AN OUTLINE SKETCH

OF THE

CHARACTER OF WATER,

AND

ITS NATURAL MOVEMENTS.

THE IMPORTANT DISCOVERY

OF

THE TRUE FORM FOR A VESSEL;

CREATING AN ERA

IN THE HISTORY OF NAVIGATION.

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INTRODUCTORY.

Nautical men, and others, in various parts of the world, have ever been seeking the true form for a vessel, but as yet they have not discovered it, for it is still sought for. As it is the form that is wanted, men have confined themselves to an experimental study of the form alone, seeking by altering and improving it to attain their object. This certainly is a wrong method of procedure, for it is obvious to all, that as our ability to move in vessels is derived from the character of water, and as the resistance we encounter comes from it, the only proper way to proceed is to learn its character, laws and movements and then form the vessel intelligently, in such a way, as will secure the best results.

Having myself pursued this course and learned its character and what the form should be, I in this way present the knowledge gained to the public for their consideration and acceptance, and I request the reader's careful attention to what is written.

THE MECHANISM OF WATER.

Water, in quantity, is composed of invisible globes which range themselves in perpendicular columns resting on the bottom under them. While water to the eye appears so compact as to form a solid mass, these globes are nevertheless each and every one separate from every other one, giving them the power to move freely among other globes without friction. In this statement we have the mechanical construction of water, and it certainly is not difficult to understand. The man who refuses to accept of it because he cannot see the invisible, need not, he being one of those who will not know if they can prevent it.

THE MOVEMENTS OF WATER.

This mechanism gives to water the character and movements it has, which are those and those only that we would expect from such a construction. First, we have the balancing of these columns which gives water a perpendicular or vertical movement in line with them. Next we have a horizontal movement as we see in tides and currents which is caused by the globes of water, (ranged as they are in columns,) being pliable, causing each and every globe to give out at all times a horizontal pressure exactly equaling the weight resting on them. In tides and currents, the water is more elevated at one point than it is at another, there is a slight descent to its surface producing a proportionate shortening of the columns of globes that compose it. As each globe in every column gives out a horizontal pressure corresponding to the weight on it, the globes in the more elevated columns have in horizontal lines a greater pressure than the globes in the columns less elevated, and consequently they press more forcibly and drive before them in a tide or current all the water that in horizontal lines has a less pressure. Although I find it difficult to state this clearly, it certainly is not so difficult to understand it, and as it is worth knowing, I trust the reader will understand it, for in it we have the secret of the power that moves such vast quantities of water up and down our rivers in tides, and the secret of the power that moves the water from before a vessel's path and places it behind her.

Beside the above mentioned well known movements, the wave motion causes the water from the surface to the bottom to gyrate in circles, corresponding to its size and form, which in giving form to a sea-going vessel should be considered if we would build her so that the ocean wave could never harm her.

THE BOTTOM CONSIDERED.

In connection with these movements, we must not overlook, or disregard, the important fact that the bottom on which the water rests, is the fulcrum of its power and the base of its movements. Or the fact that when we use a vessel as a lever to move it, that the bottom under her, no matter how far off it may be, supports her weight, and is the point where the fulcrum power to move water is obtained.

EXISTING FORMS FAULTY.

Hitherto we have formed vessels without taking into consideration these important features, and the result has been very different from what it would had we done so. Our forms being wedge-like, when they move quickly much of the water is ploughed upward and pressed away to the side in waves, which is a mistake, as we will clearly see when we look at it from a more intelligent stand point than we hitherto have had, for we are thus driving from our control the very water that is needed to help clear the vessel's path, and needed to fill in behind her. That we are working against ourselves, and in opposition to nature's laws, is evidenced by the well-known fact, that as we increase the driving power, and more water is ploughed up, the speed rapidly becomes disproportionate to the power exerted, and if excessive power be used, the speed will be thereby actually reduced, and so great a power can be applied, and so much water can be ploughed up that the vessel will refuse to proceed.

The fact is, we have had, and now have, an improper form, we have thrown away upon it much power without getting in return an equivalent result, and we have been misled by it, and have formed an erroneous opinion in regard to the speed attainable by vessels moving in water. To form some idea of the power thrown away, consider that our best formed steamboats, when passing up our large rivers, set in motion every drop of water in them, and send powerful waves to dash violently against their shores.

HOW TO FORM A VESSEL.

To correct these faults in the form is not difficult, to obtain one that will move in accord with nature's laws requires no objectionable change, in fact, we may use substantially the same vessel. When intending to build, and having an approved model which represents a half section of the vessel to be constructed, all that is necessary is, instead of building from the model in the usual way, with the bows and rounded side outward, that we place these parts in solid contact amidships, and let the straight side of the model represent and be the model for the outer sides of the vessel.

ITS ADVANTAGES.

By placing the bows inward, and the straight sides outward, we get much greater stability, an important point, especially to sailing vessels. And we have all the water that is in the vessel's path, and which must be moved by her, where it is perfectly under our control. We have it between the lever and the fulcrum, or the vessel and the bottom, where the power to move it is, and where we have the power to move it by the perpendicular and horizontal movements natural to water. We have it where all the power that is exerted will give its full equivalent of speed. Yes, we have it where we can put in force that first great charge given to man, to "Conquer the earth and subdue it."

EXAMPLES TO SHOW ITS WORKING.

