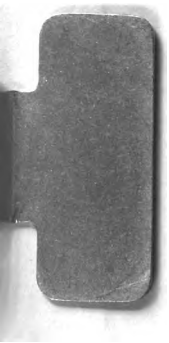

ERRATA.

Page 27. 8th. line from top, for "when they were *laden*" read, when they were *discharged*.

Page 70. 9th. line from top, for "*boat* on the Serpentine" read, *model* on the Serpentine.

THE

PROBLEM, ETC.


THE
PROBLEM

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PROBLEM;

ITS ORIGIN AND DEVELOPMENT,

WITH A BRIEF SKETCH OF

THE LIFE OF THE INVENTOR,

DURING A THIRTEEN YEARS' RESIDENCE IN INDIA AND CHINA.

THE PROBLEM.

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MDCCCXLIII.

THE PROBLEM.

READER,

As you are aware there is a charm in a "name," particularly if it be a well known and agreeable one; my reason for calling this book "The Problem," is not only because it is agreeable to pronounce, but because it signifies, "A question proposed for solution." For as the contents of the following leaves may only be considered a question proposed, but not yet thoroughly solved; it appears to me that the name I have chosen is one quite appropriate. That is, however, for you and not for me to decide. I will therefore leave it with your better judgment, wishing you to thrust all that is not tangible beyond the

bounds of time and space (if possible), and trusting, if any thing within the circle can be adopted for beneficial purposes, only such will be looked upon as subjects fit for discussion. As my object in conducting this little work will be brevity and perspicuity, at the same time to communicate all I possibly can within a limited compass, it will be understood that days, dates, and other unnecessary appendages, will not be very carefully attended to, as at present I am writing principally from recollection, not having kept any diary of my past life. "I shall endeavour, however, not to spin my yarn too hard, for fear of weakening its strength, but rather keep within the mark, so that hereafter, if necessity require it, I may again have it in my power to give the yarn another twist."

There being little doubt but many of my readers would wish to know how such an idea could enter my head, as to build and rig a sailing vessel upon the principle of my problem, capsizing, as it appears, so many old notions of

ship building and rigging entirely, I shall give a brief outline how I progressed in raising the structure, after the idea of improving the rig of sailing vessels had struck me. I shall also endeavour to show, by description and diagrams, how very simple the whole plan in reality is, and how very easy others may understand it if they are desirous of so doing.

I shall also intermingle in my narrative a brief sketch of my origin and travels, with occasional hints, as to what appear to have been the predominant features in my character. And I shall give also an account of the different trading vessels I have sailed in, and other necessary circumstances, so that you may be the better able to judge why I should have prosecuted an idea with such unvarying perseverance, battling against the stern prejudices of a world single-handed, and after having been several times repulsed by the very heads of governments.

I shall likewise endeavour to show the various advantages to be gained from my method of building and rigging sailing vessels, chiefly adapted for pleasure yachts, and teaching naval tactics; and the very simple manner in which the *new rig* is worked. Although if I should be able to convince you as to what I have just stated, I believe you will still think it must be quite a *new rig* of mine to attempt the field for literary fame.

Presuming my readers are well enough acquainted with the histories of indigent inventors, whose over-sanguine hopes are so often dashed from the very pinnacle (as they suppose) of their ambition, down to the lowest gulfs of keen and bitter disappointments, I shall not here trouble you with an account of what were the various degrees of temperature at which my feelings ranged, whilst under the influence of sometimes elevated and at other times depressed circumstances. Nevertheless, it may not be amiss to say, that I believe my disposition of

mind has been, the greatest part of my life, as happy as many of my predecessors in the inventive line.

The greatest difficulties I have had to encounter in bringing forward this invention have been, with few exceptions, strong head currents of prejudice and baffling winds of jealousy, and several times I was nearly laid on my beam ends for want of proper ballast. Fortune, however, willed it that I was not to become a total wreck; so that what with occasionally a few favourable breezes and the improved facilities of my principle for backing, filling, and manœuvring in a very small compass; laying close to the wind when it blows hard and being weatherly at the same time, "The Problem" has been gaining ground against hurricanes of prejudice and torrents of jealousy, whilst many other vessels would have fallen dead to leeward.

I was convinced in my own mind there was a possibility of weathering the point I was trying to

double. I carried on all possible sail when weather permitted, taking every advantage of the various shifts of winds that would lead me nearest to my course and keep me clear of danger. In squally weather I reduced and set sail with that expedition which is necessary in squally latitudes. If there was a clear passage on any part of the coasts where I happened to be, or if the currents were not so strong against me as they were in the greatest streams, I tried to find them out, that I might make the more head way. A good look out ahead was always kept when dangers were apprehended, and soundings were punctually attended to when shoals were in the neighbourhood. When a gloomy aspect overcast the horizon, boding an approaching storm, sail was immediately reduced, and all made snug, so as to withstand the mighty contest. Never would I bear up so long as I could carry a stitch of canvass to the breeze, and hold on what I had gained; and when it did happen, from the overpowering influence of my opposers, that I fell to leeward, still I hung at it as long as

my tackling and stores held out and I had plenty of sea-room to drift in: trusting always that the storm would soon subside, and be succeeded by a favourable shift of wind.

If by an unforeseen occurrence, either from thickness of weather, darkness, or erroneous observations, I happened to overrun my distance and get into a strait or other narrow channel, where were hidden dangers of which I was totally ignorant, they not being marked on my chart nor noticed by any directory; when so entangled I was always very cautious not to carry on too great a press of canvass, to keep a good look out from aloft, and have my anchors ready to let go in the first safe creek, harbour, or bay I could espy, until I had made a survey of my true position. Never did I remain at anchor in a wind bound port an hour after weather permitted me to weigh and proceed on the voyage of discovery in which I had fairly embarked. I never endangered my bark by carrying on from any feeling of bravado, nor would ever I let

run a haulyards until the moment it was requisite. It is a well known problem, that there are extremes in most things, and that a medium course is generally the best; such a course is the one I intend to pursue in writing the forthcoming pages, so until you have passed your judgment upon mine, adieu,

THE AUTHOR.

THE AUTHOR'S BRIEF ACCOUNT OF HIMSELF AND HIS INVENTIVE WANDERINGS.

My parents were both natives of Scotland, and belonged to a small burgh town, on the north side the Frith of Forth, called Kinghorn, where, in the year 1807, I was first introduced on the stage of life. My father at that time was thirty-eight years of age.

My grandfather by my mother's side had been a sailor in the merchant service. He died when I was eight years old; and my father's father, who was a sailing master in the royal navy, died some time before I was born; my father was also brought up in the navy, and had been several years a master's mate, acting lieutenant, during the French war. In 1803, after peace was proclaimed, he was ordered out to the West India station; but whether it was he did not consider his health sufficient for such a cruize, or as he was married, and liked better to be at home,

I never rightly heard; but he resigned his acting lieutenancy and went to reside at Kinghorn his native town, where he purchased the share of a large passage boat trading betwixt Pettycur* and Leith. In this situation he sailed skipper of the boat several years, till a company of gentlemen, designating themselves, "Trustees of the Fife and Mid Lothian Ferries," took a lease and monopolized the passage.

The consequence of this was that all those who had boats on the passage were obliged, either to dispose of them to the trustees, or to remove them from the station. The one my father had a share in was sold to them, and he was afterwards appointed superintendent's assistant, in which situation he remained, until his death in the year 1832.

During my boyhood, whilst at school, I was remarkable for being mischievous; being always amongst the first in school boys' pranks. I could learn my task quickly, but unless I was constantly in practice, it would just as soon be forgotten. The education I received in my youth was but very limited, never having exceeded the rule of three in arithmetic, plain reading, and writing, with a few months at a dancing, singing, and fiddling school. The last

* Pettycur is the name of a harbour belonging to Kinghorn, and is situated about half a mile to the westward.

mentioned part of my scholarship, as a matter of course, I attended to with much more pleasure than I did to any other tuition that was to be of incomparably more value to me.

I believe I possessed, in a high degree, all those finer feelings that are generally common to youth in an honourable point of view. I cannot recollect ever being beaten by any boy equal to me in size, although I have sometimes crowed over those who were half as big again as myself. With respect to my ideas in choosing a profession, there was none appeared in the same brilliant light as that of a sea-faring life. There I was to rise and be a warrior, and from a warrior I would be a conqueror, and as a conqueror I would make the very world ring with my name. Every thing connected with shipping was exaggerated in my active imagination, and oftentimes I wished that years would pass quicker by and mature me to be a sailor. So soon as I could lift an oar, and pull it, boat sailing often tempted me to play the truant from school. Climbing about the rigging of vessels in the harbour, and up on trees in the field, was also a favourite amusement, and not unfrequently I was noticed dancing about on the tops of houses, and at times standing on the crown of my head.

My father seeing the strong predilection I had for the sea, and being acquainted with a lieute-

nant Mitchell, who then commanded the Swinger gun brig, stationed on the north sea, watching over the herring fishery, he wrote requesting him to take me on board, thinking, very possibly, to get me on in the navy. At the age of fourteen, I was conveyed on board of the Swinger in her own boat, whilst she was boxing on and off Pittenweem. I was entered as supernumerary on the books as a third class boy, and sent to mess with the pilot. In working the ship I was stationed in the main-top to bear the backstays abaft, and abreast, together with other duties proper to the boy of a man-of-war gun brig.

Fifteen months after I had joined the Swinger, she was paid off at Deptford, when I returned to Kinghorn, with the intention of studying navigation; but before I got well through the geometrical and trigonometrical introduction to it, I became restless, and again wanted to be at sea. My father required me to wait patiently till lieutenant Mitchell had got another command, when I would again go with him; but as this appeared to be longer than my patience could bear, I went to Leith and there inquired for a situation as boy on board of any sort of a ship.

I soon got notice that a brig of 200 tons burden, belonging to Newcastle, wanted a lad. The

master of her agreed to take me if my friends consented, and my father being sent for, all was settled.

During the three years I belonged to this vessel, she was generally employed in the Baltic trade during the summer season, and in the coal trade, betwixt Shields and London, throughout the winter,—a trade in which, it is well known, many a seaman has learned a good practical knowledge how to manœuvre a sailing vessel in the most critical situations. After leaving the collier, I made a voyage up the Mediterranean as an ordinary seaman,* on board a small brig belonging to Kincardine.

My next voyage was from London to Bengal and China, on board a 1400 ton ship, as an able seaman. My station was in the main top. Having always been of a remarkably restless disposition, burning to satisfy the eyes and ears with every thing within their reach that was considered great or marvellous, the lengthened confinement of this voyage, together with other privations which common sailors are subject to, sprinkled, it would appear, cold water on the fire for nautical fame which burned within me; as when the vessel returned to this country, I returned to Kinghorn with the intention of aban-

* In this case strength of body alone was deficient; it was neither the want of knowledge in my duty, nor activity, that prevented me from undertaking the task of an A. B.

doning the sea-faring life, if I could obtain a situation as an excise officer. At this time my father being a baillie of the town, had a little interest with the member of parliament, Sir Ronald Crawford Ferguson. He was accordingly applied to in my behalf, but Sir Ronald considered I had better go to India and push my fortune; and he would procure me a free mariner's indenture from the H. E. I. Company. A puff of this sort very soon ignited the dying embers of my nautical aspiration. I consented, went to school, and studiously applied myself to learn navigation. A few months after this, Sir Ronald wrote from London for me to come up and receive my free mariner's indenture, and he would send me out to Calcutta on board of the H. E. I. C. ship, Thomas Coutts, Capt. Christie in command.* All necessary preparations being made, I embarked, was placed in the mess with the master at arms, and requested to do my duty as a midshipman. During our passage the chief officer gave me several lessons how to take lunar observations.

