

A Draught of the Streights of Gibraltar.

WITH

Some Observations upon the Currents thereunto
belonging.

By Captain Richard Bolland.

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WE weigh'd Anchor, out of *Tangier* Bay, near eight in the Morning, the Wind at S.S. West off the Shoar, very moderate; before Ten, the Tide of Ebb then setting to the Westward, had drove us down the length of *Jems* River, which having observ'd, that I might something more improve my judgment on the Tides and Currents in these parts, I then produc'd this Draught of the Streights Mouth of *Gibraltar*, which I had drawn sometime before; having often cross'd over from the one Shoar to the other, as also anchor'd several Boats, half a League distant from one another, that they have reach'd one third of the Channel over; having on Board of each of them, Watches for Time, Logs to inform the turning of the Tide, and several other Conveniences proper for those Observations; by which means, I gain'd some experience how the Tides set, their time and distance from the Shoar; as also where the Current, which has its constant Indraught into the Streights, if extremes of Wind occasion no alteration, does commence from the Tides. Having thus gather'd these Collections, I drew this Draught, as it is here demonstrated at large, and Calculated the Tables thereupon plac'd, which are for every Day in the Moon's age, that is, from Full to Change, and from the Change to the Full; so that looking upon these Tables, you are inform'd at all times, when the Tides flow to the Eastward, and Ebb to the Westward, upon both Shoars. Our Ship having thus drove contrary to our Course, that Day being the twelfth of the Moon's age, I consulted the Table for the Offing upon the *African* Shoar, that the Tide began

to flow to the Eastward at Ten a Clock, and 21 Min. By this time the Wind sprang up fresh Easterly, and increased so furiously, that we were forc'd to Reef our Top-sails, having now the advantage of the Tide; here the Current in the middle, as also the Tide upon the *Spanish* Shoar, which began that Day to flow to the Eastward, at 11 of the Clock and 16 Minutes. Thus happen'd the time so opportunely, that standing the nearer both the Shoars was the greater advantage, making no more than three Boards we weather'd the Easternmost Point of *Gibraltar* above two Leagues. Thus did we make a clear Experiment of the truth of these Tables and Draught. The same advantage may be made in turning out of the *Streights* with a *Westerly* Wind, only stopping the Tide of Flood, if Weather will permit. For want of Experience in the Tides and Currents here, this Age has produc'd but too many Examples of the loss both of Men of War, and of Merchant-men. I remember in the Year 1663, Sir *John Lawson*, in the *Resolution*, having been in the *Levant*, coming near to *Gibraltar* in the Night, the Current having set us over close on board the *Spanish* Shoar, we made the Highland of *Gibraltar*, for *Apos-Hill* upon the *Barbary* Shore, which had like to have prov'd of very dangerous consequence, our Course being right over the Low-land, which General *Blake* had intentions of cutting through, to have made an Island. Having heard many Disputes concerning Tydes and Currents, will here, in few words, give my Opinion of them. And first of Tydes, which as is observ'd, have a dependency upon the Motion, Increase, and Decrease of the Moon.

It flows in the Bay of *Tangier*, and so upon the *Barbary Shoar*, as far as *Apes-Hill*, *South-west* and by *South*, one quarter after two a Clock, Full and Change of the Moon, high Water. The *Moors* and *Spaniards*, upon each of their *Navy-Shores*, in the *Streights Mouth of Gibraltar*, thus account the Tydes. When the *Moon* appears in their Horizon upon her rising, the Tyde sets away to the *Westward*, and continues till her coming to the Meridian; which having passed, the Tyde begins to flow to the *Eastward*. I cannot be so positive in my Opinion as some are, that the Moon has an absolute Influence upon the Government of Tydes, and therefore shall lay down my Reasons with submission to better Judgments. If the *Moon's* attraction be so powerful upon the Waters, why do they not follow her motion round the World? At Prince *Rupert's Bay*, within three Leagues of *Apes-Hill*, in the *Streights Mouth of Gibraltar*, the Tyde rises perpendicular upon the Springs Nine Foot. At *Buccama*, upon the *Barbary Shore*, 20 Leagues to the *Eastward*, there's scarce any knowledge of a Tyde. So that in so short a distance, the *Moon's* influence upon the Water ceases. At *Cape Spartel*, which is the *Westermost* part of the *African Shoar*, it flows *South*, *South-west* a very strong Tyde. Five or six Leagues *West*, *South-West* into the Sea, there is no appearance of either Ebbing or Flowing. So that here to the *Westward* into the Ocean, as also to the *Eastward* mentioned before, in the *Mediterranean*; the Waters have no dependance upon the *Moon*. These Demonstrations, with many others which might be laid down, induce me to the Opinion, That the *Moon's* Change, Full, and Quarter, as also her Motion, are particular Signs to inform our Judgments, rather than of any Power she has on the Waters, or their dependance on her. The great Master of Philosophy drowned himself, because he could not apprehend the Cause of Tydes; but his Example cannot be so prevalent with all, as to put a Period to other Mens Inquiries into this Subject. I hope it will be allow'd that a Sailor, by his Experience in this Age, may better know the shifting of Tydes in several Parts than *Aristotle*, tho' not the Cause; which since no Man has attain'd to, but only conjectural Notions, I hope mine will be the more excusable. The Holy Writ mentions a Chaos, or first Matter, which was a confusion or disorder'd Mass of all the Elements, wherein God Almighty

