

The Nineteenth Book Of Natural Magick

The Proeme

I have spoken concerning light and heavy, now follow experiments by wind. For these seem to follow the reasons of mathematics, and of the air, and water, and a philosopher who seeks, to find things profitable, and admirable for man's use, must insist on these things, contemplate and search them out, in no thing does the majesty of Nature shine forth more. There are extant the famous monuments of the most learned Heron of Alexandria, concerning wind instruments, I will add some that are new, to give an occasion to search out greater matters.

Chapter I

"Whether material Statues may speak by any artificial way."

have read that in some cities there was a colossus of Brass, placed on a might high pillar, which in violent tempests of wind from the nether parts, received a great blast, that was carried from the mouth to a trumpet, that it blew strongly, or else sounded some other instrument, which I believe to have been easy, because I have seen the like. Also, I read in many men of great authority, that Albertus Magnus made a head that speaks. Yet to speak the truth, I give little credit to that man, because all I made trial of from him, I found to be false, but what he took from other men. Some say that Albertus by astrological elections of times, did perform this wonder thing. But I wonder how learned men could be so deceived, for they know the stars have no such forces. Some think he did it by Magick Arts. And this I credit least of all, since there is not man that possess himself to know those arts but impostors and mountebanks, while they cheat ignorant men and simple women. Nor do I think that the Godly man would possess ungodly arts. But I suppose it may be done by wind. We see that the voice of a sound, will be conveyed entire through the air, and that not in an instant, but by degrees in time. We see that Brass guns, which by the force of Gunpowder, make a mighty noise, if they be a mile off, yet we see the flame much before we hear the sound. So handguns make a report, that comes at a great distance to us, but some minutes of time are required for it, for that is the nature of sounds. Wherefore sounds go with them, and are entire without interruption, unless they break upon some place. The Echo proves this, for it strikes whole against a wall, and so rebounds back, and is reflected as a beam of the sun. Moreover, as I said in this work, words and voices go united together, and are carried very far entire, as they are spoken at first. These therefore being laid down for true grounds; If any man shall make leaden pipes exceeding long, two or three hundred paces long (as I have tried) and shall speak in them some or many words, they will be carried true through those pipes and be heard at the other end, as they came from the speaker's mouth. Wherefore if that voice goes with time, and hold entire, if an man as the words are spoken shall stop the end of the pipe, and that is at the other end shall do the like, the voice may be intercepted in the middle, and be shut up as in a prison. And when the mouth is opened, the voice will come forth, as out of his mouth that spoke it. But because such long pipes cannot be made without trouble, they may be bent up and down like a trumpet, that a long pipe may be kept in a small place. And when the mouth is open, the words may be understood. I am now upon trial of it. If before my book be printed the business is take effect, I will set it down, if not, if God please, I shall write elsewhere.

Chapter II

"Of Instruments Musical made with water."

Old water instruments were of great esteem. But in our days the use is worn out. Yet we read that Nero too such delight in them, that when his life and empire were in danger, among the seditions of soldiers and commanders, and all was in imminent danger, he would not forsake the care of them, and pleasure he took in them. Vitruvius teaches us how they were made, but so obscurely and mystically, that what he says is very little understood. I have tried this by many and sundry ways, by mingling air with water, which placing in the end of a pipe, or in my mouth, were the breath of the mouth strikes against the air. And though this made a pleasant noise, yet it kept no tune. For while the water bubbles, and trembles or warbles like a nightingale, the voice is changed in diverse tunes, one note is sweet and pleasant, two, squeal and jar. But this way it will make a warbling sound and keep the tune. Let there be made a Brass bottomed chest for the organ, wherein the wind must be carried. Let it be half full of water. Let the wind be made by bellows, or some such way that must run through a neck under the waters. But the spirit that breaks forth of the middle of the water, is excluded into the empty place. When therefore by touching of the keys, the stops of the mouths of the pipes are opened, the trembling wind coming into the pipes, makes very pleasant trembling sounds, which I have tried and found to be true.

Chapter III

"Of some Experiments by Wind-Instruments,"

Now will I proceed to the like wind-instruments, but of diverse sorts that arise by reason of the air, and I shall show how it is dilated, contracted, rarefied by fire, condensed by cold. If you will,

"That a vessel turned downwards shall draw in the water,"

Do thus. Make a vessel with a very long neck. The longer it is, the greater wonder it will seem to be. Let it be of transparent glass, that you may see the water running up. Fill this with boiling water, and when it is very hot, or setting the bottom of it to the fire, that it may not presently wax cold, the mouth being turned downwards that it may touch the water, it will suck it all in. So such as search out the nature of things say, that by the sun beams the water is drawn up, from the concave places of the earth to the tops of mountains, where fountains come forth. And no small arts arise from thins, for wind instruments, as Heron affirms. Vitruvius speaks the like concerning the origin of wind. But now it is come to be used for houses. So so may be made,

"A Vessel to cast forth wind."