* A free mariner's indenture is a document permitting its bearer to remain and trade in any part of the Company's territory as a subject under their government. Persons without such a privilege were liable to be sent from India without the magistrates assigning a reason. However it may be as well here to remark, that many persons did remain in the country without that privilege, who behaving themselves the government never troubled them. Circumstances like this, of course, would oftentimes darken the prospects of those who had gone out with golden hopes, having paid well for the fees of their indentures, their passage out, &c.

After landing at Calcutta, and seeing a number of country officers in want of employment, it very soon occurred to me, that a free mariner's indenture was not all that was necessary to recommend him to a situation. I was introduced to a shipping firm, but they having no berths vacant at that time in my line, it was not very likely they were going to make a berth for me. I was requested to call back occasionally, and I would hear when any of their vessels were in want of a second or third mate. In the mean time I was to be studying the country language, of which I soon picked up a smattering. Two months passed by, and there being no vacancy for me in the shipping line, I happened to get introduced to a native gentleman who was about to commence business as a boat agent and wine merchant, and who wanted a European to join him for the sake of his name, and to superintend the business; all other requisites were to be supplied by him. We both agreed to the terms proposed by each other, so that, after a few preliminary arrangements, the firm of Dempster & Co., boat agents and wine merchants, was soon got up.* Properly attended to, the profits from this business were good, and enabled me (like the greater number of Euro-

* Boat agency in Calcutta is for the hiring of accommodation craft, for such as Buggerows, Barlyoas, Pinnaces, &c.

peans in India) to cut a dash in a small way. Sickness however did not spare me; eighteen months after my commencement I was taken ill, and unable to attend to business. The natives in India take advantage of Europeans at every favourable opportunity; and finding that business was not going on suitably to my mind, I dissolved partnership. Oftentimes my ideas were turning towards home. No sooner had my health recruited, than I shipped before the mast, on board of a free trader, bound to London. On my arrival there I again went to Kinghorn. Perhaps by this time my reader will be imagining that Kinghorn must have possessed some powerful attraction to me; it is true; it was there the object of my attraction was situated—it was there my tenderest feelings were wholly concentrated—it was there the richest lustre ever my eyes did gaze on, smiled pleasantly on me. Having remained at home a few months, being strong in health, and fresh as ever, I could not rest, but must be once more off to India, to try my fortune in that quarter.

My father having supplied me with a little money, I went to London, but not being able to get a ship according to my wish, I remained until my cash was all spent. I then made a voyage to Quebec and Montreal as a foremast man. On my return to London I again endeavoured

to procure a passage to India, by working my way; but not being able to effect this, I shipped before the mast on board of a free trader bound to Bombay, with the full intention, if an opportunity occurred, to take French leave! In this case I took upon myself my mother's maiden name, and well yet can I recollect the feeling of remorse I felt when I wrote Darney instead of Dempster on the ship's articles. Lucky circumstances have often occurred to me when I at least expected them. On arriving at Bombay I was among the first of the crew who got liberty to go on shore; where, to my no small astonishment, the first person I met was Captain Christie, of the Thomas Coutts, in a palanquin. I went up and spoke to him, and related my little history since the time I had left his vessel at Calcutta. He directed me to go to his house, and told me to stop there till I was sent for. An hour afterwards a message came for me to go to Messrs. Nicholson & Co., agents. When I entered the office, Captain Barber addressed me nearly in the following words: "Well, Mr Dempster, lately Darney, I have seen Captain Christie, who has told me all about you; and how you are deirous of remaining in the country. Your good conduct on board of the Cambridge on our passage out, having given both me and my officers entire satisfaction; if you

think you can better yourself by remaining here, I have no objections to give you your discharge." Then looking at Mr Nicholson he said, "If you can do any thing for this young man you will oblige me." Mr N. promised to do so the first opportunity. I was lawfully discharged, received what pay was due to me, and again assumed my father's name.

A few days after this, Captain Barber gave me a letter of introduction to the master attendant of the port, intending to get me into the pilot service; but there being only three assistants and seven pilots allowed for the establishment, all the berths were filled. I was recommended to join the Indian navy, and place myself at the disposal of Sir Charles Malcolm, superintendent, and I would get on, which I did.

At this time the plague was raging up the Persian Gulf, so that all vessels arriving at Bombay from thence, were sent to Butcher's island, a quarantine station. To this station I was appointed as a guardian, receiving warrant officers' pay.

During my stay on this island, many inventive and fanciful ideas discovered themselves to me. The first was in war; how a ship could be completely dismasted. My plan was, let several guns, of equal dimensions, be loaded with an equal quantity of powder; let the balls put in

them be all connected with a chain, stretching from the muzzle of one to another, and let the guns be discharged at one moment of time. My next idea was, how to make a flat-bottomed boat hold a good wind and be stiff, by a sliding keel to be lifted up and let down in midships.

I communicated my ideas to Lieutenant Hains, who commanded the station, but when he told me that such ideas had been thought of before I did not trouble myself about them further. There were eight guardians on the island along with me, who were all sailors picked out from the cruisers in the navy. We lived in an old castle, in the shape of a tower roofed over. It was said to be haunted; there was a loft in the centre, supported by wooden pillars, the access to which was by a ladder.

My restless brain being always projecting one thing or other; and it appearing to me that some of my messmates were not altogether free from superstition, although some of them boasted largely that if the devil was there he would not frighten them; I resolved to put their bravery to the test, by means of the following scheme.

Whilst they were all out but one whom I had engaged to assist me, I rove a line over one of the rafters of the roof, and led one end down behind a screen which was in the apartment. To the end of the line directly above the loft, I

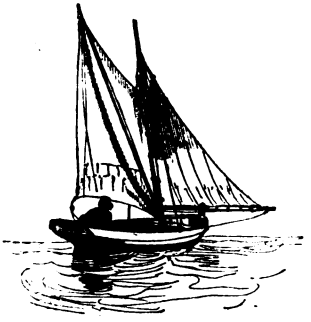
made fast a large block of wood, which was traced up to the rafters by the hauling line, and made fast behind the screen.

About ten o'clock that night, whilst the jovial crew were sitting round a table that stood beneath the loft, quaffing their glass and puffing cigars, my assistant, at a giving signal, slipped behind the screen, and letting go the hauling line, down came the block of wood on the loft with such a crash that shook the very castle to its foundation. "Great God," exclaimed one, "what's that?" "In the name of heaven, what's that?" says another. All were on their feet, and staring at each other with such looks as I leave you to imagine. My assistant and I of course appeared much alarmed. Shortly after the first panic had abated, it was considered some one must be in the loft; as to ghosts or devils, they did not, or would not believe in such beings. I proposed to go up and see if any one else would go with me; two consented; I took the candle in my hand, and whilst we were climbing up the ladder with cautious steps, my assistant again traced up the block of wood. The two having got safely up to the loft, with looks betraying their feelings, as nothing earthly could be seen. Whilst their backs were towards me, I blew out the light, which was no sooner done, than down again came the block of wood,

making the boards tremble under our feet. All now being in darkness, I will not pretend to describe how the two got down the ladder; however, when I got down myself I found they had all decamped, my assistant excepted.

My suspicions now began to be awakened, that they might go and alarm the lieutenant, by exaggerating what they had heard; to prevent which we went down to the beach, where they were all collected about the sentry, proposing to do just as I supposed. My assistant and I now began to rally and laugh at them, asking where all their boasted bravery was gone; that they were neither frightened at ghosts nor devils; we told them it was we who had played the trick to frighten them. Some thought "it was a devilish wide awake move of ours;" whilst others said it was not we. All returned to the castle but two, who would not have returned that night had an independency for life been secured them. It was only next day after they had seen the apparatus erected, and experimented with, they would believe we were telling the truth. Health being restored in the Persian Gulf, the quarantine station was abolished, and I was ordered on board of the H. E. I. Company's receiving ship Hastings, there to remain and make myself acquainted with the harbour, preparatory to entering the master attendant's department. Occasionally I

moved about with the pilots, taking out and bringing in vessels; at other times I sailed about in a small punt fifteen feet long, studying my land marks, and by the way of amusing myself. It was in this little boat the first ideas suggested themselves to me for improving the rigging of sailing vessels. She was rigged with a spritsail and jib, as is here shown.



In a short rippling sea, this boat could not be stayed, although every power she possessed without oars was tried. When the helm was put down, the jib-sheet was eased off and the main-sheet hauled in, the jib-sheet was boomed out, and, when she took stern way, the helm was immediately shifted. All would not do; she lost her way before bringing the wind right ahead, the water ceased to act upon the helm—the sea knocked off her bow, and back again she went.

One day whilst sailing about in such a sea as I

have described, it occurred to me, that if the jib-boom was fitted on a pivot on the stem head, with the heel of the boom loose, so as to shove it to leeward in stays, the outer leech of the jib would catch quicker aback and bring the boat round. I got permission to make the experiment on this boat, which I did and succeeded. She afterwards seldom missed stays, and when running before the wind the jib was easily made to act as a studding sail; but I noticed when the boom was much slued, the outer leech of the jib slacked, and this was the reason that I made the mast raking forward, so as the mast head would plum the stem at the point where the pivot was fixed. I afterwards found a raking mast, cutting a line one-third the length of the boat from the stem head, to be superior. An equilateral triangle sail could be set on the jib boom, that would go right round, which induced me to rig the boat as is here represented.

Although the rig might not look so well to

the eye as some others, still the boat worked cleverly under it. The equilateral triangle sail going round had a double advantage over all other sails I knew of. The boom (or yard) could be fixed to any degree on a circle; the sail acted powerfully, as the body of the canvas was low, and the principal strain being on the stem head. It was safe and handy, and when I discovered it possessed the advantage of propelling astern equally powerful as it did ahead; it then occurred to me, that if there were another mast raking aft, with a similar sail, and a square sail in midships hoisted up to a stay, the boat could then be sailed astern ways, as easily as ahead, particularly if there were a rudder at either end. I was just thinking about rigging the boat as is represented under, when the superintendent of the Indian navy had other employment for me.

When first the Red sea became a channel for steam navigation, and coal depôts had not yet

been established at its entrance, an Arab bugglow was employed by government to convey coals to Perim island in the Straits of Babelmandel. As no vacancy had yet occurred nor seemed likely to occur soon in the master attendant's service, I was ordered on board of the bugglow as supercargo, with instructions to proceed to Perim island, and there wait the arrival of the Forbes steamer, and deliver my cargo to her. If she did not come by a certain date I was to proceed to Mocha and there deliver the coals, after which I was directed to proceed on board the commodore's cruiser, if there.

I was six weeks at Perim island; my time being up and no steamer arriving, I proceeded to Mocha and there discharged the coals; the commodore being in the roads I went on board, and a few days afterwards a native bark bound to Bombay arriving, I was sent as a passenger on board of her. When she arrived at her destination, I was appointed second mate of a pilot schooner during the south-west monsoon. When the monsoon had blown past, the schooner, as was customary, was transferred from the master attendant's department to the naval. I was ordered to the receiving ship Hastings, there to occupy my former berth.

