

one of them in *vacuo*; the other in the free Air, there was let fall into both at the same time two equal parcels of *Lime*, one into each; and it appear'd, that that which was in *vacuo* did indeed throw up some big bubbles, but yet fewer of them than that which was in the Air: And having taken it, an hour after, out of the Recipient, and stirr'd the *Lime*, it was found to have only the consistence of Dirt, whereas the other had the consistence of flecked Lime. The reason of which may perhaps be, that the Volatil Salts of the *Lime* do exhale whilst the Recipient is emptying.

There was also some Plaister of *Paris* flecked in *vacuo*, and the Ebullition of it did there appear much more than it doth in the open Air. When it is not touched, the bubbles that issue out leave great holes in it, and then it settles very un-even; but taking care to stir it until the bubbles be come forth, and pressing it when it begins to settle, it becomes very smooth, and hath not so many little holes as the common Plaister.

A particular account, given by an anonymous French Author in his book of the Origin of Fountains, printed 1674 at Paris; to shew, that the Rain and Snow-waters are sufficient to make Fountains and Rivers run perpetually.

IN order to give a gross Estimât of the quantity of Rain*, compared with the quantity of Water running away in Springs and Rivers; it will be necessary first to agree of the way of measuring these two sorts of Water. Those that make profession of governing and conveying Spring-waters, say, that a cubick inch of water yields in twenty four hours 144 *muids*, (the name of a *French* measure, holding 280 *French* pints;) others say, it yields but 70 of that measure. For my part, I have reason to believe, that it yields 83 of this measure, and follow those that say, that a Vessel of two foot deep, long and broad, holds one *muid* of Water.

*The like to which hath been attempted here, and proposed to the R. Society, some years since, by Sr. Chr. Wren, who by the contrivance of a Rain-bucket had taken an account of all the Water that fell for a considerable time; and by his Weather-clock had, among other particulars, not only taken in the measu-

ring of the quantity of Rain that falls, but also the time when it falls, and how much at each time. Which Instrument, if put into practice, would be of excellent Use, forasmuch as it may also serve, by some additions made thereunto by Mr. Hooke, to record the weight of the Air, the drought, moisture, heat and cold of the Weather, the Sun-shine, the quarters and strength of the Winds: And all this to be performed by one only motion, driving all the parts of the Instrument; which is therefore the more considerable, that it self records its own effects.

This

This being supposed, it follows, that a Vessel, which contains 83 *muids* of Water, is able to furnish in twenty four hours so much as will make an *Inch* of water run continually. And so, if a Conservatory should hold 3378 *muids* of water, it would furnish for a whole year a sufficient quantity to make an *Inch* of water run constantly: And if it were as big again, it would make run two, and so on more or less in proportion. But here I suppose an Equality in the running, though I am not ignorant, that the Conservatory being full, the water will then run out with more velocity, and consequently in greater quantity, than when 'tis near empty. But this being only to make the matter better understood, I shall not stand upon this preciseness.

But then for the measure of the Rain and Snow-water, I shall tell you, that as to the Observations which I have made my self of the quantity of such water, I have found, that from *Octob.* 1668 to *Octob.* 1669, there had fallen so much of it, as amounted to the height of 18 inches 7 lines; and from the same Month of 1670 to the same Month 1671, there had fallen only so much as came to the height of $8\frac{1}{2}$ inches; and from *Januar.* 1673 to *Januar.* 1674, to the height of $27\frac{1}{2}$ inches. Of which, taking the *medium*, we have 19 inches and $2\frac{2}{3}$ lines.

This supposed, we must for our purpose measure or make an Estimat of some River, as it runs from its very source to a place where some Rivolet enters into it, and see, whether the Rain-water that falls about the course thereof, if it were put into a Conservatory, would be sufficient to make it run a whole year.

I have looked upon and considered the River of *Seine* in its course from the source of it unto *Ainay le Duc*, where enters a Rivolet that swells it. And this I shall take for the subject of the *Examen* I intend to make.