You may make Brass bowls, or of some other matter. Let them be hollow, and round, with a very small hole in the middle, that the water is put in. If this be hard, use the former experiment. When this is set at the fire it grows hot, and being it has no other vent, it will blow strongly from the hole. But the blast will be moist and thick, and of an ill favor. You may also make,

"A vessel that shall cast forth water,"

There is carried about with us a Glass vessel, made pyramidal, with a very narrow long mouth, with which it casts water very far off. That it may draw water, suck out the air with your mouth, as much as you can, and presently thrust the mouth into the water, for it will draw the water into it, do so until a third part of it be filled with water. When you will spout the water far off, fill the vessel with air, blowing into it as hard as you can. Presently take it from your mouth, and incline the mouth of the vessel, that the water may run to the mouth, and stop the air. And the air striving to break forth, will cast the water out a great way. But if you will without attraction of air, make water fly far with it, heat the bottom of the vessel a little. For the air being rarefied

seeks for more place, and striving to break forth, drives the water before it. Thus drunkards making a little hole in a vessel of wine, because the wine will not run out, the mouth being stopped. Whereby the air might enter, they will blow hard into that hole. Then as they leave off, the wine will come forth in as great quantity, as the air blown in was. Now I will show,

"How to make water ascend conveniently."

We can make water rise to the top of a tower. Let there be a Lead pipe that may come from the bottom to the top of the tower. And go down again from the top to the bottom as a conduit. Let one end stand in the water that we should desire to rise, the other end that must be longer and hang down lower, must be fastened into a vessel of wood or earth that it may take no air at all. Let it have a hole above the vessel, whereby the vessel may be filled with water, and then be stopped perfectly. Set a vessel on the top of the tower, as capacious as that beneath, and the Lead pipe now spoke of, must be fastened at one end of the vessel, and go forth at the other end, and must be in the upper part of the vessel, and let the pipe be divided in the middle, within the vessel. And where the pipe enters, and where the pipe goes out, they must be jointed, that they take no air. When we would have the water ascend, fill the vessel beneath with water, and stop it close that it take no air. Then opening the lower hole of the vessel, the water will run forth. For that part of water that runs out of the vessel, will cause as much to rise up at the other end by the other Lead pipe, and ascend above the tower. The water drawn forth is filled up again, and we may make our use of it, and the hole being stopped, the lower vessel may be filled again with water, and so doing we shall make the water ascend always. We may also,

"By heat alone make the water rise,"

Let there be a vessel above the tower, either of Brass, Clay, or Wood. Brass is best. Let there be a pipe in the middle of it, that may descend down to the water beneath, and be set under it, but fastened that it take no air. Let the vessel above be made hot by the sun, or fire, for the air that is contained in the vessel rarefies and breaths forth. Then we shall soon see the water rise into bubbles. When the sun is gone, and the vessel grows cold, the air is condensed, and because the air included cannot fill up the vacuity, the water is called in and ascends thither.

Chapter IV

"A description of water Hour-glasses, wherein wind or water-instruments for to show the hours are described."

The ancients had Hour-Dials made by water. And Water-Dials were usual and famous. Heron of Alexandria wrote a book of them, but they are lost. I have written a book of them, and that his part may not be deficient, I shall show two that are made by contraries, one by blowing in the air, the other by sucking it out. This shall be the first.

"A Water-Dial"

Take a vessel of Glass like a Urinal, it is described by the letters A B. On the top is A, where there is a very small hole, that the point of a needle can scarce enter it. At the bottom, near the mouth, let there be a staff, E F, that in the middle has a firm pillar going up to the very top of the vessel. Let the pillar be divided with the hour lines. Let there be also a wooden or earthen vessel G H, full of water. Upon the superficies of that water, place the glass vessel A B, that by its weight will press toward the bottom, but the air included within the vessel, keeps it from going down. Then open the little hole A, whereby the air going forth by degrees, the vessel will gradually descend also. Then make by another Dial, the marks on the staff C D which descending will afterwards show the hour marks. When therefore the vessel goes to the bottom of the wooden vessel, the Dial is done, and it is the last hour. But when you would have your Dial go again, you must have a crooked empty pipe, O K, the upper mouth K must be stopped with the finger K. So K being stopped with the finger, that the air may not enter, sink it under

the water, that it may come within the vessel A B. Then put your mouth to K, and blow into it, for that will raise the vessel upward, and it will come to its former place and work again. I shall also describe for my minds sake.

"Another Water-Dial,"

Contrary to the former, namely, by sucking in the air. Let there be a Glass vessel, like to a Urinal as I said A B, and being empty set fast on it the vessel C D, that it cannot sink down. Then fill it with water, as far as B. Let there be a hole near the top, E, wherefore sucking the air by the hole E, the water comes into the vessel A B. Let there be another very small hole, that the air may come in by degrees. And so much as there comes in air, so much water will go forth. On the supersicies of the vessel, make hour-lines that may show the hours marked, 1, 2, 3, etc. Or if you will let the still fastened to a Cork swim on the top of the water, and that will show the hours marked on the outside of the vessel.