The little punt which I had left with her mast

raking forward, I now found rigged as she was formerly, with her mast upright but still the pivot jib boom. It was considered she looked better so, which I admit, but only as a matter of fancy.

To make the experiment with the two raking masts of which you have seen a figure, I purchased a small boat and rigged her upon that principle. If you look again at the figure, you will perceive the stay, which was iron hooks, and the main haulyards from one mast head to the other, assisted to keep it up; the small flag-staff was screwed on. This boat was alike at both ends; instead of pivots on the stem heads there were swivels. All being ready, the experiment was made, and fulfilled my expectations. The rig was powerful and the boat sailed well under it. All the yards swung round without touching a mast, and so safe that she never could be caught aback. The following example will serve to explain the improvement.

Consider the boat, as represented by the figure, to be close hauled upon a wind. Consider that the wind, at a moment's warning, may chop round to directly the opposite point; the only alteration this boat will have undergone is, the bow will have become the stern and the stern the bow; the jib the mizen and the mizen the jib; the tack the sheet and the sheet the tack.

There can be no such term as catching aback ever used; the boat's sails are all full and properly trimmed, and still close hauled upon a wind.

The government were fitting out an expedition to take possession of the island of Socotra, and I was ordered to take command of a large native pattamar transport, laden with troops and stores. When they were laden, she was to be left in charge of her own native commander, and I was to repair on board the H. E. I. Company's schooner Shannon. The heavy surf upon the beach being the only resistance shown, we were detained a little longer than we otherwise would have been. However, the stores were all landed, and I had but shortly given up my command when it came on to blow a heavy gale direct in shore; the pattamar parted her cables, drove ashore, and was wrecked. After the gale had ceased, the commodore of the squadron ordered the Shannon schooner to proceed to Bombay. Her officers were a lieutenant in command, a midshipman, and myself. The midshipman and I kept watch and watch. On our arrival, I was again ordered to the receiving ship Hastings. My little boat, which I had left with a friend, was safe. Every opportunity I sailed her about the harbour, and felt pleased when I saw crowds of spectators witnessing her manœuvring.

The south-west monsoon was approaching, when the master-attendant ordered a pilot brig to be put in readiness for what was termed the Rock Station. I was appointed to her as second mate. About the conclusion of the monsoon, there was a vacancy in the master attendant's department for a pilot. I was promoted; and when the brig was transferred over to the naval department, I went on shore to lodge. After leaving Butcher's island, in all my various situations, (with the exception of the Hastings) I had what is termed batta money, in addition to my salary; when I became a pilot my pay was good.

Favourable opinions expressed to me by men whom I considered competent to judge on the discovery I had made, stimulated me to improve my boat. Perceiving that the rig I had proposed for sailing vessels would not answer for crafts on a large scale, as the stay from one mast head to the other would be inadequate to support a large square sail; it occurred to me to erect a main-mast in midships of the boat and to have the sails to be worked upon it, in the same manner as they are on the main-mast of a square rigged ship.

My next step in advance was to purchase a small yacht, seventeen tons burden. She was cutter rigged, and as such, all the sailing boats passed

her; after I had rigged her upon the new principle, she outstripped all the sailing boats at Bombay.

Being a government pilot, I was allowed a boat but only to perform my duty with, so that this yacht, which was named the *New Rig*, was kept up wholly at my own expense whilst testing the experiment.

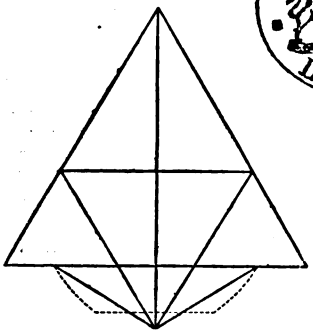
When I had fully satisfied myself as to its advantages, I wrote to the superintendent of the Indian navy, requesting he would appoint a committee of naval officers to report upon the properties of my invention. I received an affirmative answer. Ultimately, a commander of the Indian navy, examined and reported; and I was informed by letter: "The committee were of opinion that although my invention was very ingenious, it was not sufficiently useful for the government to adopt it."

During my life time, previous to this, as I never had patience to read much, nor study philosophical works on human nature, consequently my feelings were not sufficiently disciplined to receive such an answer without murmuring.

I all along had thought the ideas I had advanced, were calculated to enhance the credit of the nation I belonged to. I had proved that there was no sailing vessel afloat capable of per-

forming so many manœuvres under sail, as the New Rig could. I had expended a considerable sum of money in carrying out the experiments, and for receiving such an answer, I became indignant, and resigned my situation. Various now were the speculations that entered my head. To go to England and bring my invention before the home government I had not the means, and to bring it before the government of Bombay I had not the interest. However it struck me that if I had printed descriptions of my inventions, with drawings attached, I perhaps would be able to introduce myself to some of the officials.

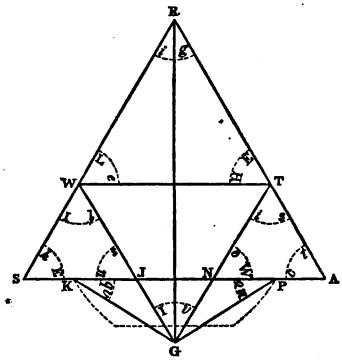
Being under no restraint from employers, my mind was wholly occupied as to the description of document I should frame; and whilst ruminating and poring over a drawing I had made, it appearing so simple and equal in all its parts, I thought, could it be reduced to a mathematical scale, it would be so much the better. I saw that by extending the lines of the masts below the vessel, they would meet at a point. I drew lines from each stem head to this point, where the masts concentre. The whole figure, as is here shown, then quickly discovered itself to me.



A train of thoughts now rushed upon me, and I proceeded to consider if a vessel were built on this particular plan, what would be its advantages and what its disadvantages.

An insuperable objection was at once apparent, the great draught of water. I was of opinion that there was a possibility of building a vessel in this plan so very strong at the bottom, as that in the event of striking a rock she would not be so liable to stick as others, and bumping on a sand bank she would not be so liable to break her back. I thought that fast-sailing weatherly qualities might be got out of a vessel so formed together with manœuvering in a very small compass. I could not see any particular purpose my plan could be applied to, except for scientific pursuits; such as small vessels of war, surveying vessels, or pleasure yachts, &c. I ultimately came to the conclusion that the advantages of a vessel so constructed, counterbalanced

the one disadvantage—draught of water; and I resolved to endeavour to construct the figure trigonometrically, which I did, and whilst doing so I found that a mathematical hint could be given to those whom I considered had broken down my plans. For the trigonometrical construction, see the preceding figure.



Draw the line SA any given length, which divide into five equal parts, K,J,N,P,A.

With the chord of 60° in your compasses, place one foot in S and describe the arch *e h*, which mark off 60° with the same chord in your compasses; place one foot in A and describe the arch *c t*, which mark off 60°.

Draw lines from S through *h* and from A through *t* until they meet at R. With one-fifth the line SA in your compasses place one foot in K and describe the arch QV, which mark off 30° and with one-fifth of the line SA in your com-

passes place one foot in P and describe the arch OM, which mark off 30°.

Draw lines from P through *m* and from K through V until they meet at G; then will KP be the length of hull and KG,PG the stem and stern posts.

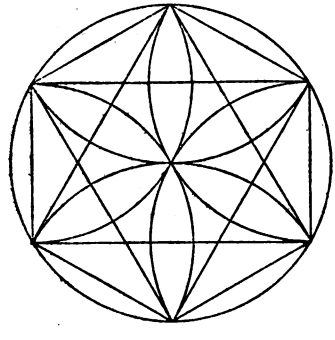
With the length of hull in your compasses place one foot in G, and cut the lines SR at W, and AR at T.

Draw the lines GW,GT which will form the fore and after masts. SJ,AN will be the fore and after booms (or yards).

Through the centre of gravity raise a perpendicular from G to R, which will form the main-mast.

Draw a line from W to T which will form the main stays, and it is finished, so that the whole of the angles G I V, T H E, N *e* W, R *i g*, J U S, T *i* S are equal to the angles S *h e*, W I *l*, A C *t*, W *e* L.

The deck and midship section were then described on the same paper as is hereafter shown.



C

Six hundred copies like the foregoing document were lithographed, headed with "drawings and diagrams." I sent a copy to all the officials of any note from the governor downwards, to all the captains of ships in the harbour, and to all the respectable European merchants in Bombay; and several were dispatched to other British governors in India, and some to my acquaintances at home. This was what I considered sending out a fleet of surveying vessels, to explore the various channels of people's minds upon the subject.

Allowing a few days to pass by, I called upon Sir Robert Grant, then governor, but he not being able to do any thing in it unless brought to his notice by the superintendent of the Indian navy, all he did was to advise me how he thought I should act. I afterwards waited upon several members of council, and asked their opinion of the Problem. All of them considered it was very ingenious and did me a great deal of credit.

At this time Admiral Capel, royal navy, was daily expected in Bombay with his flag ship. I was anxious to speak with him and his officers upon the subject, and kept a good look out for his arrival. The signal was no sooner hoisted for his appearance, than I was out with the New Rig to meet him coming in. That day I man-

œuvred about my experimental craft to the best advantage, and in a regular way sent a few copies of my Problem on board of the flag ship, and when the admiral went on shore I called on him for his opinion.

"He considered my plans very ingenious, but it was not in his power to interfere with the Indian government about them; he would speak what he thought of my invention to the superintendent of the Indian navy; that was all he could do."

My next proceeding was to get certificates from officers in the royal navy and merchant service, stating their opinion of the New Rig. Having obtained twenty all pretty favourable, I sent them to the superintendent of the Indian navy, requesting he would forward them to the government, with any recommendation of his own he might feel disposed to give. A fortnight expired when I received a letter from the Indian navy office stating that my certificates had been before the government, and "they highly commended me for my ingenuity, but they were sorry they could not reward me." All hopes at Bombay were now quenched; I looked upon the most of things in an odious light; I disposed of my boats and sought a situation.

As the sea that is agitated by fearful tornadoes becomes smoother when the wind has abated

its strength, so the mind becomes calm when favourable circumstances succeed to bad. Only a few days had elapsed from the time I had desired to quit a country that was every day becoming more disagreeable to me, when a chance occurred to navigate a native brig to Penang, and I afterwards made one trip to the west coast of Sumatra.

Hearing that the king of Siam wanted European commanders for several large ships he was building, to be a sort of half men-of-war half merchant vessels, to carry cargo, at the same time mount a frigate's battery, I took a passage to Singapore, where for a time at least there appeared some prospects of my wishes being crowned with success. The king of Siam's agent, a British Chinaman born, and brought up at Singapore, recommended me to Mr W. Johnson, merchant there, who examined and gave me a letter to prince Montfanio, as a fit person to take the command of one of the said semi-war vessels.

There was at this time, in Singapore harbour, a Siamese war bark named the Lightning. "I was to be sent in her to the prince as a passenger, to make arrangements concerning what was to be the amount of my salary. If I did not agree, I was to be returned to Singapore in the same vessel." The Lightning was commanded by a China-

man; her officers and crew were a mixture of Bengal, Malay, and Arab lascars, and her marines were Siamese. The hull of the vessel above water looked tolerable well, and so did her masts and rigging, but her canvas was too light and she was flat-bottomed. When all was ready for sea the sail was set, the anchor weighed, and a salute fired, which was returned by the fort on shore. Not being able to beat up the gulf against the monsoon that had set in strong against her, she, eight days after her departure, paid the same compliment to the fort as when she left, and dropped anchor till the monsoon would blow past.

