

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. Jessop 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

scorched by the *fulminating damp* (the marks of which they yet carried in their hands and faces;) and from them I received the greatest part of my information.

The shaft of the Coal-pit is about fifteen yards deep; the Soyl a stiff mire, shaly about the middle of the shaft, dry at the bottom (as they say, though I observed some moisture about the middle) and without any quarry of stone; the stones in the field about it are grit-stone: It lies almost at the bottom of a rising ground, being incompass'd with Hills on all sides, except towards the East, or rather Southeast.

There are three Pits which lye almost in a direct line, the middlemost of which is that we speak of. There is also a fourth, which stands a little higher than the rest: They lye in this figure;

From the bottom run four Binks, as they call them; four yards wide, and forty yards long, except that in which they met the fiery damp, which wants four or five yards of its due length.

The Bink in which the damp is, is the farthest from the Air, which is communicated from the other Pits.

The Soyl of this Bink (as they tell me) is a stiff clay; neither can they find in it the sign of any Mineral, except Coal and Shale. The Coal, they say, is absolutely free from the *Pyrites*, with which most of our Coals are infected.

The Bink in which the damp is, was wrought forward twenty yards on *Whitson*-monday last, when *George Michell* (one of my informers) going in to fetch some of his tools with a Candle in his hand, and coming within four or five yards of the further end, found himself (on a suddain he knew not how) environed with flames. His face, his hands, his hair, and a great part of his cloaths were very much burnt: He heard very little noise, although one *Edward Michell*, who was working at the same time in another Bink, told me, That both he and those that stood above ground, heard a very great one, like a clap of thunder, and that the Earth shaked; so that he was affraid the roof would have falln in, and buried him.

This being the first accident of this nature, those without ran, in a great amazement, with their candles in their hands, to see what the matter was; which were twice extinguished, but held in upon the third lighting: They saw nothing, but met with an intolerable stench of brimstone, and an heat as scalding as an Oven

half heated (for that was their expression ;) which forced them very speedily to quit the place.

Notwithstanding this, they wrought forwards for about three weeks, and carried it on to betwixt thirty and forty yards, until one *Henry Turnelly* met with the same accident, which had formerly befallen *Michell*, and *Michell* had also the misfortune to have his share in this: For, being by chance under ground, at the mouth of the Bink, he was shot forth for about two or three yards, and had his head broken, and his body bruised against the further side.

About a week after, *Edward Michell*, another of my informers, adventuring in again, met with the same misfortune, and was worse scorched than any of the rest.

The things I chiefly took notice of, were these :

1. That those who were in the Bink whilst it was fired, never heard any more noise than that which is usually made by a flash of Gun-powder in the open air, although those in the other Binks, and out, heard a very great one.

2. It shot off the Turne at the mouth of the Pit, and small Coals with other rubbish from the bottom, into the air to a considerable height.

3. They could perceive no smell before the fire, but afterwards a very strong smell of brimstone.

4. They used to go with their candles low, as neer as could be to the bottom, because they perceived the vapour to lye towards the roof; which, if they held their candles higher than ordinary, they could see descend like a black mist, and catch hold of the flame, lengthning it to two or three handfulls; which would nevertheless burn after the usual manner without any further mischief, if they suddainly held down their hands close to the ground.

5. The flame would continue in the Vault for two or three minutes after the crack: The last time, which was the most violent, they thought it continued for about half a quarter of an hour.

6. The colour of the flame was blew, and very bright, something inclining towards green.

7. Although they told me, they were sensible of no smell before the kindling of the Vapour; yet the Colliers cloaths, that worked in the adjoining Pits, smelt very strong of brimstone; which makes me suspect all the Pits to be infected, although the air secures them from mischief. Their insensibility I ascribe to custome.

To your *Quære's** I answer as followeth: * What most of these *Quære's* were, suggested by Mr. Boyle, may be easily collected from the Answers.