The course then of this River from its Spring to the said *Ainay le Duc* is about three leagues long, and the sides of its course extend themselves on the right hand and the left about two leagues on each side, where there are other little Rivers that run another way: And, since that these Rivolets need Water to maintain them as well as the *Seine*, I will count but half that space of the sides, and say, that the place where the *Seine* passés, hath from its source to *Ainay le Duc*, three miles long, and two miles large. Whereupon I say further, if a Conservatory were made of this bigness, it would be six leagues square in surface, which being reduced to fathoms, would.

would, according to the measure fixed above, make 31 millions, and 245144 fathoms in surface. In this Conservatory imagine, that during a whole year there has fallen Rain to the height of 19 inches $2\frac{1}{3}$ lines, as was said before. This height of 19 inches and $2\frac{1}{3}$ lines gives 280 millions 89942 *muids* of water, or thereabout, according to the measure supposed.

All this Water thus collected in the quantity just now expressed, is that stock which is to serve to make this River run for a whole year, from its source to the place before-named, and which must also serve to supply other occasions and losses, such as are the feeding of Trees, Herbs, Vapors, and extraordinary swellings of the River whilst it rains, and deviations of the water running another way.

Concerning the measure or estimate of the water of this rising River, it would be difficult to find it just and precise, and to determine what quantity it furnishes. Yet so far as I was able to judge, it can have no more than a 1000 or 1200 inches of water alwaies running, compensating the lesser quantity it hath at its source with the greater it hath towards *Ainay le Duc*: The which I so judge by the comparison I make of these Waters with those of the River of the *Gobelins*, in the condition wherein it is towards *Versailles*, where it hath fifty inches of water, according to the measure taken of it. So that I esteem, it will be enough to allow twenty four or twenty five times as much to *our* River. For the Channel of it is to be four or five fathoms large, and for depth 'tis but shallow; it carries no Boats, and serves only to float down some loose Billets.

These particulars being thus supposed, I say, that according to the measures we have agreed upon, 1200 inches of water do furnish in twenty four hours, after the rate of 83 *muids* of water to an inch, they furnish, I say, 99600 *muids* of water; wherefore, for a whole year, which is near 366 times as much, they will furnish 36 millions 453600 *muids*.

This River then sends away within its banks, in a year, no more than about $36\frac{1}{2}$ millions of *muids* of water. But taking this quantity out of the 280 millions that are in the Conservatory above described, there will remain yet above 188 millions of *muids*, which amounts to almost five times as much, and which serves to furnish for the losses, diminutions, and other wastes, above taken notice of. So that there needs but the sixth part of the

the Rain and Snow-water that falls in a year, to run continually through the whole year.

I am well aware, that this deduction is not sure; but who can give a surer? However such as it is, I think it is more satisfactory than a bare Negative, as is that of those, who pretend, it rains not enough to furnish sufficient quantities of water for the constant running of Rivers.

Now then, if these Rain-waters are sufficient to make one River run, they may also suffice for all the rest in proportion, considering especially, *first*, what remains for waste, which is superabundant, and *secondly*, what little space I allow to both sides of the River's course, which is but of one league on each side. For, Rivers are not commonly two leagues near one another.

It may be objected, *that there are Countries where it rains but seldom, and somewhere it rains not at all, and yet there are considerable Rivers.* But I answer, that the Rivers of those Countries, where it rains but seldom, do not run continually, being only big in Winter, but in Summer almost quite dried up. The reason of both which effects is, that they being near some high Mountains whence they come, the Snow that falls in abundance on those Hills, and is melted afterwards, is able, as long as that water lasts, to make them run abundantly in Winter, leaving them dry when it ceases in Summer.

As for the Countries where it rains not at all, there are but few of them in the World. The *Torrid Zone* (where that may be more true than any where else) is a Climat abundantly moistned with Rains twice a year, and it may be more than these Northern Countries, at least in greater plenty at certain Seasons. But if there should be any Countries where no Rain at all should fall, that will not hinder the running of Rivers there, because they may have their sources in other Countries where it rains, as the *Nile* in *Egypt*, where it rains not.

A Letter of the Ingenious Mr. Jeffop of Broomha' in York-shire, containing a further account of Damps in Mines, promised in Numb. 117. of these Tracts.

S I R,

IN order to give Mr. Boyle and you some satisfaction to your last Letter, I went to *Wingersworth* this last week: That which I saw was little, because a great part of the Pit was filled up; but I found two of the Colliars in the Pits adjoining, who had been scorched