I never could abide inactive and badly brought up sailors. I had seen sufficient of a Siamese crew to show me that their ships would not suit my fancy, even although they were men-of-war. As I was not on pay, and the Lightning was obliged to lay by several months till the monsoon had passed over, it was optional with me to remain or not.

A British bark arrived at Singapore from Maulmein, laden with grain for China, and then to Sydney with tea. Her second mate was too young a lad to do his duty, and the captain wanted a second officer. I left the Lightning and joined this bark. A few weeks after we were at sea, the captain and chief mate quarrelled,

the mate sent in his resignation, which the captain accepted, and I had to do the duty of chief officer. We anchored off Macoa one day, where the old mate was discharged.

When we arrived in Canton river, the captain left the ship at the second bar for town, and I was left in charge. The morning after the first day we had anchored at Whampoa, the large iron handles for heaving round the windlass were missing, and every rope attached to the swinging boom outside of the ship was cut away; the Chinese had stolen them, although there was a look out on deck. The ropes stolen were not of great consequence as they could be replaced; but the iron handles for heaving round the windlass was a serious affair. I used every means to get them back, which I eventually did for five dollars. It was my impression, that the identical person who had stolen the handles, was the one who received the five dollars; she was a washerwoman, who had been on board the first day of our arrival, making her observations.

Smuggling opium into China at this period had ascended to its apogee; interception from the celestial satellites was never apprehended; the mandarin officers moved round and looked upon it like the stars in the heaven assisting the moon with their feebler light. Darkness was

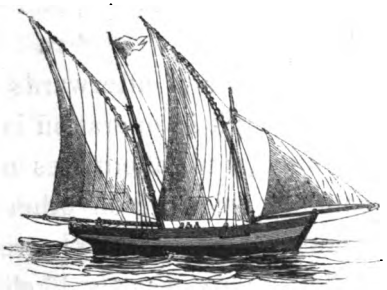
no more necessary for the foul deed of smuggling; daylight was more congenial. At Whampoa there were a number of small schooners, some of which had been fitted up from ship's long boats. These little smugglers were employed carrying opium from the large ones that generally lay at the islands of Lintin or Hong kong; they belonged principally to European, American, and Parsee merchants at Canton, and were commanded by persons sailing under their respective flags.

I was offered the command of a vessel with a good salary, if I could obtain my discharge; although the command was small, yet the pay was tempting, and as there was a sort of indescribable feeling of reluctance to go to Sydney came over me, I wished to be from the vessel I was in.

Those who go down to the sea in ships see the wonders of the deep, and those who have wandered as I have done, must have seen many a strange scene. In the bark I belonged to were two brothers; the youngest was the captain and the older the sail-maker. The latter had been chief mate the voyage previous, but for some reason (which I never inquired into) he was reduced. The elder brother was going this voyage as sail-maker, for the purpose of liquidating a debt he owed to the younger.

I was the means of reconciliation between the two brothers. Oh! how pleasing the task; the captain favoured me with my discharge and promoted his elder brother to be the chief mate. I shortly afterwards became commander of a little opium clipper; my owner was a Parsee, who gave me full permission to rig his schooner as I chose.

Having made several trips to Hong Kong for the drug, the schooner required repairing. I took her to Macao to have what was required done, and whilst there I proposed to rig her upon the new principle. All was nearly ready, when I received a letter from my owner, ordering me peremptorily not to rig his schooner with three masts, as the Chinese would not allow her to pass through the Bocca Tigris without paying certain duties, to which boats with only two masts were not liable. Obedience being the only resource left me, I rigged her as follows, with two masts, and I made slight alterations I had never before seen.



The alteration here is, instead of bending on the upper part of the sail to the yard, it is made fast to hoops round the yard, traced up with a line from the mast head. When the yards are lowered down and the tracing line let go, the whole body of the sail comes into the boat; it is nearly upon the same principle (which I have since seen) as sails that are traced out and in on gaffs. Frequently, after leaving Bombay, I had thought how much I would like to see a vessel built upon my plan, and whilst at Macao an opportunity occurred for getting a small model of two feet in length made.

Admiral Maitland's flag ship was at this time anchored in the roads. He resided on shore at Macao, in the house of captain Elliot, British plenipotentiary. To these gentlemen I showed my model, and they gave me a little encouragement, by saying they would like to see it tried. The model was sent on board the flag ship,

where it remained several days, and was again returned.

To conceive a plan and afterwards not have the means of putting it in operation is gnawing beyond description, and oftentimes urges men to acts of condescension which otherwise their very souls would shrink from with horror. When I was informed there was a likelihood the British merchants at Canton would assist me in building a vessel on my plan, I gave up the schooner I belonged to, and went to Canton with the two feet model. Mr now Sir W. Jardin, was the principal British merchant there; on him I first waited; he received me kindly and gave me proper advice. My model, rigged, was placed on a table in a house where the greater part of the merchants and captains of vessels congregated throughout the day. Descriptions were lithographed, and dispatched to all who were likely to understand them. Wood cuts of the vessel under sail, and also diagrams how to build and rig her, were printed in both of the public journals there. A fleet of cruisers which, as I thought, would at least make some slight impression.

I next proposed to have a sixty ton vessel built in shares. Most of the European and Parsee merchants wrote, "they would be most happy to subscribe;" others wrote, "they would be

glad to subscribe ;" but a gentleman who rode under the star spangled banner, wrote, "that he would subscribe to a limited extent." This of course raised a question amongst others as to what could be his meaning; and therefore it was considered the safest plan would be, as they were only merchants and knew little about ships, for me to call a committee of professional men, and they would abide by their opinion.

I requested five English captains and one American, to form themselves into a committee to report. They did so, and when I received their letters, all appeared to be much in favour of the rig, but with respect to the hull there were six different opinions. One thought it was impossible she could sail. Whilst another stated she would sail fast, but she could not hold a wind for want of a grip. Another was of opinion, that without a grip and keel she must go bodily to leeward ; whilst another considered she would be weatherly enough so long as I could carry on sail. The American's principal objection was the great draught of water, and he thought "it would be better to try it upon a small scale so as not to put the community to too much expense."

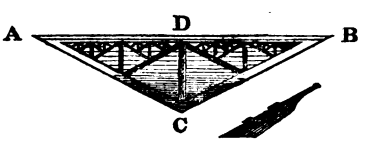
The last opinion was, that if I would cut away some of the point below and give her a keel, the plan would do all well enough. But how could

I do this? To cut away the point would have been to cut away my plan. No! I had determined to stick to the point, even though a boat was never to be built.

How often do we see the defenceless crushed, to satisfy the foibles of parties more strong. Such was the case here. I ultimately consented to build "a boat upon a small scale, so as not to put the community to too much expense." Money was subscribed quickly, and a Chinese boat-builder contracted with, to complete a craft thirty-four feet long over all, upon my principle, in three months. She was to be built at Canton under my inspection.

Having furnished the builder with my model and plans, he set to work in a true Chinese style, imitating piece by piece in the most accurate manner, even to the very colour of wood in the small model.

The following figure is a broadside view when built.



The stem and stern post AC, BC were joined to a strong knee that formed the bottom angle; they were then set up on the point; the frame

of the gunwale was then nailed on at AB as a guidance for the builders; the midship section, DC was then erected, and in succession the different sections, as represented by the dark lines in the figure, were put up.

As the structure rose, it looked rather a strange and unusual method for ship building, and a great many foreigners went to see it. Great differences of opinion were expressed, and many a hearty joke was cracked at so strange a looking figure. The frame of the different sections, answering for timber and plank, consisted of a dark red wood; the planks nailed on to the frame, as represented by the light lines in the figure, consisted of handsome grained camphor-wood. A few other timbers were put up and down inside the usual way, the deck was laid, the boat was bright varnished, and round her gunwale she was decorated with a gilt ribbon.

Shipping is a subject which mostly all men interest themselves with more or less, particularly at a sea-port town, and when any alteration is being made upon the construction of vessels on a large scale, it is not so easily hiding it from scrutiny, as an idea whilst it is merely fluttering on the imagination. How was she to be launched was asked by one, whilst another said if she laid down upon her broadside she

would never again get up. She was generally admired for her picturesque and novel appearance; and the Chinese looked upon her with an eye of strange wonderment.

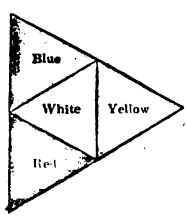
The current of affairs had now changed their course in the smuggling departments. The emperor finding his sycee silver was daily being exported from his empire, to be converted into a foreign coin, which once within the precincts of his powerful dominions was contemptuously broken. He issued out flaming edicts, to warn all foreigners that if the trade was not immediately suppressed, he would behead, sink, burn, and destroy, &c. My apprehensions were awakened that if any of the mandarins happened to see this boat, and suspected her depth in midships, they would supposed she was intended for stowing away opium, and thus she might not only be seized but the builder also get into trouble. However I found afterward my suspicions were too great. On account of the peculiar build of the vessel we required to have a cradle made to launch her in, and as she had no ballast on board, when she was plunged into her element, over she went on her broad-side. You may judge the consternation which now seized many of the lookers-on. Some swore she would never rise, whilst others said that was just what they expected. Those who were prejudiced, depend on

it, had a fine laugh, whilst others who were friendly, I believe sincerely pitied me. One hundred weight of lead into her bottom pressed the point a little down, a few hundred weights more brought her upright, and when she was sunk to her line of floatation with ballast it was generally considered she looked splendidly.

The best of men will be mistaken at times, particularly in judging on subjects obscure to their views, and it is only by practical research and experiment we have arrived at the profound knowledge of demonstration for truths, what was before considered uncertain. Previous to building this boat, I knew little or nothing about the construction of vessels. I never had studied theoretically the action of bodies in the fluid, unless it were what I had practically observed during my duty in working vessels. I knew nothing from instruction. I had remarked that short vessels were manœuvred in a smaller compass than longer ones, and that flat bottomed craft never held so good a wind as those that were deeper in the water. I had seen boats with raking stems and perpendicular stern posts both sail fast and be weatherly; and boats constructed upon the contrary principle, act equally as well. I had observed extra gripe given to some ships and to others additional heels to make them hold a wind, and not unfre-

quently false keels put on them for the very same purpose.

From all I had observed I learned practically, that what was necessary to keep a sailing vessel to windward was a sufficient resisting surface in the water, according to the size and surface exposed to the wind. It mattered not in what part of the vessel the resistance surface was; it might either be in the gripe, the heel, or right in midships. And it was upon thus reasoning that I was induced to bring it to the point. Having now projected (as I suppose) an entire new construction for a vessel and rig, a thought crossed my mind to make it more complete, I should invent a code of signals. I made out the following flag, which by making each of the colours the centre alternately, four different flags will be formed.



The advantages to be gained from those signals are, by bringing each edge to the flag staff, and turning them upside down, each answers for six numbers.

A rudder something like the following was

shipped, the masts were stepted, and sails bent, when she appeared rigged as is shown in the frontispiece.

