sions, they perhaps may be inferred from the circle. Thus, if the extreme breadth be made equal to the dia­meter, the length at the load water line, or the diſtance between the rabbets of the ſtem and poſt at that place,may be made equal to the circumference of the ſame circle ; and the depth of the hold equal to the radius, the upper works being continued upwards according to circumſtances. A ſhip formed from theſe dimenſions, with a bot­tom more or left full according as may be judged neceſſary, will no doubt anſwer the propoſed intention. Nevertheleſs, one or other of theſe dimenſions may be varied in order to gain ſome eſſential property, which the trade that the veſſel is intended for may require.

The following hints are given by Mr Hutchinſon @@\* towards fixing rules for the beſt conſtruction of ships bottoms.

ι. “ I would recommend (ſays he), to prevent ſhips bottoms from hogging @@\* upwards amidſhip, to have the fore and after part of their keels deep enough, that the upper part may be made to admit a rabbet for the gar- board ſtreak, that the main body and bearing part of the ſhips bottoms may be made to form an arch down­wards in their length, ſuppoſe with the ſame sheer as their bends, at the rate of about 2 inches for every 30 feet of the extreme length of the keel towards the mid­ſhip or main frame, which may be reckoned the crown of the arch ; and the lower part of the keel to be made straight, but laid upon blocks so that it may form a re­gular convex curve downwards at the rate of an inch for every 30 feet of the extreme length of the keel, the loweſt part exactly under the main frame ; which curve, I reckon, is only a ſufficient allowance for the keel to become ſtraight below, after they are launched afloat, by the preſſure of the water upward againſt their floors amidſhip, which cauſes their tendency to hog. And certainly a ſtraight keel is a great advantage in failing, as well as to ſupport them when laid upon level ground or on ſtraight blocks in a repairing dock, without ta­king damage.

2. “As ſquare ſterned ſhips, from experience, are found to anſwer all trades and purpoſes better than round or pink ſterned ſhips, I would recommend the fore part of the ſternpoſt, on account of drawing the water lines in the draught, only to have a few inches rake, that the after part may stand quite upright per­pendicular to the keel : and for the rake of the stem I would propoſe the rabbet for the hudding ends for the entrance, and bows from the keel upwards, to form the ſame curve as the water line from the ſtem at the harpin towards the main breadth, and the bows at the harpin to be formed by a ſweep of a circle of half the three- fourths of the main breadth ; and the main tranſom to be three-fourths of the main-breadth ; and the buttocks, at the load or failing mark aft, to be formed, in the ſame manner as the bows at the harpin, with a ſweep of a circle of half the three fourths of the main breadth, to extend just as far from the ſtem and ſtern poſt as to ad­mit a regular convex curve to the main frame, and from theſe down to the keel to form regular convex water- lines, without any of thoſe unnatural, hollow, concave, ones, either in the entrance or run ; which rules, in my opinion, will agree with the main body of the ſhip, whether ſhe is designed to be built full for burden or sharp below for sailing.

3. “ This rule for raking the ſtem will admit all the water-lines in the ſhip’s entrance to form convex curves all the way from the ſtem to the midſhip or main frame, which anſwes much better for failing as well as ma­king a ship more easy and lively in bad weather. And the bows ſhould flange off, rounding in a circular form from the bends up to the gunwale, in order to meet the main breadth the ſooner, with a ſweep of half the main breadth at the gunwale amidſhips ; which will not only prevent them greatly from being plunged under water in bad weather, but ſpread the ſtanding fore-rigging the more, to ſupport theſe material masts and fails forward to much greater advantage than in thoſe over ſharp bowed ſhips, as has been mentioned. And as the foil­ing trim of ſhips in general is more or left by the stern, this makes the water lines of the entrance in proportion the ſharper to divide the particles of water the easier, so that the ſhip may preſs through it with the leaſt resistance.

4. “ The run ought to be formed ſhorter or longer, fuller or ſharper, in proportion to the entrance and main body, as the ſhip is designed for burden or sailing faſt. The convex curves of the water lines ſhould lessen gra­dually from the load or foiling mark aft, as has been mentioned, downwards, till a fair ſtraight taper is form­ed from the after part of the floor to the ſternpoſt be­low, without any concavity in the water lines ; which will not only add buoyancy and burden to the after body and run of the ſhip, but, in my opinion, will help both her sailing and ſteering motions ; for the preſſure of the water, as it cloſes and rises upon it to come to its level again, and fill up that hollow which is made by the fore and main body being pressed forward with sail, will impinge, and act with more power to help the ſhip forward in her progreſſive motion, than upon thoſe unnatural concave runs, which have so much more flat dead wood, that muſt, in proportion, be a hinderance to the ſtern being turned so eaſily by the power of the helm to ſteer the ſhip to the greateſt advantage.”

Many and various are the methods which are employ­ed to deſcribe the ſeveral parts of a ſhip. In the follow­ing problems, however, thoſe methods only are given which appear to be moſt eaſily applied to practice, and which, at the same time, will anſwer any propoſed purpoſe.

Prob. I. To deſeribe in the plane of elevation the ſheer or curvature of the top timbers.

Let QR (fig. 3.) be the length of the ſhip between the wing tranſom and the rabbet of the item. Then ſince it is generally agreed, eſpecially by the French conſtructors, that the broadeſt part of the ſhip ought to be about one-twelfth of the length before the main frame or dead flat ; therefore make R⊕ equal to five- twelfths of QR, and ⊕ will be the station of the main frame ; ſpace the other frames on the keel, and from theſe points let perpendiculars be drawn to the keel. Let ⊗P be the height of the ſhip at the main frame, VF the height at the aftermoſt frame, and RK the height at the stem. Through P draw EPL parallel to the keel; describe the quadrants PGI, PMN, the radius being Ρ⊕; make PH equal to EF, and PO equal KL, and draw the parallels GH, OM : Divide GH ſimilar to ⊕C, and OM ſimilar to ⊕R. Through theſe points of diviſion draw lines perpendicular to EL, and the ſeveral portions of theſe perpendiculars contain­ed between EL and the arch will be the riſings of the

@@@[m]\* Practical Seamanship, page 25.

@@@[m]\* See Book ii. Chap. 2.