

So far these experiments were highly satisfactory; but it still remained to be seen, whether or not the ropes which had an inferior degree of twist, had not also an inferior degree of useful solidity, notwithstanding their superiority of strength in carrying weights.

In order to determine this point, M. Du Hamel had a considerable quantity of rigging made with yarns wrought up into only *three-fourths* of their length, and got them put into actual use on ship-board, during a whole campaign. The report given by the officers of the ship was highly satisfactory. They proved that the ropes thus manufactured were *one-fourth* lighter than the common kind; that they were nearly *one-eighth* more slender, so as to give less hold to the wind; that, from their being more pliant than the common ones, they run easier through the blocks, and did not run into what are technically called kinks; that the new cordage required fewer hands to work it, in the proportion of *two to three*; and that it was at least *one-fourth* stronger.

Wherever ropes are not exposed to short bendings, as in the case of standing rigging, where they can be defended from water by tarring, &c., the least twisted cordage may be advantageously employed, and should, according to M. Duhamel's experiments, be made from strands; for it is demonstrable that in fine stranded cordage, when the twist of the strands is exactly equal to the twist in the laying, the strands lie less obliquely to the axis than in other ropes, and therefore bear a greater load.

In examining the strength of cordage, $3\frac{1}{2}$ inches in circumference and under, M. Duhamel found that the strength increased a little faster than the number of equal threads, thus:—

Ropes of 9 threads bore 1,014, instead of 946 lbs.		
12	1,564,	1,262
18	2,148,	1,893

According to the experiments of Mr. Huddart, no strength is lost in the common way when there are only three yarns in the strand. When there are more than three yarns, the loss is one-sixth, and with a hundred yarns it is about one-half.

The following rule is given by Dr. Robison for obtaining the strength of ropes:

Multiply the circumference of the rope in inches by itself, and the fifth part of the product will be the number of tons which the rope will carry.

For example, if the rope is 6 inches in circumference, we have 6 times 6, = 36, the fifth of which is $7\frac{1}{5}$ tons.

Tarring Ropes.—There is no branch of the rope manufacture more important than that which relates to the tarring of the cordage. The following experiments were therefore made by M. Du Hamel, on the relative strength of tarred and white or untarred cordage:

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UNTARRED ROPE.	TARRED ROPE.	DIFFERENCE.
Broke with 4,500 pounds	3,400 pounds	1,100
4,900	3,300	1,600
4,800	3,250	1,550