Reader, now that you see me fairly afloat and ready to make the experiment still, it cannot be effected for want of wind; light airs in a narrow river where strong tides run, was neither time nor place for trial. I therefore took her down to Whampoa.

The opium disturbances, at this period, had begun to assume an alarming aspect. Edict after edict had been blazed from the imperial throne, so that boat sailing on the river was entirely prohibited. Nevertheless as I was safe amongst the British shipping at Whampoa the experiment was made to a certain extent; but the results of it, although they were the means of showing me where I had erred, yet they were far from coming up to what I had looked forward too. I expected speed; but in this particular point she was deficient; all the other properties for manœuvring, &c. she possessed to

my satisfaction, but what were they all, wanting speed?

I have already said that previous to building this boat, I knew little or nothing of ship-building, nor even did I study theoretically the action of bodies in fluids. It was only from what I had practically observed that I judged, and so far as my knowledge extended, in this instance, it was correct. The boat turned quick, and held a wind; but, as I never could perceive the exact manner a vessel's bottom displaced the water that bore her; I had never remarked whether it was a long floor; a short floor; or no floor at all, that was best adapted for velocity; it could not, of course, be expected that I could be acquainted with "the line of least resistance."

This boat however soon showed I had made a mistake, and at the same time where the mistake rested. She wanted a longer floor. As the construction altogether was considered strikingly picturesque, Captain Draymore, of George IV. East Indiaman, proposed to purchase and take her home to England, as she would be a novelty there. Nothing could appear to me in a more favourable light than this. The boat, once in England, could soon be improved, and if I had the means nothing would have given me more pleasure then to have paid freight for her

to England. Such were my feelings. The subscribers were made acquainted with Captain Draymore's proposal, and ultimately she, and an oil painting of her fully rigged, executed by a Chinese artist, were made over to him with directions to alter the floor. Delighted to think my boat would now be taken to England, I parted with the officers of George IV. at Whampoa, and went to Canton, there to make preparations to embark for Macao, to look for a situation. But I had not been above six hours in my lodgings, when the landlord told me I was a Chinese prisoner.

The Emperor of China knew there were 20,000 chests of opium in foreign ships lying at Hong-Kong; he was also aware it belonged to the merchants at Canton, and until they had consented to give it up to him to be destroyed, all foreigners, guilty or innocent, were to be his prisoners, and subject to his wrath in the event of a denial. This piece of celestial wisdom, this reasoning of him whose power was next to heaven, seemed as it would cause some internal convulsion which would produce an immediate dissolution of the empire. It brought into my mind an idea that I have formed of this earth and the cause of its unevenness.

I am of opinion that the surface of the planet we inhabit, at one period, was globular and en-

tirely covered with water; at that time there were no clouds and the wind blew regularly from east to west. It may be compared (as I think it was) to a shell covered with water and fire in the centre. By some unknown law of nature the shell exploded and was forced in different directions. The fire came in contact with the water, clouds of smoke arose, and the fire not extinguished was scattered. By the laws of gravitation the shell again fell towards its centre, but being broken, the parts lighting on ends, *disfigured its spherical appearance*, leaving, hills and caverns, seas, and mountains, as trophies of the great works of Providence.

The Chinese government, by an unprincipled blow, has disfigured its polished and smooth-like position. War hath left its trophies of victory, as honours to truth, to laws and to justice. With respect to the opium question the following are the views I took of it.

The government of China being despotic, it follows that all subjects under it *are slaves*. The proper Chinese population being gifted with better rational endowments and being in a more refined state than their rulers, (the Tartars,) feel their slavery the more keenly. The laws of the Tartars for governing their conquered Chinamen, are almost as invariable in their course as the planets of the solar system, which

move regularly on, according to the laws of nature, without deviating to the one side or the other. At least like the Medes and Persians, they have, so far as their weaker judgments would admit, endeavoured to keep them unchangeable in the action against all but the favoured few of their *own race.*

Ability and wealth are measured out in China. A fixed line of conduct must be observed, a stated education only learned, and according to the sphere the individual moves in, so must every one wear a particular dress; and when in business, if the surplus profits exceed their wants, it is forced, it is dragged, it is squeezed from them. This is what is termed in China *the squeezing system.* No innovations are allowed, no channels left open for aspirants after fame, the same old beaten track must for ever be trodden. Wander from it and their existance is endangered. Reflecting upon a state of affairs like this, how could I blame the Chinese for indulging in opium. Where is the slave that will not use ardent spirits, or other intoxicating stimulus, when he can get it? My opinion is the emperor of China has himself to blame for his subjects being intemperate. The foreign merchants at Canton, thinking it more business like to give up 20,000 chests of opium than lose their heads, did so; but until

the mandarin officers, had got the whole into their possession, a guard of soldiers, was stationed before our houses, to prevent escape. The situation of the prisoner is ever monotonous. While in this condition, and philosophising one day as to the probable termination of the dispute, the poetic muse came dancing in to my assistance, and in a rhapsody of effusion I wrote out a short poem, which I termed the Opium Argument. It was afterwards printed, and copies given to nearly all the Europeans in Canton.

The mandarins having received the full amount of opium exacted, the guard of soldiers was withdrawn, and permission granted to all who pleased to quit Canton. I proceeded on to Macao, and shortly afterwards got a situation as second mate on board of a bark bound for Singapore, where I had not been long when I obtained the command of a brig that traded betwixt Singapore, Malacca, and Penang.

Wherever I went, things always appeared to me in a different light from what they did to those with whom I was in the habit of associating, and as a matter of course difference of opinion always creates argument. One day, whilst walking on the beach at Malacca, I observed the sea had been making inroads upon the land; and that if some barrier was not erected

to prevent its further progress, a low extensive plain on the shore would soon be added to Neptune's dominions. I wrote in the public paper upon the subject, and after an examination it was found I was correct.

I had made a few voyages in this trading vessel when it was reported an expedition was soon expected at Singapore on the way to China, I left the brig I commanded, and purchased a small schooner of twenty tons burden and rigged her upon the new principle. When the fleet had dropped anchor in the roads, I took the earliest opportunity of manœuvring about my craft, and afterwards called upon Sir Gordon Bremier, then in command of the squadron. My wish was to be engaged on the expedition, as a tender to some of the ships of war. But Sir Gordon, although he considered my rig to be remarkably handy and ingenious, yet he did not consider he would be justified in engaging so small a vessel to cross the China seas at that season of the year. England was the place for me to bring forward my experiments.

From the time I last left Kinghorn up to this date, my friends never had heard from me, with the exception of the problem I sent from Bombay, which was sent merely to show them I was alive: but there being neither date nor address on it they never knew where it came

from, and therefore did not know where to write to me. My reason for never corresponding with them was owing to my unsettled state of mind, and besides I never had acquired any wealth of which I could boast. England sometimes floated on my visions, but when I considered that I had been thirteen years in India and was still poor, the idea of going home again recoiled from whence it had sprung. Ambition ever grasping at phantoms; ambition ever propping up the hopes on unstable foundation! The boat I had sent home in the George IV. East Indiaman, now began to raise castles in my mind. Home I must go, get how I may. The little craft I had purchased was disposed of, and I went as a passenger to Penang and thence to Maulmain in Burmah. Here was a vessel bound for Calcutta which wanted a chief mate, and I engaged in her. A few days afterwards a bark arrived at Maulmain with the loss of her topmasts. She had left Calcutta and was bound to England. The captain of this vessel and his chief mate had quarrelled, and the latter wanted to be discharged. This was fortunate for me, as he and I arranged matters with the consent of our captains, so we exchanged situations.

With what pleasure now did I look forward to the happy day when I should arrive in

England, to hear my invention had pleased the British public, and how I would be handsomely rewarded for my past troubles. How pleased was I too, when I recalled to my mind all that was near and dear to me at home, and that a few short months would bring us together; the very thinking about it amounted next to madness.

New topmasts being procured, swayed up, and rigged, the bark left Maulmain on her homeward passage, and three months after we dropped anchor in Table Bay, Cape of Good Hope. The blood of persons who have been a length of time in a warm climate, becomes thin and unable to stand cold weather. I saw the vessel I belonged to would arrive at England in the cold season, and to cheat the winter at home, I wished to remain at Cape Town a few months. I asked the captain to favour me with my discharge if he could get another mate on shore that would suit him; he suited himself and I was discharged.

The Cape of Good Hope (or half way stage, as it is termed) agreeably disappointed me. The town looked beautiful, and the many fair looking faces in it looked quite enchanting; at times I thought, was it not for my invention that urged me home, I could live and die in such a healthy climate.

Thinking that amongst so many Europeans as were at Cape Town, perhaps there might be some of my townsmen; I made inquiry, when I was informed of one. He not being long from home knew all the news; on asking after my parents, I was informed my father and mother were both dead several years ago, and when I hinted towards the object that at one period of my life had a powerful attraction over me, I was told she was married.

Though a lengthened absence from home amidst the perversities of life, has a tendency to blunt the finer feelings, and render the heart callous, still I could not hear of the death of my parents without suffering a pang. As for the lady I had loved, but knew not her sentiments more than from her looks, she was justified in following her own inclinations, and it gave me pleasure to hear she was married to a gentleman possessing the means of making her happy.

The appellation of philosopher and author being gratifying, I was now beginning to consider myself a little of both, and I turned my attention to every thing that I thought could be improved. The Cape of Good Hope is a fine country, and presents a wide field for industry. What is wanted for this improvement of the colony is money and good labourers.

Another want I perceived, which though not

beyond the power of man, was far beyond my power to supply. This same want I had noticed elsewhere generally, but at Cape Town it appeared to me to be one of the greatest importance both for the prosperity of the town and colony; this was a safe harbour for shipping. After having turned a little attention to the subject, a plan occurred to me which would answer. I made a drawing so as I might obtain the opinions of others on the utility of my scheme, and nearly all who saw it said the idea was good; but where was the money to come from to put it into execution? I perceived that various other improvements were necessary; and after having made all my own remarks, and gleaning such information from others as appeared to me of importance for the benefit of the colony, I published "The Cape of Good Hope Pamphlet," being wood cuts descriptive of my invention in India, and wood cuts descriptive of the proposed harbour in Table Bay. Of this pamphlet 3000 copies were printed, and 2900 quickly sold, the remaining 100 I kept by me. How pleasing the feeling when an author has satisfactorily accomplished the task he has undertaken! No sooner had I accomplished mine, then I began to look out for a situation to go home.

At the Cape of Good Hope chances do not

often occur to get a berth to England; as an officer in a homeward bound ship, the person who is anxious to see his native land, must therefore not stick at trifles. The Clifton of Bristol, a large free trader, captain Cox, arrived in Table Bay; a third mate was wanted, which situation I obtained, and shipped for England.

During my stay at the Cape, I made frequent inquiries amongst persons arriving from England, if they had seen or heard any thing about the boat that went home in the George IV., but with the exception of one gentleman, who told me he had seen some notice taken of it in the newspapers, I got no farther tidings. What he told me, however, was any thing but disagreeable to me.

The Clifton having spread her canvass to the breeze, rolled nobly down to St. Helena, and there her thirsty water casks being filled, again she bounded towards home; every day I drew nearer England, the fresher grew the recollection of scenes I had parted from thirteen years ago, and before we had made the Land's End, circumstances which I never could have remembered in India, were becoming quite familiar to me. The Thames was at length fairly entered, a steamer on each side towed the gallant vessel against the wind, and no sooner was she riding at anchor at Gravesend than I inquired about my boat.