We may obtain an idea of the practical working of such a form from the tidal movement. When it is one hour's flood at New York and the tide has risen eight inches, it is low water at a point on the Hudson, twenty-four miles distant. Thus there is a fall to the water of one inch in three miles, which fall, slight as it is, owing to the globular columnar construction of water, globe pressing against globe, and column pressing against column, is sufficient to create a current of three miles an hour. The deeper the water is, the longer the columns are, the more rapid is the current, as it should be, this being its construction.

To apply this to a vessel, suppose a steam boat built on this principle to be 300 feet long, and suppose by driving her ahead the water is elevated two inches more at the bow than it is at the stern, then we have a descent to its surface of two inches in 300 feet, which, being one hundred times greater angle than is the fall of one inch in three miles, must act more powerfully on the water under the vessel to drive it, as in a tide, in a swifter current sternward.

We can at any time see, when vessels are moving at a moderate speed, the large quantity of water before them strangely disappear without increasing in any degree the volume alongside. To account for this, we must understand that there is a sternward current of all the water under them, which is sufficiently rapid to draw this water from the bow, convey it under the bottom, and place it again on the surface at the stern.

Again, suppose the vessel to draw five feet of water, and to be moving in water that is forty feet deep, a sternward current under her of three miles an hour would clear a channel for her passage at the rate of twenty-one miles an hour. If the speed of this current be doubled, then the channel would be cleared twice as fast, and the boat would move with twice the speed. Or what is the same, a current of three miles, in twice the depth of water, would double the speed. Thus we may see how power applied to such a form would act on the water, and see that it is advantageous to have a considerable depth of water. We can see that, unless in shallow water, it would be impossible to elevate the water between the bows to any injurious extent, because every inch it is elevated increases the speed of the sternward current, which is clearing the way for a more rapid passage of the vessel.

MASTS FOR SAILING VESSELS.

This form of vessel may be thought unsuitable for sailing vessels, because the masts cannot be stepped in every case, in the usual way, below the decks. To answer this objection, I remark that they can be stepped in a socket on deck, which any man of sound judgment must see, is a very much better plan. As a spar cannot break, unless it first be bent to the breaking point, it follows that the right way to proceed to break a mast is to bind one end firmly, as we do, when it is stepped below deck, and then rig it so that it may bend sufficiently to break. If, however, we want to secure it so that it will be next to impossible to break it, we must step it loosely in a socket on deck, and then rig in the usual way. As no stretching of the rigging would have any effect to bend this mast it could not break. It is common sense that a very much smaller mast would be more reliable if stepped on deck.

OCEAN NAVIGATION.

My previous remarks have had reference to inland navigation only, where a form corresponding with the perpendicular and horizontal movements natural to water is all that is needed. When, however, we would construct a form for ocean navigation, we must, as a first consideration, have a regard to the powerful movement given to water by the ocean wave. It has never had a proper consideration, and consequently vessels have imperfect forms that are more or less unseaworthy. The dangers of the sea is looked upon as something beyond man's power to overcome, when the fact is the sea would be as harmless as the river, if the form was what it should be.

The water, under the influence of the wave, gyrates in circles, as I have said, and when influenced by a storm, the whirling motion imparted to it clothes it with a mighty power. This movement is perfectly harmless unless interfered with. In a properly formed vessel no harm would come from it, but let a form be such, that it interferes with it when it is clothed with power, and it will leap and strike it with a terrific force, destroying everything in its way. To overcome this evil, all that is necessary is that a vessel's form be beveled under from the water line downward, so that the roll of the wave will not be interfered with. While a perpendicular form invites destruction, a beveled one secures safety. It is proper to remark in this connection, that perpendicular forms are largely protected by the motion they impart to the water when going rapidly forward, or by the drift water when hove to.

THE HEAD SEA CONSIDERED.

A head sea is considered to be a great evil, hindering progress and doing damage. Much of this is not true, and it is bad seamanship to blame the wave when the fault is in the form of the vessel. To contend with this so-called evil vessels are constructed with lofty, bulky bows, which when plunged swiftly deep into a head sea, encounter a pressure that causes the vessel to stagger and tremble with the strain, and if she was not stopped would soon destroy her. The wave is blamed for this, when the fault is entirely in the bulky bow, that this is so, is plain, for if the bow above the water line was removed, she could plunge continuously and violently without the slightest increase of strain, or without encountering the least detention.

To correct this fault to construct a sea-going vessel on right principles, we should discriminate between the actual vessel in contact with the water and the structure raised upon it. The actual vessel should be formed so that the bows and stern for a proper distance would be but little above the water line, say three or four feet, and should be formed so that they could pierce the wave, or be washed by it without much increase of pressure, or possibility of damage. At a proper distance from the bow and stern the upper structure could be erected where it would not be a source of injury, and where it would be out of the reach of harm. Then the head sea would cease to have the damage doing character it now has, then vessels would pitch much less and could go forward rapidly unharmed. We should remember that we cannot conquer the wave by bulk in the vessel, for bulk above water is the very thing that gives it power to do damage.

In closing, I remark that while I would not recommend the adoption of the form mentioned in these pages to sea-going vessels that have lofty bows and high sterns, I would most earnestly recommend its application to forms of vessels such as I have indicated, FORMS THAT WOULD BE IN FULL ACCORD WITH THE THREE WELL KNOWN MOVEMENTS IN WATER.

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