To the *first* and *second*: That damps are most generally observed to come about the latter end of *May*, and to continue during the heat of Summer; and in those places, which have damps all the year long, yet they observe them to be most violent at that season: And I could meet with no other certain rule for any periodical returns except this Annual; although it be certain, they do often return in the same Summer.

To the *third*: I never heard of damps that kindled of themselves, although I have been told, that in some places they have been kindled by the motion of the Sled, in which they draw their Coals.

To the *fourth*, *fifth*, and *sixth*||: I can say nothing, because the Pits were stopt; but I rather suspect it to be a sluggish vapour resting in the Vault, than otherwise, because the motion of the air cures it not only here, but in other places.

|| These three *Quære's* were;
1. Whether the fumes that come visibly out of the mouth of the Pit, will

be lighted by a candle or torch? 2. Whether, if a piece of a plate, or any other flat piece of clear copper, be held for a competent time over the mouth of the Pit when the fumes ascend, any blewish or greenish discoloration will be made on the surface of the Metall? 3. Whether a light body of a convenient shape, being tyed to a string, and held over the mouth of the Pit, will be carried up and down with a briskness that may argue an unusual wind, or current of vapours, coming from beneath?

To the *seventh*: Damps generally are held to be heavier than the Air; but this was manifestly lighter, for it lay towards the top of the Bink.

To the *eighth*: Upon the breaking of the fulminating damp there proceeded a dark smoak, of the smell and colour of that which proceeds from Gun-powder fired.

To the *ninth*: Many Damps are seen, but many also are not seen; which whether they be visible or no, is hard to tell. But I suppose, all would be visible, had we a convenient light to view them by, because, be they either thicker or thinner than the Air, that density or thinness will occasion a refraction, and that must needs render them visible.

To the *tenth*: Some Damps will quite extinguish all those fires that are let down into them, be they never so many successively, or never so great; and fire is observed to be so far from curing, that it often creates Damps in places not otherwise subject to them. In-

deed they are a present remedy, if you can so order them as by their help to make a circulation of the Air through the infested place, otherwise they do hurt; and those groves wherein they are forced to break their rocks by the help of great fires, are seldom free from Damps.

To the *eleventh*: Men usually work in places infested either by the fulminating or other Damps, after they suppose the Vapour spent.

To the *twelfth*: Damps are common both in dry and wet grounds; but I cannot tell in which most.

To the *thirteenth*: Damps are observed to be most pestilential, and to kill the suddainliest, that are in groves not stirred for many years; especially if such groves have formerly had great fires in them.

To the *fourteenth*: The general opinion of our workmen is, That there are some Damps which kill by reason of the noysome steam, and others merely by want of air: Which latter opinion I have heard disallowed by the more experienced sort. For they say, there is no grove that wants Air, be it never so deep; but the air stagnating in very deep groves or pits, the grosser parts must needs at length separate themselves by their own weight, and subsiding to the bottom, there corrupt, and consequently get malignant qualities, especially in the Summer time, when the Sun promotes the fermentation. Besides this, the standing Air being in a short time filled with the Vapours arising from mens bodies and the steams of candles, and passing so often through the lungs of the workmen, is quickly rendred unfit for that use (whatsoever it is) to which respiration is accommodated: And this they take to be the most frequent cause of ordinary Damps.

To the *fifteenth*: Damps will often follow the water, and particularly this sort of fiery damp, if I am rightly informed.

An Account of some Books.

I. *A Philosophical Discourse of EARTH, relating to the Improvement of it for Vegetation and the Propagation of Plants: By J. Evelyn Esq; Fellow of the R. Society.* London, printed for J. Martyn, Printer to the said Society. A. 1676, in octavo.

THis instructive and useful Discourse was presented by the Ingenious Author thereof to the *R. Society* in two Lectures, *viz.* April 19. and May 13. of this very Year.

In it he first describeth what he means by *Earth*; then endeavors