Judge my surprise when informed she was laying in the East India Docks, seized, because she was built of camphor wood, an article which in this country is subject to a high duty.

The first few moments of sudden surprise gone past, I did not feel so much chagrined at this disappointment as I had done upon former occasions. But like a ship amongst dangers in a fog bank, it cast a mist before my eyes, dimming my imagination to such an extent that I felt more difficulties were yet to be contended with, and that it would be necessary for me to grope my way. The Clifton being safely moored in St. Katherine dock, London, I received my discharge. And now, Great Britain, enlightened isle, where knowledge has been the power which raised you to your present exalted state, once again I tread your holy ground! I feel as if it was bliss indeed. During my wanderings, when I was thwarted, I was sometimes almost tempted to abandon the idea altogether in disgust. I always remarked, however, that no sooner was the first bad feeling over than another ray of hope started and dispelled the gloom that enveloped me, and inspired me with fresh vigour to persevere still further. Taking an example from the past as a guidance for the future; my mind bore up, still to try and bring my invention before the government I put my resolution

in execution. How I proceeded and what were the results, the sequel will truly show.

The morning following the day of my arrival in London, I posted to Blackwall, to the E. I. docks, where, sure enough, the boat I was looking for lay there high and dry upon her beam ends, with her masts out. I observed her bottom had not been altered according as directed to give her a longer floor, and immediately something whispered she was of more service to me where she lay, than if she had been tried and proved to be no flyer. My next proceeding was to learn the names of the lords of Admiralty, and the different scientific associations likely to patronize my invention. When done, as the diagrams in the Cape of Good Hope pamphlet were upon the improved principle, giving a floor to the vessel, (although I still stuck to the point) one of the 100 cruisers I brought home with me was dispatched to each party in regular order. Money is the lever power to greatness; without its strength how can we rise? And now that mine was becoming like a well that dries up after the spring has ceased to flow, it caused me to dig the deeper for further supply.

According to the laws of Scotland, when a parent dies leaving no will, the oldest male heir becomes entitled to his property. My father

leaving a few old houses when he departed this life, by law they were mine. There were other branches of the family who were perhaps as much entitled to them as me, but I wanted money, and if there was any lawfully due me, I must have it. So like the hunters who go to the north in pursuit of game, in like manner did I direct my course northward a money hunting.

Having arrived at Leith, I could now look across the Frith and see my native town; and not to take what friends I still had there by surprise, I sent to a number of them, under cover, a Cape of Good Hope pamphlet. "Alive!" not he, "he died years ago in India; how could a person like him, who was brought up only as a common sailor, write a book like that. It was impossible, it must be some other Dempster, not he. There were plenty of people in the world of the same name." Such were the remarks passed, as I afterwards understood, after reading the pamphlet. What the feelings were at the same time, I leave you to judge. It must be any thing but an agreeable sensation to lose, at a moment's warning, what one had considered so securely his own.

Being lawfully identified my father's heir, I was put in possession of what property he had left in Kinghorn, and with it I again returned to London. Captain Draynor being there, informed

me duty had been demanded. He wished to sell me the boat cheap as she lay, without giving him any more trouble about it; but the property I had received at Kinghorn, being so small as not to assist me even thus far, it could not be effected. I stated to him the plan I had in view of bringing my invention before the admiralty, and asked for a few days the loan of the oil painting he got at Canton with the boat.

This he acceded to; and the oil painting, with other drawings, descriptions, and a memorial from me, was forwarded to the lords commissioners of admiralty. Six days afterwards the oil painting was returned with a letter stating, "Their lordships did not consider it necessary to adopt it."

To retreat—to run back, or fearlessly meet any antagonist and be slaughtered, were now the only alternative. Without money, I had no strength; without interest, I had no weapons; and now I was in England without a situation, I was worse than a pauper.

In war, a good retreat is always deemed better than a bad battle. I had once witnessed that at Canton, and a thought struck me I would adopt the same tactics. Having returned to Captain Draynor his oil painting, I got a passage to Leith, then to Kinghorn, where I rested a while to examine my position.

Like a general repulsed, but not entirely conquered, I looked back on the scenes that had lately passed by. I could see the proud and prominent situation my enemies held over me; a rising ground which no inferior force dare directly to approach. I saw that with reinforcements, and skillful manœuvring, the enemy was not invincible; so to enlist recruits and then teach them the art of warfare, was my next consideration; wood cuts and diagrams of the entire plan being made, first one editor and then another of respectable newspapers in Edinburgh, and Kirkaldy, printed them in their journals, with descriptions, giving now and then recommendatory paragraphs upon the subject.

"This is what may be considered sending out detachments to make an impression on public opinion, together with recruiting parties, press gangs, &c. to enlist all in my cause who thought it just."

It was exceedingly encouraging to me when I was told the members of the Royal Scottish Society of Arts, in Edinburgh, had returned me a vote of thanks for the Cape of Good Hope Pamphlet they received. "To enlist such an army as this, I considered, was certain victory."

Day after day I was now completely harassed with inquirers in my cause; every one seemed to be of opinion I was in the right, but all

wanted to see it put to the test. I was not yet quite ready. The moving spring was still wanting—Money! To give the gentlemen belonging to the Royal Scottish Society of Arts a better idea of my invention than they could obtain from diagrams alone, I got made a model two feet long, and fully rigged her. She being brought before their notice in the regular way, they highly approved of the plan and appointed a committee to report. A week afterwards I was recommended by the convenor to withdraw my model in the meantime until I could present them with a vessel sufficiently large that they could practically experiment on; the model was too small for them to give any decided opinion on. I could not well object to a truth so evident, but where to get the means to build a vessel such as here wanted was quite another question, so again was I left to my dwindling resources.

Prejudice being a failing so common to mankind, it is uncharitable to condemn a man for what is natural to him. Of late years I have looked at it in rather a favourable light; for if an invention is worth nothing, persons will not be prejudiced against it.

Subscriptions have done wonders, subscriptions have gained battles. It was a subscription party that once built me a craft, perhaps it might

build another; such were the thoughts wandering in my mind, after withdrawing my little model from the Society of Arts.

At Bombay whilst experimenting with the New Rig, I became quite convinced of its utility, and now, not the slightest shadow of a doubt rested on my mind, that a vessel constructed upon my principle, with a floor, would sail fast, I next proposed to the public to have a sixty ton yacht built, estimated cost £600, in shares of £1 each. A vessel of this size would be for other purposes besides testing the invention. Iron being better suited for my purpose than wood, it was proposed to build her of that material. Printed descriptions, prospectuses, and subscription sheets, were left at various public places for subscribers, but every one appeared more backward than another to put their name down first, they were all left blank.

I now saw it was necessary to call upon parties personally, although the very idea of doing so was humbling in the extreme; however as my mind was made up, the point I aimed at must be carried. Like the forlorn hope, death or victory, or as the parliamentary candidate goes round canvassing for voters, so I went round canvassing for subscribers.

By this time my little model had made several cruises round halls of various scientific circles.

Wonder was sometimes expressed why the lords of admiralty did not notice it. At times I was asked if all had been brought under their notice; when I answered no; they had merely seen the oil painting and diagrams; the reply was they ought to see the model.

To canvass for £600 in £1 shares being rather a lengthened task to look forward to, and to maintain myself during the time, and having no permanent means to depend on, it occurred to me to go again to London, and try whether the heads of the nation would not become shareholders in the experimental yacht. If they refused, I could reduce the scale and try a smaller one.

Four influential shareholders at this time, had headed the list for a sixty ton yacht, and a few more, at the rate of one or two a-day, might propably have been obtained, had I felt inclined to persevere, but London was running in my thoughts; so with the assistance of a friend, I packed up my model and off I went. To Scotland's shores again I bade farewell, but not for ever. Having safely arrived in the great metropolis of the most powerful nation in the world, to address the heads of it was now the business. I was like all great projectors, thereupon supplied with descriptions, prospectuses of their plans, &c. I sent through the post, copies of my prospectus

to Prince Albert, to all her Majesty's ministers, to each of the lords of admiralty, and several others; at the same time got permission to put my model in the model room, admiralty office.

Nothing now appeared to me so certain than that I would make a breach; but whether it was to be a successful breach in their battlements, or only a breach of good tactics, I was not so sure; however, a short time soon set me at rest as to that matter. They all returned answers to my prospectus; but being only complimentary refusals, they amounted next to nothing. Again I was *completely levelled.* Such a warfare methought must be quite unprecedented. There was I allowed to enter their castles and blaze off my pop guns, whilst they on the ramparts looked down and complimented me. Here did I challenge the whole nautical and scientific world to surpass my vessel in manœuvring; no one would accept, no one would oppose; here did I send truce after truce to sign amnesties of peace, and consider my arms had an all-powerful sway, but no one would submit; no one would pursue. The field was mine! and like a country that is taken without troops to maintain it, I was obliged to withdraw.

The field being mine could be overrun without opposition but not without draining my exchequer; seeing this, I thought moral force

would perhaps effect what my feeble arms could not; so as a protection for trade and a security for my missionaries, I merely maintained a small portion of the plain I had conquered.

The Mechanic's Magazine, London, gave a full account of my invention, with descriptions and wood cuts. Having made a circuit amongst the principal scientific societies, and exhibited the boat on the Serpentine river; I found the thought that whispered to me when first I saw the boat lying without her floor being altered, "was right." Many persons had seen the vessel in the East Indian docks, but as her masts were out, there were some who did not know she was a boat; and now when they saw the little model upon the improved principle with a floor, it was generally considered that both the model and rig were great novelties.

Seeing no chance of raising £600 with any degree of pleasure to myself; stores now running short and canvass nearly thread bare; a light air sprung up to waft me towards the north. To lose no advantage of such a favourable shift of wind, I bore up and run for Leith.

VICTORIOUS CONCLUSION.

After my arrival at Leith I called upon the four gentlemen who had commenced my subscription list; they were agreeable to let their names stand for a craft on a small scale, to have the invention tested.

I proposed one of eighteen feet long, to be built of iron. The greatest part of shipowners about Leith, Edinburgh, and Kirkaldy, subscribed a sum. Messrs. Brown & Co. engineers, Kirkaldy, undertook to build her. I furnished them with my plans, and they finished their work in a masterly style.

On a beautiful morning in autumn, 1842, the boat, which was named the Problem, was borne

to her element for solution. A few experimental trips with her convinced me where I had

before erred without a floor, but now the principle exceeded my expectations.

To the Royal Scottish Society of Arts in Edinburgh I again repaired, to acquaint them I now had a vessel sufficiently large for practical experiment. The convenor of the committee appointed to decide on its merits being from home, a little delay ensued. Ultimately another committee was appointed, which after due examination of the construction of the vessel, her rig, and facility for manœuvring, gave in a favourable report, of which the following is a verbatim copy:—

THE ROYAL SCOTTISH SOCIETY OF ARTS.

Copy—Report of Committee on Mr. H. Dempster's Boat and Rig.

"*Dated 30th Dec.* 1842.
"*Read and approved 9th Jan.* 1843.