Chapter V

"A description of Vessels casting forth water by reason of Air."

Now I will describe some fountains, or vessels, that by reason of air cast forth water. And though Heron ingeniously described some, yet will I set down some others that are artificially found out by me and other men. Here is described,

"A fountain that casts forth water by compressions of the air,"

Let there be a vessel of water-work close every where, A B, make a hole through the middle, and let a little pipe C D go up from the bottom of the water-work vessel D, so far from the bottom that the water may run forth. Upon the supersicies of the Tympanum let there be C a very little hole with a cover to it, or let it have as the Greeks call it, Smerismation, to shut and open it handsomely. And in the upper surface of the Tympanum, bore the basis quite through with a little pipe, which enters into the hollow of the Tympanum, and having in the hole beneath a broad piece of leather or brass, that the air coming in may not go back. Wherefore pour in water at E, that it may be three fingers above the bottom. Then blow in air as vehemently as you can. When it is well pressed in, shut the mouth. Then opening the mouth A, the water will fly up aloft, until the air be weak. I, at Venice, made a Tympanum with pipes of Glass, and when the water was cast forth very far, the Lord Estens much admired it, to see the water fly so high, and no visible thing to force it. I also made another place near this fountain, that let in light, and when the air was extenuated, so long as any light lasted the fountain threw out water, which was a thing of much admiration, and yet but little labor. To confirm this, there is,

"An artifice whereby a handgun may shoot a bullet without fire,"

For by the air only pressed is the blast made. Let there be a handgun that is made hollow and very smooth. Which may be done with a round instrument of Lead, and with Emril powder beaten, rubbing all the parts with it. Then you must have a round instrument that is exactly planed on all parts, that may perfectly go in at the mouth of the wind gun, and so fill it that no air may come forth. So this Lead bullet being put into the gun's mouth, and thrust down with great force and dexterity, then presently take away your hands (but you must first shut the little hole that is in the bottom of the hole). And the bullet and little stick will fall to the bottom, and by the violence of the air pressed together it will cast out the bullet a great way, and the stick too, which is very strange. Also I will make,

"A vessel, wherewith as you drink, the liquor shall be sprinkled about your face."

Make a vessel of Pewter, or Silver, like to a Urinal. Then make another vessel in the fashion of a tunnel, or a round pyramis.

Let their mouths be equal, and joined perfectly together, for they must be of the same breadth. Let the spire of it be distant from the bottom of the Urinal a fingers's breadth, and let it be open. Then pour water into the vessel, and fill the Urinal unto the hole of the spire end, and fill the tunnel to the top, and the rest of the Urinal will be empty, because the air has no place to get forth. When therefore any man drinks, when the water is drank up as far as the hole of the spire end, by the air pressed within, is the water thrust violently forth, and flies in the face of him that drinks. Also there is a vessel that no man can drink from, but he who knows the art. Make an earthen or metal vessel, in form of a bottle or Flagon, and make it full of holes from the neck to the middle of the belly. From the bottom let a pipe ascend by the handle of the vessel, and the handle being round about it, let it come above the brim of the vessel, empty. Under the handle in a place not seen, make a little hole, that any man holding the vessel by the handle, may with his finger stop and unstop this hole when he please. Under the brim of the vessel, where you set it to your mouth, let there be another secret hole. Then pour water into the vessel. If now any man put the bottle to his mouth, and raises it to drink, the water will run forth at the neck that is open, and at the belly. But he that knows the trick, taking the vessel by the handle, shuts the hole with his thumb, and not moving the vessel, he draws the air with his mouth, for the water follows the air, and so he drinks it all up. But if any man suck, and shut not the hole, the water will not follow.

Chapter VI

"That we may use the air in many arts."

We may use Air in many artifices, I shall set down some, that I may give a hint to others to invent more. And chiefly,

"How wind may be made in a chamber, that gusts may almost freeze,"

Make a deep pit, and put in a sufficient quantity of river or running water. Let the pit be close stopped. Only let a pipe convey it through the walls, that it may be brought into the chamber. Let the water be let down into the pit by a kind of tunnel, let the air should come forth at the place it goes in. By the water is the air of the pit expelled, and comes by the pipe into the chamber, that not only those that sleep there, but such as converse there become extremely cold, and benumbed. I will show,

"How Air may serve for Bellows,"

I saw this at Rome. Make a little cellar that is close on all sides. Pour in by a tunnel from above, a wuantity of water. On the top of the wall let there be a little hole, at which the air may break forth with violence. For it will come so forcibly, that it will kindle a fire, and serve for Bellows for Brass and Iron melting furnaces. The tunnel being so made, that when need is, it may be turned, and water may be put in.