

We must submit, however, the reasons which led us to propose the above dimensions.

The experiments made in 1775, by the French Academicians D'Alembert, Cordorcet, and Bossut, have shown: 1. That the resistance of water to the perpendicular motion of a given plane, may be regarded as proportional to the square of the velocity; 2; That, the velocity being the same, the resistance of water may be considered as proportional to the area of the plane; 3. That these results obtained only in the case of an indefinite expanse of water; 4. That, in narrow canals, the resistance increases in a more rapid ratio than the square of the velocity.

To attenuate, as much as practicable, this inconvenience, researches have been made to ascertain what should be the ratio between the transverse section of the canal and the transverse section of the boat, in order that the boat might move through such a canal, as through an indefinite expanse of water. Experiments made on the subject, by the celebrated Chevalier Dubuat, have shown that, to attain this result, the cross section of the canal ought to be, with moderate velocities, 6.46 times the cross section of the boat, and the water line $4\frac{1}{2}$ times the breadth of the boat.

Adopting, to preserve uniformity, $13\frac{1}{2}$ feet for the breadth of the boats used on the Chesapeake and Ohio Canal, [which is the breadth of the Erie Canal and of the Ohio Canal boats;] if we suppose the draft to be three feet, the prow to be rectangular, and the sides and bottom of the boat to conform to it, the cross section of the boat will be 40.5 square feet. Taking, now, this area 6.46 times, we find 261 2-3 square feet for the cross section of the canal, through which the boat would not meet with a greater resistance than through an indefinite expanse of water. The water line should be 60 3-4 feet, that is, four times and a half the breadth of the boat.

Were not expense to be taken into consideration, these dimensions might be recommended; but fitness of the work, and strict economy, must be reconciled as much as practicable, and it is in such a view that smaller dimensions are to be fixed upon.

It is to be remarked, that the distance from Georgetown to Pittsburg, in following the line of canal, is $34\frac{1}{2}$