"YOUR Committee met at Leith, and assisted by several naval gentlemen, saw Mr. Dempster manœuvre his little vessel called the 'Problem.' The day was not so favourable as could have been wished, from the wind being very light; but yet your Committee saw sufficient to enable them, with the concurrence of those gentlemen who kindly assisted, to report, that the invention, as regards shape of hull and form of rig, is

not such as could recommend it to either navy or the merchant service. But they are of opinion, that from the facilities afforded by this plan, as far as can be judged from the experiment exhibited, it might be well adapted for pleasure yachts under forty tons, or for training youth in naval tactics. This form gives peculiar facilities in tacking, rendering it impossible to miss stays, and performing that manœuvre in much less time than can be done by the usual mode of rigging, &c.

"The 'Problem' stood very near the wind, and made very little lee way; and one gentleman, who tried his yacht along with her on a previous day and having plenty of wind, gave her a high character as a sea-worthy boat, and as performing her work in a handsome manner; and he added, that were he changing his yacht at present, he would be inclined to adopt this plan in the construction of a new one.

"Your Committee are quite aware of the difficulties that attend hazarding an opinion on a construction of hull and rig, before it has been tried on a vessel of the full size to which it is adapted: they are also aware that many advantages as well as obstacles, unlooked for from experiment, often exist;—but they, in this case, do not contemplate any that can materially impede efficiency, where a considerable draught of

water, and carrying a small cargo in proportion to tonnage, are not objections.

"They unanimously testify to the ingenuity and perseverance of Mr. Dempster in his experiments, and to the ready manner in which he and his 'Problem' act and manœuvre; and, if in consistence with the rules of the Society, they would beg to suggest that some assistance of a pecuniary nature should be given to Mr. Dempster for what he has already done.

"All which is humbly reported by

(Signed)

W. CRAWFORD, *Convener.*
J. H. TAIT, *R. Admiral.*
P. STODDART, *Rr. Admiral.*
ALEX. HAMILTON.
WILLIAM GALBRAITH.
THOMAS MENZIES.
JAMES GOWAN.
W. ARCH. SMAIL, *Lt. R. N.*"

Mr. Henry Dempster, Mariner, Kinghorn,

Edinburgh, 10th Jan. 1843.

SIR,

I BEG leave to prefix copy of the Report of the Committee of the Royal Scottish Society of Arts, on your boat of new construction and rig, which was read and approved of at the meeting held yesterday.

The Society remitted to the council, to con-

sider and report what pecuniary assistance it may be within their power to grant towards the experiments you have made, relative to the "Problem."

I am,

Sir,

Your Most Obedient Servant,

JAMES TOD, *Secy.*

THE ADVANTAGES OF THE HULL

Are, First, The possibility of building a vessel so formed, particularly strong at the bottom. Iron is the best material for construction, as it answers the threefold purpose of strength, weight, and leaves sufficient capacity for the requisite ballast that should lay low. The ballast fitted for the formation of the vessel's bottom, a deck can be laid over it, and so securely caulked, that, in the event of leaking below, the water would not flow up.

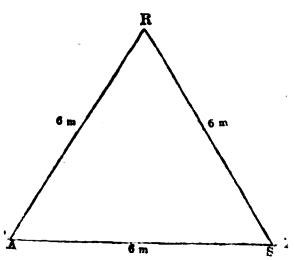
Secondly, A vessel so formed is less liable to damage herself in the event of striking a rock or any other hard substance, as the shock is less

sudden than that of a vessel with a perpendicular stem, and, unless she was to stick exactly on the point, the chances are in her favour for again coming off. Getting aground on a sand-bank she does not bump so heavily as a vessel with a long keel, whilst there is little danger of her breaking her back.

Thirdly, The sailing qualities of such a formed vessel are good, and her property for quick turning unequalled, as both the rudder and sails can be made at once to act in bringing her round.

Her weatherly qualities, are good. It is my opinion that, with a six-knot breeze upon a wind, where the water was smooth, and no current, she would make an equilateral triangle course; that is to say, if she was to sail six miles on one tack, and six miles on the other, she would go six miles to windward.

As, for example, suppose the wind to be



blowing from A towards S in the diagram. The

vessel starts at S on the larboard tack, and sails six miles, she will fetch R. About ship, and sail six miles on the starboard tack, she will fetch A; the vessel will then have gone from S to A, six miles dead to windward.

My reasons for supposing she would be so weatherly are these: When the wind is blowing sufficiently strong, so as to make such a formed vessel careen over, the more she careens, the more length and body of the vessel is immersed in the fluid to leeward, whilst the contrary is the case to windward; so that the greater pressure of the fluid on the lee side of the vessel, and acting upon a little weather helm, has, in my opinion, a tendency to press her to windward of the course she looks; and as the sails of the rig lie remarkably close to the wind, they, of course, will be of assistance in bringing out my hypothesis.

With respect to the stability of such a vessel, when properly constructed and ballasted, there can be little question; because the ballast lying low, and the vessel having a good beam, sail may be carried on until every mast went by the board.

The action of the wind, also, upon the weather quarter of such a formed vessel, whilst beating to windward, has no bad effect; the action of the wind upon a square-sterned vessel retards her progress.

On building a vessel upon this principle, intended to possess the combined advantages of speed, weatherly qualities, stability, and to be capable of performing rapid evolutions, it is required that she must be constructed upon the strictest mathematical calculations; that is to say, the exact dimensions of that portion of her bottom which is intended for the ballast to lie and hold her to windward, must be nicely determined, so as to show as little resistance to the fluid as possible; whilst, at the same time, it must be exceedingly strong.

THE ADVANTAGES OF THE NEW RIG

Are power, safety, and handiness, having a decided superiority for expeditious working, and being capable of manœuvring a vessel through more evolutions with a finer scientific nicety than any other rig that ever preceded it.

The fore and aft equilateral sails being set, a vessel is always under government when there is wind, and will never miss stays if properly managed; as the sails have an equal advantage of propelling and manœuvring astern as they have ahead.

The principle upon which these sails are worked is simply this; there are yards fixed at the middle in swivels on each stem head, those yards are kept from topping either way by lifts that are fast to other swivels at the mast heads.

The sheets of the sails are hauled out by travellers round the yards.

The sails are hoisted up by a single tye, that reeves through the swivel at the mast head, so that, in case the yards should be turned round and round, the tye is always kept clear. When those sails are set tight, there is an equal strain on both leech ropes, and, as the greatest body of the canvass is low, the principal strain comes on the swivels at the stem heads and the lower yards that spread them.

The fore and after masts can be secured with shrouds on each side, and stays from the main and main-top mast head. The lower lifts will be sufficient support to prevent the masts from bending upwards.

The main mast may be rigged, and sails made to be worked on it, as on board of any other square rigged vessel; but what I would recommend for small craft is, that the top-gallant and royal mast (which will be one spar), go sliding gunter fashion abaft the main and main-top mast, which is also one spar.

When the top-gallant mast is struck, its heel

may be stepped on deck, so that, when its backstays are set up, it will be no burden upon the main mast, but rather a support.

The square sails on the main mast have the advantage of receiving the full strength of the breeze from all points; there being no eddy winds to affect them either from fore or mizen topsails. Sailing off the wind, studding sails may be set from all the yards as required.

The safety of the foregoing rig in tacking, wearing, or boxhauling, is unequalled. There is no danger apprehended as there is in that of a main boom jibing; there is little danger of splitting sails, as jibs are so liable to do.

The fore and aft equilateral sails go round on their centre; they are easily worked, reduced, or taken in.

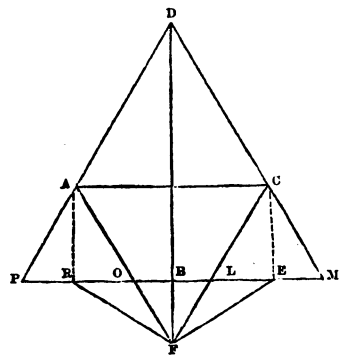
From the sails being equally balanced over the vessel, she is not so liable to pitch heavily as rigs where the greater quantity of canvass is before the centre of gravity.

A vessel properly adapted for this rig ought to be sufficiently large, so as to admit of the lower yards working clear of the heads of those standing on deck.

I may also remark, that, in performing any of the evolutions above specified, there is no necessity to swing the lower yards round, unless the artist who is working them thinks proper,

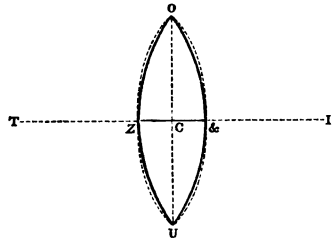
as the principal advantage of those sails is the easy manner which they are worked, by merely slueing the yards from side to side.

Geometrical Definition to find the Principal Outlines how to Build, Mast, and Rig a Vessel, as shown in Vignette on title page.



The length of hull A C. Upon A C construct the equilateral triangle, A D C and A F C on the opposite side of the line. Join D F. Draw C E and A R parallel to D F. Make the angles C F E, A F R, equal to D F A, D F C. Produce D C, D A. Through the angles of meeting R and E, draw the line PROBLEM, and it is finished. Then the ROBLE represent the length of hull, B F will be the depth, F E, F R the stem and stern posts, F O A, F L C

the fore and after masts. F B D the main mast. P R O, L E M, is the length of the fore and after yards. Twice C E M or A R P are the fore and after sails. A C will be the length of main stays, and A D, C D the main-top gallant stays.

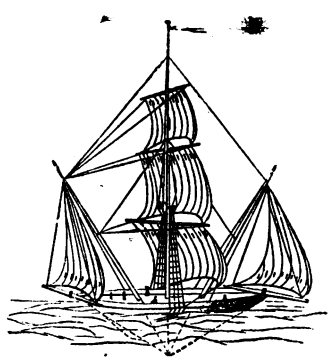


Draw O U the length of hull, which bisect at C with the line Z & produced on both sides. With $\frac{7}{8}$th the length of hull in your compasses, place one foot in U and the other in I, and describe the arch U O; and, with the same distance in your compasses, place one foot in O and the other in T, and describe the arch O U, which will form the deck, Z & being the breadth of beam.

With the breadth of beam, & Z, in your compasses, describe the arches Z, F, & F, F; being the point perpendicular with the centre of gravity, and where the midship section is securely fastened. A also shows the floor line.

It is my opinion that no more body of a vessel (intended for fast-sailing weatherly qualities) ought to be immersed in the fluid than what is actually necessary to secure her stability, and keep her to windward; as it stands to reason that all long vessels must drag a certain portion of the fluid along with them, which tends a little to retard their velocity. But it must also be remembered, that if there is one square foot less of resisting surface exposed to the fluid than what is necessary to keep to windward, it would be equally as bad, because upon a wind the vessel would fall to leeward.

