*) than in a *South* and *Weſt*-wind.

10. I tryed ſeveral times, by ſtrong fumes and thick ſmoaks to alter the Air in my Cloſet; but I cannot affirm, that the *Mercury* yielded any more, then might be expected from ſome increaſe of heat. Such as have exact *Wheel-Barometers*, may try whether Odors or Fumes do alleviate the Air.

11. In this Cloſet I have not in all this time found the extreameſt changes of the Quickſilver to amount to more, than to $2\frac{1}{4}$, or to $2\frac{1}{8}$. inches, at moſt.

12. Very often I have found great changes in the Air, without any perceptible change in the *Barometer*; as in the dewy nights, when the moiſture deſcends in a great quantity, and the thickneſs ſometimes ſeems to hide the Stars from us: In the days foregoing and following, the Vapors have been

drawn up ſo *Inviſibly*, that the Air and Sky ſeem'd very clear all day long. This I account a great change between aſcending and deſcending Dews and Vapors (which import Levity and Weight,) and between thick Air and clear Air: which changes do ſometimes continue in the Alternative courſe of day and night, for a week or fortnight together; and yet the *Baroſcope* holding the ſame.

13. Sometimes (I ſay not often) the *Baroſcope* yields not to other very great changes of the Air. As, lately (*December* 18.) an extraordinary bright and clear day; and the next following quite darkned, ſome Rain and Snow falling; but the *Mercury* the ſame: ſo in high winds and calms the ſame.

14. I do conceive, that ſuch as converſe much *Sub dio*, and walk much abroad, may find many particulars much more exactly, then I, who have no leiſure for it, can undertake. To inſtance in one of many, *December*. 16. laſt, was a clear cold day, very ſharp and ſtrong *Eaſt* wind, the *Mercury* very near 30. inches high, about three in the afternoon, I ſaw a large black cloud, drawing near us from the *Eaſt* and *South-Eaſt*, with the *Eaſt-wind*. The *Mercury* changed not that day nor the day following; the Stars and moſt of the ſky were very bright and clear till Nine of the Clock; and then ſuddenly all the ſky was darkned, yet no change of weather happened; *December* 17. the froſt held, and 'twas a clear day, till about two of the clock in the afternoon; and then many thick clouds appear'd low in the *Weſt*; yet no change of the weather here; the Wind, Froſt, and Quick-ſilver, the ſame, *December* 18. the *Mercury* fell almoſt $\frac{1}{4}$ of an inch, and the ſky and Air ſo clear and bright and cold with an *Eaſt-wind*, that I wondred what could cauſe the *Mercury* to deſcend. I Expected, it ſhould have aſcended, as uſually it does in ſuch clear ſkys. Caſually I ſent my ſervant abroad, and he diſcovered the remote Hills, about 20. miles off, cover'd with

ſnow

ſnow, This ſeem'd to manifeſt, that the Air, being diſcharged of the clouds by ſnow, became lighter.

15. I have ſeldom ſeen the change to be very great, at any one time. For, though I do not now take a deliberate view of my Notes, yet I wonder'd once to ſee, that in one day it ſubſided about $\frac{3}{4}$ of an inch.

16. Of late I have altered my Method upon the *Barometer*, obſerving it, as it is before my Eyes, all day long, and much of the night, being watchful for the moments of every particular change, to examine, what cauſe in the Air and Heavens may appear for ſuch changes. And now my wonder is, to ſee, how ſlow it is, it holding moſt between the nine and twentieth and thirtieth inch of late.

17. I muſt now (*January* 13. $166\frac{5}{6}$) tell you, that the *Mercury* ſtands at this time (as it did alſo yeſterday) a quarter above 30. inches; yet both days very dark and cloudy, ſometimes very thick and miſty Air; which ſeldom falls out. For, for the moſt part, I ſee it higher in cleareſt ſetled weather, than in ſuch cloudy and miſty Foggs. This thick Air and darkneſs hath laſted above a week; lately more Cold, and *Eaſt* and *North-Eaſt* wind.

Thus far the Notes of this Obſerving *Divine*; of which Mr. *Boyle*, to whom they were alſo communicated, entertains theſe thoughts, that they ſeem to him very faithfully made, and do for the main, agree well enough with his obſervations, as far as he remembers, not having them, it ſeems, at that time, when he wrote this, at hand; and though it be wiſhed by him, that the Obſerver's Glaſs-Cane had been ſomewhat bigger; yet his diligence in fitting it ſo carefully, or rather ſo skilfully, as is above-mentioned, is much by him commended.

This ſeems to be wiſhed, becauſe the motion of the Mercury *may be more free in a wider Cane.*

Some