Ladiya, or *lodiya*, is an older word without the affix, surviving in some places.

We meet with various spellings of both words; e.g., *loddics* or *loddings* in the narrative of Stephen Burrough's voyage (1556), *lodgie* in the narrative of William Barents's Third Voyage (1596) (*vide* P. F. Alexander, *The North-West and North East Passages*, 1576-1611, Cambridge, 1915, p. 184). *Lotkey* is found in the description of the Russian Fleet by a contemporary Englishman, 1724 (edited by Admiral Sir Cyprian Bridge, Navy Records Society, vol. xv., 1899, p. 8, f.n.), in which it is stated that *lotkey* is a small craft called *lodja* by the Swedes, pl. *lodjor*. An editor's note says that our seamen of the Baltic and White Sea campaigns of 1855-1856 called these craft *lodgers*. *Ladji* is von Wrangell's spelling of *ladiya* in speaking of the "small flat vessels" used by the early Russian navigators between the White Sea and Ob and Yenesei estuaries (Narrative, *cit. supra* p. xviii).

JAL'S "MEMOIRE NO. 7."

BY R. C. ANDERSON.

NOW that Mr. Wood, in his article in September, has ventured to disagree with some of Jal's conclusions, I feel justified in doing the same thing on a smaller scale. Far be it from me to dispute Jal's pre-eminent place in the world of Nautical Archæology. "No one can profitably study the nautical developments of the Middle Ages . . . without first ascertaining what Jal has written on the subject. Should he attempt to do so he would, in a majority of cases, be likely to discover that laborious study had barely advanced him to a point which Jal

had already left far behind." So wrote Mr. Laughton in our second volume, and I agree with every word. Perhaps, though, it is not too presumptuous to take Jal's own presentation of the results of his labours and to try to better it in minor details. Few of us would attempt to design or build a sailing boat for ourselves, yet nearly all of us would feel perfectly competent to make our own small improvements after she was built.

One of the most fascinating studies in Jal's "Archéologie Navale," is No. 7, "Sur les Vaisseaux ronds de Saint Louis." This is an attempt to get from certain Latin documents of the year 1268 an idea of the shape, rig, and internal arrangement of large Mediterranean sailing ships of that date.

I am not going to deal with matters of opinion; I merely wish to point out two definite mistakes. The second paragraph of the first document, as given by Jal, runs as follows:—"Navis, quæ vocatur *Roccafotis*, est longua pedibus centum et decem, quæ longitudo est de pedibus septuaginta in columba; et in largore proræ et puppis est de pedibus quadraginta. . . ." He makes quite a point of reading "largore" instead of "longore," as given by some of his predecessors. According to him, "The ship named *Roccafotis* is 110 feet long, and this length is 70 ft. on the keel; and (she) is 40 ft. in width at the bow and stern." He notes that the width of the bow and stern was the same and was very nearly equal to the extreme beam—41 ft. in this case. The ship had, in his opinion, similar lines forward and aft and was like a long box rounded at the two ends.

Now, the fact that the length over all was equal to the sum of the length on the keel and the *largor* (or *longor*) of the bow and stern, might be a coincidence if it only held good for this one ship, but we find this same relation in three different vessels— $70 + 38 = 108$, $70 + 40 = 110$, $75 + 25 = 100$. Surely we are justified in translating *largor* (or *longor*) as "rake." True, the seven ships which were to be built were to be 10 ft. longer than the sum of their keel length and the *largor* of their bow and stern. That is on the figures as given by Jal, $58 + 18 = 86$ (—10). According to Dumont's "Codex Diplomaticus" the discrepancy was the other way round— $58 + 38 = 86$ (+ 10). I fancy the "largor proræ et puppis" ought to read 28 ft.

Anyhow there is no real evidence for Jal's double-ended straight-sided vessel. His midship section is even more doubtful. "Et est ampla in fundo de pedibus novem et dimidio; et est alta in prima cooperta undecim pedibus et dimidio; et est ampla in ore pedibus quadraginta et uno. . ." That is

the evidence on which he works. "And is broad on the bottom, $9\frac{1}{2}$ ft. ; and is deep at the first deck, $11\frac{1}{2}$ ft. ; and is broad at the greatest, 41 ft." He proceeds thus :—AB is $8\frac{1}{2}$ ft., the "amplitudo in fundo." CD, drawn perpendicularly from the middle point of AB is $11\frac{1}{2}$ ft., the "altitudo in prima cooperta." Through D goes FK, which is 41 ft., the "amplitudo in ore" ; this is, of course, parallel to AB. Now, to get the curves between A and K or B and F, he takes two points on FK, Q and R, such that FQ, or KR, = CD, and with these as centres and QF or RK as radius he draws two arcs of circles. According to his own argument this is almost certainly the correct method because "the arc of a circle starting from the end of the main beam runs very exactly through the extreme point of the width on the bottom."

Well, it doesn't ; that is all there is to say about it. Draw it and see. Clearly the line AB will have to be produced to *a* and *b* if it is to meet these arcs at all and these points will be vertically below R and Q, so that $ab = 41 - 2 (11\frac{1}{2})$ ft. = 18 ft. instead of the $9\frac{1}{2}$ ft. of AB. Jal himself says : "The midship-section of the *Roccafortis* . . . has, I think, a rather unexpected shape ; it is not likely that this is the curve which would have been traced by our engineers or by any of the scientists who have rebuilt in imagination the ships of the Middle Ages." Very true. I don't pretend to know what curve was used, but I imagine it was far more angular with a very distinct turn at A and B.