enable her to carry more ſail ; and Mr Gordon then enumerates the ſeveral advantages that a ſhip of this conſtruction will poſſeſs.

This plan has lately been put into execution by Cap­tain Schank, with this difference only, that inſtead of the keels being fixed as propoſed by Mr Gordon, Cap­tain Schank conſtructed them ſo as to ſlide down to a certain depth below the bottom, or to be drawn up within the ſhip as occaſion might require.

Captain Schank having communicated his plans to the Navy Board, two veſſels were in conſequence or­dered to be built of 13 tons each, and ſimilar in dimenſions, one on the old conſtruction, and the other flat- bottomed, with Aiding keels. In 1790 a compara­tive trial in preſence of the commiſſioners of the navy was made on the river Thames, each having the same quantity of sail ; and although the veſſel on the old conſtruction had leeboards, a greater quantity of bal­laſt, and two Thames pilots aboard, yet Captain Schank’s veſſel with three Aiding keels beat the other veſſel, to the aſtoniſhment of all preſent, one half of the whole diſtance ſailed ; and no doubt ſhe would have beat her much more had she been furniſhed with a Thames pilot.

This trial gave ſo much ſatisfaction, that a king’s cutter of 120 tons was immediately ordered to be built on the fame conſtruction, and Captain Schank was requested to ſuperintend its building. This veſſel was launched at Plymouth in 1791, and named the *Trial.* The length of this veſſel is 66 feet, breadth 21 feet, and depth of the hold ſeven feet : ſher bottom is quite flat, and draws only six feet water, with all her guns, ſtores, &c. whereas all other veſſels of her tonnage on the old conſtruction draw 14 feet ; ſo that ſhe can go with ſafety into almoſt any harbour or creek. She has three sliding keels incloſed in a caſe or well ; they are each 14 feet in length ; the fore and the after keels are three feet broad each, and the middle keel is six feet broad. The keels are moveable by means of a winch, and may be let down ſeven feet below the real keel ; and they work equally well in a ſtorm as in ſtill wa­ter. Her hold is divided into ſeveral compartments, all water-tight, and ſo contrived, that ſhould even a plank or two ſtart at ſea in different parts of the veſſel, ſhe may be navigated with the greateſt ſecurity to any place. If ſhe ſhould be driven on ſhore in a gale of wind, she will not ſoon become a wreck, as her keels will be driven up into their caſes, and the ſhip being flat-bottomed, will not be eaſily overſet ; and being able to go into ſuch ſhallow water, the crew may all be eaſily ſaved. By means of her Aiding keels ſhe is kept ſteady in the greateſt gale ; ſhe is quite eaſy in a great ſea, does not strain in the leaſt, and never takes in wa­ter on her deck ; and when at anchor, ſhe rides more upright and even than any other ſhip can do : ſhe ſails very faſt either before or upon a wind ; no veſſel ſhe has ever been in company with, of equal ſize, has been able, upon many trials, to beat her in failing ; and yet her ſails ſeem too ſmall.

It has alſo been propoſed to conſtruct veſſels of other materials than wood ; and lately a veſſel was built whoſe bottom, inſtead of being plank, was copper.

Book I. *Containing the Method of. delineating the ſeveral Sections of a Ship.*

**Chap.** I. *Of the Properties of Ships.*

A SHIP ought to be conſtructed ſo as to anſwer the par­ticular purpoſe for which ſhe is intended. It would be an eaſy matter to determine the form of a ſhip intended to ſail by means of oars ; but, when sails are uſed, a ſhip is then acted upon by two elements, the wind and wa­ter : and therefore it is much more difficult than is com­monly imagined to aſcertain the form of a ſhip ſo as to anſwer in an unfavourable as well as a favourable wind ; the ſhip at the same time having a cargo of a certain, weight and magnitude.

Every ſhip ought to ſail well, but particularly when the wind is upon the beam ; for this purpoſe a conſiderable length in proportion to the breadth is necessary, and the plane of reſiſtance ſhould be the leaſt poſſible. The main frame ſhould alſo be placed in a proper ſituation ; but according to the experiments of Mr Chap­man @@\*, its plane is variable with the velocity of the ſhip : the mean place of the main frame, has, however, been generally eſtimated to be about one-twelfth of the length of the keel before the middle. Without a ſuf­ficient degree of ſtability a ſhip will not be able to car­ry a preſs of ſail : a great breadth in proportion to the length and low upper-works will augment the ſtability. The following particulars being attended to, the above property will be gained, and the ſhip will alſo ſteer well. The wing tranſom ſhould be carried pretty high ; the faſhion-pieces well formed, and not full below the load water-line : the lower part of the item to be a por­tion of a circle, and to have a conſiderable rake : the ſternpoſt to be nearly perpendicular to the keel ; and all the upper works kept as low as poſſible.

Many ſhips from conſtruction are liable to make much leeway. This may in a great meaſure be avoided by gi­ving the ſhip a long keel, little breadth, and a conſider­able depth in the hold : whence the bow will meet with little reſiſtance in compariſon to the ſide, and therefore the ſhip will not fall much to the leeward.

Another very great retardation to the velocity of a ſhip is her pitching. The principal remedy for this is to increaſe the length of the keel and floor, to diminiſh the rising afore and abaft, and to conſtruct the hull in ſuch a manner that the contents of the fore-body- may be duly proportioned to the contents of the after­body.

In a ſhip of war the lower tier of guns ought to be of a ſufficient height above the water, otherwiſe it will be impoſſible to work the lee-guns when it blows hard. This property will be obtained by giving her a long floor-timber, little riſing, a full midſhip frame, light up­per works, and the wing tranſom not too high : And in every ſhip the extreme breadth ought always to be higher afore and abaft than at midſhips.

A merchant ſhip, besides being a fast ſailer, ought to carry a conſiderable cargo in proportion to its length, to ſail with little ballaſt, and to be navigated with few hands.

That a ſhip may take in a conſiderable cargo, it

@@@[m]\* Traite de la Construction de Vaisseaux, p. 40