

able instrument, is not referred to; but the integrator which combines appliances for computing areas, moments, and moments of inertia of plane curves is described. This instrument has lately been introduced into ship-drawing offices, and is highly appreciated for the saving of time and labour which can be effected by its use, and for its comparative freedom from error. Complicated calculations can be made with this ingenious piece of mechanism by less highly-skilled draughtsmen than are required for performing the ordinary arithmetical calculations. This is a very important matter in mercantile shipyards, where the supply of scientifically-trained draughtsmen is not great. In referring to this point Sir E. J. Reed says that "in most private shipbuilding establishments these lads (drawing-office apprentices) are now required to pass an examination similar to that which candidates undergo for apprenticeship in Her Majesty's dockyards." We do not understand that this is so. It may be the case with one or two firms, but the system is a very exceptional one. Sir E. J. Reed gives a mathematical investigation of the properties of the integrator, and explains how to take off the readings for areas, moments, and moments of inertia. We notice an omission in connection with the figures given for the various constants that require to be applied as multipliers to these readings, for the purpose of converting them into actual units of measurement. The particular instrument to which the constants apply is not fully stated. The constant for areas, given as 15, and that for the area term in the expression for moment of inertia, given as 240, relate to instruments formerly supplied by M. Amsler, which had a different diameter of area wheel from those now made. We believe that the circumference of the area wheel is now 25 inches; so that the two constants which depend upon the size of the area wheel would, in that case, be 20 and 320, instead of 15 and 240.

The final chapters of the treatise deal with general questions relating to the rolling of ships at sea, and the effect of wind-pressure upon stability when ships are sailing among waves. The method of obtaining by experiment the vertical position of a ship's centre of gravity, and the precautions which have to be adopted in order to ensure fairly accurate results, are described.

The few omissions and defects we have pointed out are but of minor importance, and do not appreciably affect the general value of this very important treatise. It is not only the largest that has ever appeared in this country, but also the most intelligible, instructive, and complete exposition of the principles of stability. It forms a most valuable addition to the science of naval architecture, and one that has long been needed. Till now we have been unable to refer persons desirous of studying the various problems connected with the stability of ships to any work in which they would find the subject treated in a clear and comprehensive manner. Sir E. J. Reed has supplied a want that has long existed. We strongly recommend his book to all who are interested in the subject, and particularly to those whose connection with ships requires them to know upon what conditions stability depends, and how it is affected by all the various circumstances of construction and loading which may arise. Such a treatise should be especially welcome to students.

OUR BOOK SHELF

In the Lena Delta; a Narrative of the Search for Lieut.-Commander De Long and his Companions, followed by an Account of the Greely Relief Expedition and a Proposed Method of Reaching the North Pole. By G. W. Melville; Edited by G. Melville Philips. (London: Longmans and Co., 1885.)

THE sad story of the *Jeannette* Expedition has already been very fully told in the two volumes of journals left by Capt. De Long. Still, we do not object to this more detailed narrative of the experiences in the Lena Delta of those who managed to reach it, by the one most qualified to speak of them. It was by the strenuous exertions of Engineer Melville that the bodies of Capt. De Long and his companions were discovered, and that the few survivors were rescued. Concerning the physical and biological conditions of the great swamp formed about the mouths of the Lena, Mr. Melville does not tell us much more than we knew already; but his continual journeys to and from between the delta and such towns as Yakutsk, Tiumen, and others in this part of Siberia necessarily furnish us with many details of interest. As a story of remarkable adventures the book is certainly interesting. Mr. Melville's arctic enthusiasm was not in the least damped by the *Jeannette* misfortunes. Not only does he describe in the present volume his experiences as a member of the Greely Relief Expedition, but he means evidently to attempt to reach the Pole, if for no other reason but that it "may prevent other fools from going there." Mr. Melville's plan takes for granted that Franz Josef Land reaches to 85° N., which is probable enough; and he would therefore propose to utilise this as a basis of operations; around the Pole he supposes that a partial "vacuum" exists, and that partly as a consequence the ice-cap there is immovable, held in its place by the islands which he believes surround it. As to getting back when the Pole is reached, Mr. Melville believes that this could easily be effected either by Nova Zembla or Spitzbergen. Of course, the retreat would be secured by the establishment of carefully-selected depots. "Finally, I propose to prove this theory of reaching the North Pole by *going there myself*." Every one will wish him God speed; and there can be no doubt that the best arctic authorities are agreed that the next expedition should seriously try the Franz Josef Land route.

Stanford's Compendium of Geography and Travel—Europe. By F. W. Rudler, F.G.S., and G. W. Chisholm, B.Sc. Edited by Sir Andrew C. Ramsay, LL.D., F.R.S. With Ethnological Appendix by A. H. Keane, M.A.I. (London: Stanford, 1885.)

THIS many-authored and much-edited volume is the last of the series of Stanford's well-known "Compendium," the first volume of which was issued some six years ago. That first volume dealt with Africa, and was edited, it may be remembered, by Mr. Keith Johnston, who shortly after publication lost his life attempting to explore the continent which he had so well described. There have been subsequent editions of that volume edited by Mr. E. G. Ravenstein. The succeeding volumes were South America, by Mr. H. W. Bates; Australasia, by Mr. A. R. Wallace; Asia, by Prof. Keane and Sir Richard Temple; and North America, by Drs. Hayden and Selwyn. It will thus be seen that Mr. Stanford has been fortunate in his choice of editors for the several volumes. The Compendium professes to be based on Hellwald's German work, but it may throughout be regarded as virtually original. The various editors have put so much of their own into their several volumes, and given to the whole an orientation so essentially English, that it would be difficult to tell which is Hellwald and which the "editors." In the present volume the editors and authors (or one of them, for the title-page is awkward) have wisely