divided the Earth from the Water, which Division naturally put the Waters in motion by a Reverse, or Retreat from their first Position. After that, the Earth was made dry Land, the Waters return'd to seek their former Place, and to claim their Dominion over the more solid and consistent Bodies; by which ambition they rais'd themselves up to the High-water-mark, where they were restrained and bound by the Heavenly Power; so that being able to advance no higher, they return'd to the Ebbing; and ever since it might be God Almighty's Providential Will, for the convenience of Man, to continue the same motion of the Water. I have no other Reason or Apology to make for this my Opinion, than that in most parts of the known World, the Waters have the strength of their Motion near to the Shoars, and at Sea scarce any thing at all but what is occasion'd by Winds. Which brings me to the Course of Currents, that have no dependency upon the Moon, having observe principally three sorts of Currents or Streams, occasioned by a Trade Wind the indraught of Bays, as that of *Biscay* and the Gulph of *Lions*; a forceable Stream betwixt two High Lands coming from the Ocean, as the Current proceeding from the *Streights Mouth of Gibraltar*, where in the middle part (demonstrated upon the Draught between the two Lines *MM*) The Current has its continual passage into the *Mediterranean*, if not alter'd by some extream of Weather. And altho' I know some are of a contrary Opinion, yet there is nothing that resembles Truth more, than Demonstration upon Matter of Fact. In Nine Years that I have liv'd and sail'd from *Tangier*, I did never see any Ships in the middle of the *Streights*, happening then to be calm, or little Wind, but was infallibly driven in, if she could not reach the side of Ebb upon neither Shoar. This, I suppose may be sufficient to demonstrate that there is a vast Sluce of Water hurry'd into the *Streights*. At *Constantinople* out of the *Black-Sea*, it runs into the *Mediterranean* a forcible Stream, and many large Rivers fall into the same Seas. The Question is, what becomes of all this Water? The Tydes flow Six Hours, and Ebb the same space, so that probably they return what they bring in; the Earth no doubt, on all Shoars, does drink in and is moisten'd by the Sea; the Sun has its attractive influence on the Waters; I have often

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Bolland. served at Sea, where the strength of the Exhalation has happen'd (tho there was not one breath of Wind,) that it was dangerous to come near that part with a Boat; and on the contrary, when the Clouds have been over-charg'd or loaden, they have broken out, and fallen violently down; which we commonly call Spouts. But all these cannot near reach the Water that sets unto the *Mediterranean*, so that there must necessarily be some Evacuation; and it seems most reasonable, that as

the *Streights* Mouth of *Gibraltar* has its continual Indraught aloft, so the superficial part thereof may have its recourse back again below. To know the certainty of this, it were but stopping with a Stream-Anchor in the middle of the *Streights*; possibly it may require 300 or 400 Fathom Warp: Your Ship being brought up, the Current running strongly to the *Eastward*, brings it to Wind-head to the *Westward*.

The Description of the Sounding-Boat for Currents.

THEN having the Lead, which I have made, as the Draught here demonstrates with Springs in the inward part, a Bladder hook'd upon the outside, which has a dependency upon those Springs, so that the Lead striking the Ground, off flies the Bladder from the Lead, and all the way in its rising to the Superficies of the Water, it is drove which way soever the Current does set, your Ship being stopp'd by her Anchor, if the Current set out of the *Streights* below, then will the Bladder rise a-head of the Ship, contrary to the Current aloft. Now where your Ship is Anchor'd in 300 Fathom water, I will suppose it flows into the *Streights* 100 Fathom deep, from the Surface, and from that 200 Fathom to the bottom, it runs out to the *Westward*. To know the certainty of this, or what depth it sets contrary, I have here drawn the Draught of a Square Dragg-Sail at the Boats Bow, with Weights of Lead, at the lower part,

to depress the Sail downward; so turning the Boat loose you lower the Sail unto the Water, and which way soever the Stream runs, it will draw along the Boat. If it returns out of the *Mediterranean* at 100 Fathoms deep, the Sail being lower'd to that, then it will not fail of Dragging your Boat contrary to the Current aloft. Thus might the Experiment be made to the satisfaction of the curious.

The sounding Boat for Currents in the Draught No. 2, there is the form of a Sail mark'd G, which has two Yards, one aloft, the other below; by which means, if my Judgment fails me not, it will stand so fair, as to keep full within less than three Points of the Compass. In the Hold of the same Boat mark'd F, I have form'd a sort of work, which gives a true Account of the Boats way by her Motion, hoping it may prove of general use, more in particular unto Draughts-men, whose care ought to be in laying down Capes, and Head-lands, exactly to the distance.