These particulars are mentioned because it was the first, if it be not the only, example, in this country, of determining the position of the centre of gravity of a ship experimentally.

The draught of water was taken very correctly, the water being smooth, and was found to be, forward eleven feet six inches, abaft fourteen feet ten inches and a half. The depth of the keel and false keels below the lower edge of the rabbet of the keel was, forward one foot nine inches, abaft one foot three inches. The ship was perfectly up­right, all the weights, inclusive of the crew, being equally balanced on each side. A large quadrant marked to a scale of degrees, with a plumb attached to the centre, was fixed in the main hatchway, to measure the inclination. The stations of the carronades and long gun on one side were marked on the deck, they were then moved to the other side, keeping them in the same transverse lines ; the shot, the hammocks, and the crew, were also passed over to the inclined side, under the same condition. The distance which every weight had been moved was then measured. The weight of the shot moved was known, the weights of the long gun and the carronades were taken from the weights marked on them, and the weights of the men and hammocks were obtained by weighing them. The inclina­tion of the ship was then observed to be 6°20'. The pro­duct of the weights which had been moved, multiplied into the distances they had been moved in a transverse direc­tion, in feet, was equal to 264∙5 tons. This moment, multi­plied into the cosine of the angle of inclination, was evi­dently equal to the moment of the stability of the ship.

Let D be the displacement of the ship in tons ; I the vo­lume immersed by the inclination, also in tons ; *b* the dis­tance between the volumes immersed and emerged ; and *d* the distance between the centres of gravity of the displace­ment and the ship.

Then *b*I — *d*D × sin. 6° 20' = 264∙5 × cos. 6° 20', *d =* *b*I— 264∙5 × cos. 6o 20/sin. 6° 20' D

By substituting the values of *b*I and D obtained by calcu­lation, in this expression, the value of *d,* the distance be­tween the centre of gravity of the displacement and the centre of gravity of the ship, is obtained.

*d =* 446∙2 — 262∙8/50·85 = 3·6 feet.

The distance of the centre of gravity of the displacement below the load water-line being equal to 3∙97 feet, 3∙97 — 3∙6 = ∙37 will be the distance of the centre of gravity of the ship below the load water-line at the time of mak­ing the experiment.

When the ship was at Spithead, completely fitted out, with every thing on board that was deficient at the time of making the experiment, and with her provisions and stores for four months, the draught of water was again taken, and found to be, forward twelve feet six inches, abaft fourteen feet ten inches. The weights of all the articles brought on board since the experiment amounted to 33·4 tons, and the moment of these weights calculated above the water-line at the time of sailing was =193 tons; the height of the centre of gravity of the sails being estimated as in the case of a top-gallant breeze.

The moment of weights below this water-line at the time of making the experiment = 401 tons,

401-193/494·4=·42 feet.

The situation of the centre of gravity of the ship was ∙42 foot, or five inches, below the water-line, at the time of sailing.

The correction to the result of this experiment which we see had to be made at Spithead, in consequence of the ad­ditional weight that had been taken on board after the ship had left the harbour, must, from the great hurry incidental to any observations made at the time of a ship’s sailing, throw some doubt on the correctness of the final result ; and it would be therefore desirable that it should receive the confirmation of a second trial on some similar ship, before its being assumed as conclusive to be the correct position of the centre of gravity of a sloop of w ar.

The second method was proposed by Mr Abethell, a member of the late School of Naval Architecture, and was published in the second volume of the Papers on Naval Ar­chitecture. It is applicable whenever a ship is taken into dock with the under side of her keel deviating from paral­lelism with the upper surface of the blocks. This is almost always the case ; and it also not unfrequently occurs that ships are docked “ all standing,” and with so large a por­tion of their armament and stores on board, that the cor­rection necessary to be made to the result which would be obtained by the experiment and investigation about to be described, in order to make that result agree with the cir­cumstances of any additional armament and equipment, would be comparatively easy. We will now quote from the article in question.

“ We will suppose, by the falling of the tide in the dock, the after-extremity of the keel to come first in contact with the blocks ; then, as the tide continues to fall, the after-body is gradually forsaken by the water, and the fore-body fur­ther immersed, a constant equilibrium being maintained be­tween the total weight of the ship and the pressure of the water against the immersed part of the body, until the ship is aground fore and aft. At any intermediate instant the ship may be considered as a lever of the second kind, of which the fulcrum is the transverse line or point of contact of the keel and after-block, and the power and weight the weight of the immersed volume and that of the ship respectively, each acting in the vertical line passing through its centre of gra­vity. As we can, by mensuration and calculation from the draught of the ship, easily find its weight, that of the im­mersed volume, and the perpendicular distance of the line of pressure from the fulcrum ; in the equation of the mo­ments, the distance of the vertical line passing through the centre of gravity of the ship is the only unknown quan­tity, which is therefore readily determined. AN (fig. 3) represents the water-line corresponding to the floating po­sition of the ship, and KL the observed water-line just previously to the fore-part of the keel touching the blocks. The line PBO, perpendicular to AN, passes through the centre of gravity of the displaced volume AFMN, and consequently through that of the ship. Draw QH through the centre of gravity of the volume KFML, perpendicular to KL, and FG through the fulcrum F, parallel to QH Then, putting the total displacement AFMN = V, KFML = v, and GH = *b*,∙ if the line SEO, parallel to QH, be drawn at the distance GE from G equal to *bv/V*, it will, as well as PBO, pass through the centre of gravity of the ship, which will be in O, the point of their intersection.

“ To obtain from these considerations a general expres­sion for the perpendicular distance of the point O from the