tical almanac as ours now is, there is no magician in fairy tale, who could cope with a well-practised seaman in the performance of miracles. What human feat, we will ask, can exceed in wonder the exact determination of a ship’s place in the midst of a boundless ocean, a thousand miles from land ? This marvellous quality of exactness, or rather, we should say, of infallibility, within certain appre- ciablc limits, distinguishes the Sextant from all other nau­tical instruments. Its operations are connected with those of the sun, moon, and stars, and, by the nature of its con­struction, partake of their certainty ; whereas the Chrono­meter, which stands the next in order of importance, is es­sentially a fallible instrument, and, though eminently useful in the navigation branch of seamanship, and much more nice in its determinations, can never be depended on as the Sex­tant can. These two instruments are admirable allies, but neither is sufficient, if used without the other, to meet the wants of modem navigation. A Chronometer may, and of­ten does, change its rate, and thus it may deceive, instead of instructing, the mariner, without his having any suspi­cion of its misleading him, and though the chances of its do­ing so without detection are much lessened, by adding two or three more chronometers, still there never can be any certainty in the results. On the other hand, the errors of a Sextant lie all within the reach of detection and apprecia­tion. They cannot, it is true, theoretically speaking, be fully corrected, yet they may be sufficiently compensated for in practice, which is all the seaman need care about. A single illustration will make this plain, even to those who have not attended to such subjects.

The longitude is found by measuring with a Sextant the angular distance between the moon and a star ; and if the instrument used were perfectly correct in all its ad­justments, true in its centering and its graduations, and the distance were properly observed, the result would be quite correct. But experience proves that every instru­ment, even after all the adjustments have been made as carefully as possible, does, in fact, measure the angle ei­ther too great or too small ; and, consequently, the longitude which results from it will inevitably be too far east or too far west. The manner in which this evil is got rid of, is as follows. If the ship be in west longitude, and star ob­served lie to the *eastward* of the moon, and the sextant measures the angular distance *greater* than the truth, the resulting longitude will be less than the truth. If an­other star be now observed, lying to the *westward* of the moon, and the same instrument is used, the distance will, as before, be measured *greater* than the truth, but the resulting longitude will in this case be just as much *greater* than the truth, as the first result was *less;* but the mean of the two will of course be near the true longitude. By using a Sextant in this manner, and by taking a sufficient number of observations on both sides of the moon, when the distances are nearly the same, so close an approximation may be made to the true longitude, that not only may the ship’s place be found near enough to steer by, but the errors in the rates of the Chronometers on board may be ascertained, and a fresh departure be taken, with nearly as much confidence as if a well-known headland had been seen. For all short voyages, such as those between port and port in the same country, Chronometers may be pretty con­fidently reckoned on, since the chances of their varying from their previously ascertained rates, in the course of a few days, are proportionally small. In like manner, the interme­diate short runs made by the agency of the Chronometers, between lunar and lunar taken at sea, may be relied upon in practice.

Our neighbours the French, who are excellent navi­gators, use the reflecting and repeating circle much more than we do ; but we have no hesitation in recommend­ing the Sextant as much the superior instrument of the two

for real work. Theoretically, no doubt, the circle is more perfect; but it has disadvantages which, after very long experience, we confidently affirm, render it less useful to a seaman than the sextant. In the first place, its weight, and above all, the surface it offers to the wind, render it more fatiguing to use, especially in bad weather. In the next place, its radius being much shorter than that of a sextant, the divisions on the limb are far less easily read off ; a serious objection to the use of a circle at night, when every prac­tised seaman knows that the best work in lunars is always done. If Troughton’s circle with three verniers be used, which implies six readings for every complete observation, the labour is highly irksome; but even if the repeating cir­cle be used, the risk of error, by the nicety of the manipu­lations, and the uncertainty of the adjustments, are, we have always found, an overmatch for the simplicity of the single reading off at the end. In short, we are sure that under the troublesome variety of circumstances which are to be encountered at sea, a well practised navigator, with a sex­tant in his hand, will do twice as much good work in a given time, as he could do with any description of circle which we have had the good fortune to use. On shore, in­deed, the circle may often be used with greater effect ; but our present purpose is to treat of seamanship.

The next in order of importance in the list of nauti­cal instruments, after the Sextant, is the Chronometer ; an instrument to which modern seamanship is indebted for very great service. We are old enough to remember when Chro­nometers were not only not in general use, but were rarely employed except on voyages expressly scientific. It is dif­ficult to describe the degree of mortification, we may almost call it grief and indignation, with which practical men, skill­ed in the use of such instruments as we have been describ­ing, and fully aware of their importance in adding to the se­curity of ships, and shortening voyages, witnessed the con­tempt, or at least the neglect with which they were treated by those most interested in their general adoption. They saw vessels fitted up with every other description of costly equip­ments, with accommodations of the most showy description, and stores of all kinds in profusion, while neither a Sextant nor a solitary Chronometer ever formed, except accidentally, a part of their provision. If the captain *happened* to know any thing about such matters (for he was not required to do so), and knowing how advantageous they were to the success of his voyage, asked to be supplied with them, he was told “ that he might provide himself with these instru­ments if he liked it;” and if the poor man could not afford to

purchase them, the ship, however valuable, was actually al- owed to sail away without the most important part of her nautical equipment. Can any absurdity, or, we might almost add, any crime, equal this? We could relate several in­stances, some of which have fallen under our own knowledge, and others we know to be well authenticated, of ships, and all their crews, passengers, and cargo, being lost, demonstrably so, merely from the want of a Chronometer, which, by cost­ing the owners forty or fifty pounds, might have saved them as many thousands. Some owners are influenced by a petty spirit of economy, ill understood ; but by far the greater number are misguided by their ignorance. Happy should we feel could we persuade the owners of ships, and those who insure them, to see that their best interest lies in pro­viding the vessels, in the safety of which they are so deeply interested, with proper scientific instruments, and, as a ne­cessary concomitant, securing the services of commanders really competent to use these instruments in a seamanlike manner. The importance of all such enlarged considera­tions has of late years been gradually making its way, to the great improvement of seamanship ; for the owners of ships have begun to find out, less from any scientific know­ledge of the matter, than from the mere instinct of gain, that an attention to this branch of a ship’s outfit contributes