

*A Full Description, with the Use, of the new Contrivance for Raising-Water, propounded in the Phil. Transf. N<sup>o</sup>. 173; by Dr Papin, Fellow of the R. S.*

**T**Here being already six Months, since I did first propound a *new way for raising water*, printed since in the *Philosophical Transactions* of July 1685; and no body having yet unriddled it, I believe it would be needless to conceal it any longer; but will rather, according to my promise, give a full description of the whole contrivance; that the *R. S.* may be pleased to improve it, and that it may be made use of, by those who may have occasion for it.

Tab. 1. Fig. 4. *AA* is the great Tumbler, that must have some little hole in the bottom as *I*.

*ILL*. a slender Pipe hidden by the Chimney-Board *BB*, whereby the Tumbler *AA* hath communication with the Pump or bellows *MM*.

*MM*. some kind of Pump or Bellows well shut, and having no other aperture, but through the Pipe *ILL*. These are put in some secret place, where a body may play the same and not be seen.

*NN*, a slender Pipe, that makes a communication between the glass *AA*, and the crown *FF*; this Pipe reacheth near to the cover of the crown, that the water contain'd in it, may not run down by that aperture.

*EE* the factitious Corall hollow within, shut at the bottom, and open at the top.

*DDDD* two crooked Pipes, foddered to the sides of the Corall *EE*, so that the water running down the Corall, may spout out through the holes *DD*.

*OO* a pipe hidden in the Corall *EE*, passing through the

the bottom of the same, where it must be well soldered, and reaching near to the bottom of the Rock *CC*.

*PP* a Pipe to convey the water from the glass *GG* into the Rock *CC*; this Pipe is well soldered to the cover of the sayd Rock.

*Q* a valve working by a spring at the bottom of the Pipe *PP*, to keep the water, that gets in that way, from returning back.

*R* another valve at the top of the Pipe *OO*, that the water, getting up that way, may not fall through the same.

Now it is plain, that the Rock *CC*, being fill'd partly with water, and partly with *Air*; if we open the bellows *MM*, the *Air* from the Crown *FF*, must run through the Pipe *NN*, into the Tumbler *AA*: and thence through the Pipe *ILL*, into *MM* to fill the vacuity made therein: the *Air* in the Crown *FF* being thus rarified, gives liberty to the *Air* in the Rock *CC* to rarify too; by driving the water through the Pipe *OO*: the water being got up into the Crown *FF*, runs down the Corall *EE*, and through the crooked Pipes *DDD* spouts out at their upper apertures, and from the shells *HH*, falls upon the Rock *CC*: if we come afterwards to shutt the Bellows *MM*, the *Air* got into their vacuity, must run back into the Tumblers *AA*, and press upon the water at the top of the Rock *CC*: but the *Air* in the sayd Rock, having been rarified, its spring is not sufficient to resist this pressure, and so the water is forced into the sayd Rock through the Pipe *PP*: and by thus opening and shutting the Bellows *MM*, the water must constantly circulate by the ways aforesayd.

As for the uses, this way for raising water may be apply'd to, this I do conceive: the glasses, being meerly to conceal the secret, must be left out; and there

may be made severall receptacles above one another to receive the rais'd water, so as doth the Crown *FF*: and there should be as many bellows to communicate every one with one receptacle: these bellows should be moved by an *Axis*, so that when the first is open, the second should be shut; the third open, the fourth shut; and so forth alternatively; which may be easily done: by this means, the first or lowest receptacle would give the necessary supply of water to the second, the second to the third, the third to the fourth, &c. till the water would be rais'd to the intended height: such receptacles might easily be set twelve or fifteen foot above one another, and so but few of them might raise water to a considerable height, as well as ordinary *Pumps* do; but this new way would have this advantage, that in the ordinary pumps the strength to be applied lyeth near the water to be raised, but by this contrivance the stream of a River may be applied to draw water out of a mine far distant from it: by the same way the stream of the *Thames* might keep constant water works in *Windsor-Castle*, as easie almost as in the lowest fields: the River *Seine* might do the same at *S<sup>t</sup>. Germain*, and perhaps at *Versailles* too, notwithstanding the great distance: for it is to be observed, that the Pipes of communication between the bellows and Engine, being meerly for the conveying of the *Air*, which moves very swiftly, they may be slender enough, and so contain but a small quantity of *Air* to be rarified; and besides they will not be subject to burst or leak, since the pressure they bear, being all external to the Pipe, will rather strengthen then break the same: from whence it follows, that the say'd Pipes need not be strong, but may be made at very small charges. It is also to be observed, that those bellows, that are open, have the *Air* in them very much rarified, so that the outward *Air* lyeth heavy upon (to shut) them,

them, by which means the motion of the Engine must be helpt in lifting up the opposite bellows, that are to be opened: and this observation may answer the greatest difficulty that might be objected against this contrivance; so that I don't question, but this way for raising water, may on severall occasions be of a great advantage.

*As a farther Explication of the use of this contrivance, see Tab. 3. Fig. 2.*

*AB. AB.* Are several Receptacles set above one another, which must be well shutt and soddered every where.

*CDD. CDD.* Are two slender Pipes, whereby the first and third receptacles have a communication with the Pump *HH*.

*EFF. EFF.* Two other slender Pipes, whereby the second and fourth receptacles have a communication with the Pump *II*.

*HH. II.* Two Pumps whose plugs are so moved by the *Axis LL*, that when one goeth down the other goeth up.

*MM.* A wheel fastened to the *Axis LL*, that it may be moved by the Stream of a River.

*NO. P Q. NO. P Q.* Are big Pipes for the water to go up, from a lower into a higher receptacle.

*O. Q. O. Q.* Are Valves fitted to the top of the fore-said Pipes, that the water may not go down through the same.

Now it is plain that when the Plug in the Pump *HH* is going up, the *Air* comes in through the Pipes *CDD*, and so it is rarified in the first and third receptacles marked *AA*: and by that means the water may be driven up into the said receptacles through the Pipes *NO*. because at the same time the Plug in the Pump *II* going down, causeth the *Air* to return to its ordinary pressure in the second and fourth receptacles, that it may be able to drive up the water through  
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the said Pipes *NO*, and the lowest Pipe draws the water that lyes open to the *Air*. By the same reason when the Plug in the Pump *II* goeth up, the *Air* must come in through the Pipes *EFF*: and so it is rarified in the second and fourth receptacles marked *BB*, and by that means the water may be driven up into the said Receptacles through the Pipes *PQ*. *PQ*. because at the same time the Plug in the Pump *HH* going down, causes the *Air* to return to its ordinary pressure in the first and third receptacles, so that it is able to drive up the water through the said Pipes *PQ*.

*A Letter from Mr William Cole of Bristol, to the Phil. Society of Oxford; containing his Observations on the Purple Fish.*

GENTLEMEN,

**T**Here being many Naturall things, which I have formerly, and of late, happily found in the South and West parts of *England*, not (as I can find) published by any *Author*; besides many more, which have been discovered by the industrious exquifitions of divers ingenious and curious Searchers of Nature; (as also others which were before thought to be *Exotiques*;) I have reason to believe, that there are very many more (for encouragement of such Inquirers) yet undiscovered in this our Native Country. Among others, that of the *Purple-Fish*, which I found the last Winter, on the *Sea Coasts*

*Philosoph. Transact. Numb. 178.*

*Tab. 3.*

