to the refractive power of the atmosphere, will always be ambiguous when exhibited as a single signal. But Colonel Pasley has added a short arm, which he calls an *indicator,* as below at A ; and which, when made moveable, more than compensates for this defect.

It was with a different view, however, that he has added this indicator. It was suggested to him by a captain in the navy, who had experienced the greatest incon­venience, in using Sir Home Pop­ham’s ship-semaphores, from the sig­nal-men confounding the positions of the arms when seen in *reverse.* We apprehend no experienced signal-men could possibly make any mistake in merely changing the right hand for the left.

The respective powers of the three telegraphs, in making single, or what may be called pri­mary signals, are, as appears from the tables, 62, 42, and 28. In making *two* changes, with a stop between them (that is, *three* signals), to represent a word or sentence, their powers will be as 3844, 1764, and 784 ; in making *three* changes (or, with the *stop, four* signals), as 238,328-74,088-21,952. Now, as the telegraphic dictionary of Sir Home Popham, which has been, and still is, used in the navy, does not exceed 13,000 words and sentences, and has never been found deficient in any of its divisions of subjects, it is evi­dent that even the lowest power of the three is more than sufficient for all useful purposes ; and that those compilers who have swelled out their telegraphic dictionaries to upwards of 100,000 (one mentioned by Colonel Pasley has extended his labours to 140,000), have made them nearly useless, by the difficulty and loss of time in finding the required phrase or sentence. We have actually seen in one telegraphic dictionary 126 pages, of three columns in each page, and sixty sentences in each column, containing upwards of 20,000 sentences (about one third of the number of words in Johnson’s Dictionary), and each of these sentences be­ginning with the personal pronoun HE, twenty pages with IF, &c. Compared with the use of such a dictionary, spelling the sentences is infinitely preferable as to certainty, and in many cases as to celerity. Indeed we should say that the abbreviated nature of communications made by telegraph renders spelling by far the most eligible mode. In clear weather, the rapidity of working single signals, the short compass within which any message may be condensed, the impossibility of committing any mistake that cannot be immediately rectified, more than compensates for the dif­ference of a few minutes which the use of sentences may probably save. In cloudy or foggy weather, the latter me­thod will always be liable to mistake. If experience may be assumed as a guide, the practice at the Admiralty, of spelling all sentences, for the last thirty years, must decide in favour of that system.

In making use of the alphabetical table, much time may be saved by condensing the message into the briefest form possible, leaving out of the sentences such words as may not alter the sense, and generally the vowels of words. For instance, “ *Order the Agamemnon out of harbour, and direct her to proceed to Spithead.n* To convey this message alpha­betically, it would be quite enough to say, “ Agmemn to Spthed.” If *from Spithead into harbour,* “ Agmemn nto hrbr.” In spelling, too, it is very desirable, especially in our foggy climate, that the intelligence to be conveyed should be compressed as much as possible into the early part of the message. By not observing this rule, a curious mistake is said to have been made in the course of the Pen­insular war. The admiral at Plymouth endeavoured to send up a message, but a fog coming on, part of it only on that day reached London. It began thus : “ Wellington de­

feated”—and the rest was stopped by the fog : the anxiety for the remainder may readily be conceived ; it came, how­ever, complete towards the evening, and conveyed the in­telligence, that “Wellington defeated the French,” &c. Had the message been thus framed, “ French defeated at,” &c. (the word Wellington being quite superfluous), the anxiety for the particulars would have been of a very dif­ferent kind. Much therefore depends, as far as celerity and certainty is concerned, on the construction of the sen­tence containing the intelligence to be conveyed.

The methods suggested for making use of telegraphic communications by night have not been less numerous than those for the day, though on land there are very few occa­sions on which they can be of the least possible use. A regiment might perhaps be ordered to move, at a moment’s notice, in order to reach a particular point at a given time ; or, as an extreme case, the enemy’s fleet might be seen to­wards the close of the day in a particular quarter, which would make it desirable to have the intelligence conveyed in various directions ; but no naval movement could take place during the night at any of the ports. So little useful, indeed, does a night telegraph for the navy appear to have been considered, that, with all the facility of applying lamps to the shutter-telegraph at the Admiralty, no attempt was ever made for carrying such a purpose into execution. Colonel Pasley’s description of the application of his Universal Te­legraph to night-signals will suffice to show one method (as good as any other, perhaps) of adapting the machine to this purpose.

“ For night-signals, one lantern, called the centre-light, is fixed to the top of the post ; and one lantern (I), as an indicator, is fixed to a light crane or derrick attached to the post, by night on­ly, as under.

“ These lanterns are stationary, and appear on the same level. Two other lanterns are suspended to the ends of the arms, upon fixing which a couple of weights are added to counterpoise them. Each of the two arms by day, and each of the two moveable lights by night, is capable of exhibiting the seven positions, be­sides position O pointing vertically downwards. The indi­cator serves to distinguish the low numbers 1, 2, 3, from the high numbers 7, 6, 5, in whatever direction the tele­graph may be viewed.”

The use of telegraphic communication, important as it may be on land, is far more so in the management of a fleet at sea. On the unfortunate result of Admiral Keppel’s en­gagement, Dr Beatson, in his Memoirs, thus expresses him­self : “ The defects or impropriety of the signals having

thus appeared clearly to be the true and sole cause of the miscarriage which disappointed the reasonable hopes of Britain on this critical and weighty occasion, we may be justified in observing, that if an admiral cannot command all the necessary movements of his ships by signal on the day of battle, he is not upon a footing with an enemy who possesses that advantage ; and even with better ships and better men, and more experienced commanders, he may be foiled in his expectations of victory, if not defeated, from his want of the means to direct and to perform the neces­sary evolutions of his fleet.”

In the Fighting and Sailing Instructions of the Duke of York (afterwards James II.), a certain number of signals are established for certain movements and manœuvres of the fleet, each flag having its respective object. *L'Art des Armées Navales* of le P. l’Hoste, published at Lyon in 1697, contains something like a system of signals, but so awkward and clumsy as to be of a very limited use. Indeed the best signals made use of, down to the American war, could only