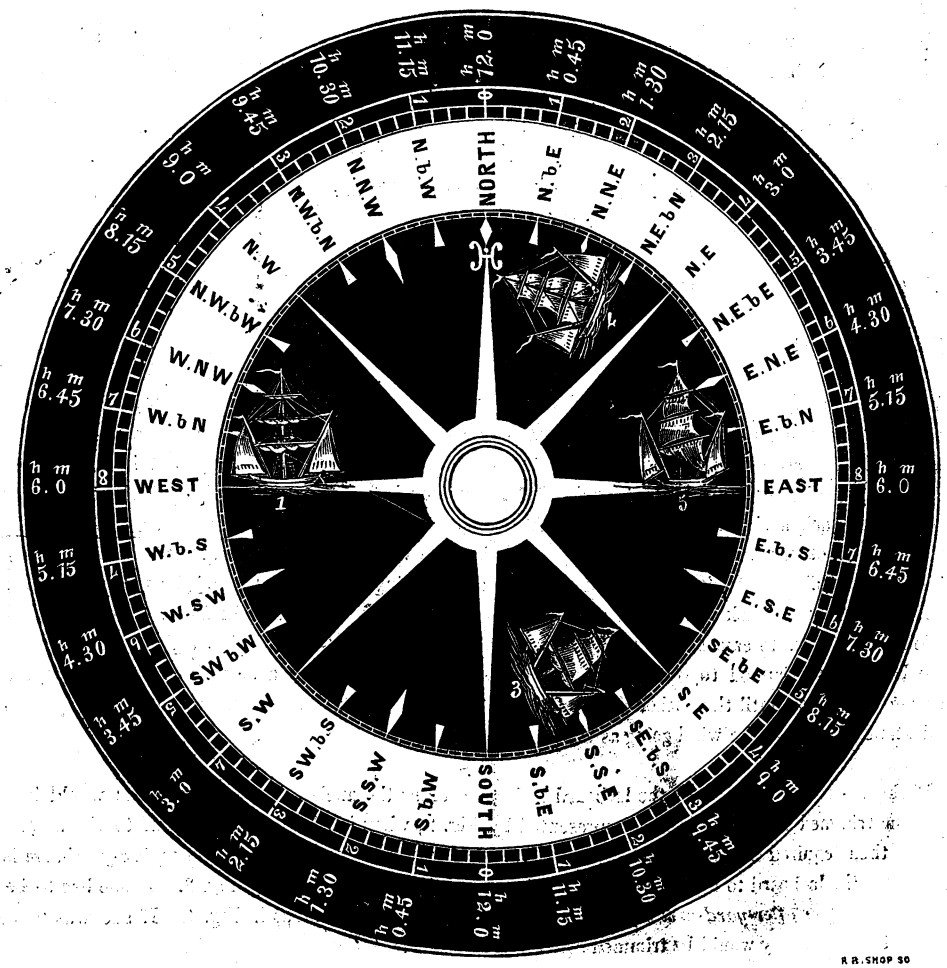
The only disadvantages of the hull upon the new construction are, great draft of water, and unfitness for grounding in a tideway where it is hard, as she would lay over at a considerable angle. Were she to ground where the bottom was soft, the last mentioned disadvantage would be overcome.

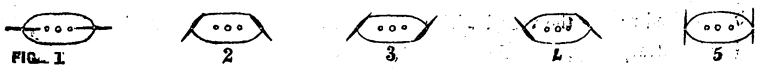


29. 5. 06.

W. G. BLACKIE AND CO., PRINTERS, GLASGOW.

EXPLANATION DESCRIPTIVE OF THE NEW RIG.





THE New Rig being now generally admitted to be quite a *new* and original idea, and as there is none doubts the utility of the improvement in a scientific point of view, to those who did not see the vessels, by means of which I practically demonstrated the invention, the above figures will convey an idea where the improved advantages really do exist, which is principally in the fore-and-aft triangular sails, which are worked on

"*inverted swivel-yards*" at each extremity of the vessel. These yards acting from their centre clear the masts, and can be swung round so as to describe a circle.

The fore-and-aft masts are stepped to *rake* fore-and-aft, so that the sheave-hole at mast-heads for haul-yards (or tie) will be perpendicular to the *swivels*, secured at the stem and stern of the vessel, where the yards are worked on. There is also a swivel at each mast-head, where the *lifts* are fastened; those lifts keep the yards in a horizontal position (or from topping either way) when the sails are lowered down.

The haulyards reeve down through the swivel to which the lifts are fastened, so that, should the yards be swung round and round, the haulyards are always kept clear.

These lifts act as stays to the fore-and-aft masts, keeping them from bending upwards.

The mainmast stands perpendicular in midships.

The better to explain the method of working the fore-and-aft triangle sails, let us suppose, for example, that the drawing on the WEST POINT OF COMPASS is a vessel riding at anchor, head to wind, the wind at the time blowing strong from the *Eastward;* the vessel has to be got underway, but in doing so every precaution must be taken not to *start* (or dredge) the anchor before sail is set, and all is ready to *cast* her quickly. In such a situation, the fore-and-aft triangular sails, worked on "inverted swivel-yards," are superior to all other description of sails; because, when the vessel is hove to the anchor, (*short a peak*,) the sails are set, whilst the yards are trimmed, fore-and-aft, pointing in the direction of the wind. (See Fig. 1, which represents the deck and "inverted swivel-yards.") These sails being in this position, the wind has little effect on them to cause the dredging of anchor, and so soon as the anchor is weighed, the sails can with ease be rapidly trimmed to *cast* the vessel on either tack, or to make a stern-board if necessary, or to *heave-to* the vessel, until the anchor is *catted* and *fished*. The triangular sails are as powerful in propelling, and stand as close to the wind going astern as ahead.

If the vessel is to be cast on the larboard tack, as soon as the anchor is *tript*, the yards would immediately be trimmed to the angle, as is represented by Fig. 2, when her head would fall off to the southward. If it is then required that the vessel is to be sent *ahead* on the larboard tack, the *inner fore-yard-arm* is angled from the larboard to the starboard side. The yards would then be as in Fig. 3. If she has to be sent astern, the *inner after-yard-arm* is angled over—they would then stand as in Fig. 4. If she was to be put before the wind, they would be trimmed *square*, as in Fig. 5.

Should it be required to *cast* the vessel with her head to the *northward*, on the *starboard tack*, the yards are worked in the contrary way, as is above stated.

Whilst sailing along upon *a board*, should any danger appear suddenly ahead, and it were necessary, from the position of the vessel, to take her astern, the fore-and-aft triangle sails can, with little exertion, be rapidly shifted to propel astern. If the square sails on the mainmast were set, they would have to be swung round aback, as on board of a square-rigged ship.

In propelling a vessel astern, (that carries but one rudder, and it shipped on the stern-post,) it ought to be understood that particular attention must be paid to the *different action of the fluid upon the helm, going sternways from headways.* Many mistakes and accidents occur at sea from neglect or a want of knowledge of that point.

In DROPPING or working in a *tideway*, the fore-and-aft triangular sails are remarkably handy, as *Quick* Tacking, Wearing, or Boxhauling, is obtained by their power.

To TACK a vessel rapidly under the New Rig, when the helm is put *a-lee*, the *after* yard-arm is hauled in *midships*, and the fore-yard checked off, that the sail might *shiver*. The vessel then comes *fast up* in the wind. The manœuvre is then performed in the usual way, as on board of a square-rigged ship, by hauling round the mainyard, &c. The fore-and-aft triangle sails might either be *braced round* or merely *angled* from one side to the other.

To WEAR her rapidly, when the *helm* is put *a-weather*, the *fore-yard* arm is hauled in *midships*, and the after sail *shivered*. Her head then falls *quickly off*. The rest of the manœuvre is then performed as on board of a square-rigged ship. But it must always be kept in view, that with the fore-and-aft triangular sails, you possess *a double* advantage from sails otherwise rigged, as they can be *braced round*, as square sails are worked, or merely *angled* from one side to the other, as a fore-and-aft sail.

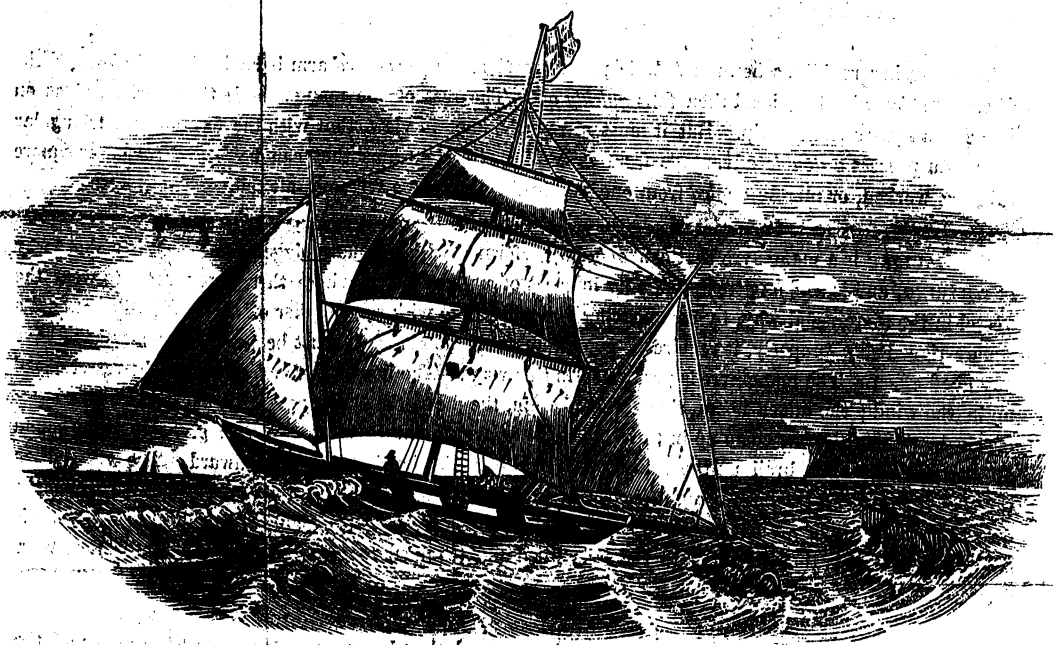
BOXHAULING is a manœuvre that can *only* be performed with a square-rigged vessel. It is a short way of WEARING, and is seldom attempted, only in cases of necessity, and where there is not room to wear the vessel in the more usual way, by commencing the manœuvre with running her off the wind. To boxhaul a square-rigged ship properly, it requires a good number of hands, as it must be performed smartly to have any good effect. The manœuvre is performed in this way:—The helm is put *a-lee* to bring the vessel's head up in the wind; the mizen-boom sheet is hauled in, the head-sheets are eased off, and the lee fore-brace checked. When she has come up in the wind three or four points, the order is then given to swing round all the yards at once, brail up the mizen, and haul over the head-sheets to windward. The vessel then takes stern way, and the *helm* being *a-lee*, the action of the *fluid* on it brings the vessel's stern up toward the direction of the wind. When her stern has arrived at the nearest point capable of fetching, and her way is stopped, the helm is then shifted, and the sails filled and trimmed to give her headway, she is then wore round.

By performing this manœuvre, a vessel loses less ground than by commencing at first to run her off the wind, as in *wearing;* because, before she takes headway, the wind is brought well aft from the sternboard she has taken, and bringing her stern up in the wind.

From this description of boxhauling a square-rigged ship, it will easily be observed the great advantage to be gained with the New Rig to perform that manœuvre. There is no necessity to take sail off the vessel. The fore-and-aft triangular sails are easily shifted to propel astern without any great exertion being required; and a vessel with the New Rig on can not only be given a sternboard to, but she can be tacked

or wore stern foremost, manœuvres which no other rig heretofore discovered is capable of performing to command a vessel through. With the New Rig you can tack and beat a vessel to windward sternways. The possibility of so doing being entirely obtained from the power and action of the "inverted swivel-yards," and the fore-and-aft triangular sails.

H. DEMPSTER.



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