adoption has not only contributed very materially to the in­creased efficiency of the British navy, but it has been made optional for use with the mercantile marine. Curiously enough, flashing is not to any great extent used in the navies of other countries which rely more on some system of coloured lights at night. This system generally takes the form of four or five double-coloured lanterns, which are suspended from some part of the mast in a vertical line. Each lantern generally contains a red and a white lamp, either of which can be switched on. By a suitable keyboard on deck any combination of these coloured lanterns can be shown. The advantage of this system lies in the fact that each symbol is self-evident in its entirety, and does not require an expert signalman to read it, as is the case with flashing, which is a progressive performance.

For long distances at night the search-light, or some other high power electric arc light, is utilized on the flashing system. Dots and dashes are then made either by flashing the light directly on the object, or by waving the beam up and down for short and long periods of time. Sometimes when a convenient cloud is available the reflection of the beam has been read for nearly 40 m., with land intervening between the two ships. In a fog signals are made by the steam-whistle, fog-horn, siren or by guns. Except for the latter method the dot and dash system is employed in a similar manner to flashing a light. Guns are some­times used in a fog for signalling, the signification being deter­mined by certain timed intervals between the discharges. The larger British ships are supplied with telegraph instruments for connexion with the shore, and heliographs are provided for land operations. Marine galvanometers are also provided, and can be used to communicate through submarine cables. To the various methods of naval signalling must be added wireless telegraphy, which in its application to ships at sea bids fair to solve some problems hitherto impracticable. (See Telegraphy: *Wireless*.)

The international code of signals, for use between ships of all nations, is perhaps the best universal dictionary in exist­ence. By its means mariners can talk with great ease without knowing a word of one another’s language. By means of a few flags any question can be asked and answered. The number of international flags and pendants used with the international code is 27, consisting of a complete alphabet and a special pendant characteristic of the code. At night flashing may be used. \* (C.A.G.B.; A.F.E.)

*Army Signalling.—*Communication by visual signals between portions of an army is a comparatively recent development of military service. Actual signals were of course made in all ages of warfare, either specially agreed upon beforehand, such as a rocket or beacon, or of more general application, such as the old-fashioned wooden telegraph and the combinations of lights, &c., used by savages on the N.W. frontier of India. But it was not until the middle years of the 19th century that military signalling proper, as a special duty of soldiers, became at all general. It was about the year 1865 that, owing to the initiative of Captain Philip Colomb, R.N., whose signal system had been adopted for his own service, the question of army signalling was seriously taken up by the British military authorities. A school of signal­ling was created at Chatham, and some time later all units of the line were directed to furnish men to be trained as signallers. At first a code book was used and the signals represented code words, but it was found better to revert to the telegraphic system of signalling by the Morse alphabet, amongst the unde­niable advantages of which was the fact that it was used both by the postal service and the telegraph units of Royal Engineers. Thenceforward, in ever-increasing perfection, the work of signallers has been a feature of almost every campaign of the British army. To the original flags have been added the helio­graph (for long-distance work), the semaphore system of the Royal Navy (for very rapid signalling at short distances), and the lamps of various kinds for working by night. Full and detailed instructions for the proper performance of the work, which provide for almost every possible contingency, have been published and are enforced.

The apparatus employed for signalling in the British service consists of flags, large and small, heliograph and lamp for night work. The distances at which their signals can be read vary very considerably, the flags having but a limited scope of usefulness, whilst the range of a heliograph is very great indeed. Whether it be 10 m. or 100 away, it has been found in practice that, given good sunlight, nothing but the presence of an intervening physical obstacle, such as a ridge or wood, prevents communication. For shorter distances moonlight, and even artificial fight, have on occasion been employed as the source of light. In northern Europe the use of the instrument is much restricted by climate, and, further, stretches of plain country, permitting of a line of vision between distant hills, are not often found. It is in the wilder parts of the earth, that is to say in colonial theatres of war, that the astonishing value of the helio­graph is displayed. In European warfare flag signalling is more usually employed. The flags in use are blue and white, the former for use with fight, the latter for dark backgrounds.

There is further a distinction between the “ small ” flag, which is employed for semaphore messages and for rapid Morse over somewhat shorter distances, and the “ large" flag, which is readable at a distance of 5 to 7 m., as against the maximum of 4 m. allowed to the small flag. With a dear atmosphere these distances may be exceeded. The respective sizes of these flags are as follows:—large flag 3'X3'*,* pole 5' 6" long; small flag 2'x2', pole 3' 6" long. The lamps used for night signalling are of many kinds. Officially only the “ lime light ” and the “ Beg- bie ” lamps are recognized, but a considerable number of the old-fashioned oil lamps is still in use, especially in the auxiliary forces, and many experiments have been made with acetylene. The lime light is obtained by raising a lime pencil to a white heat by forcing a jet of oxygen through the flame of a spirit lamp. The strong light thus produced can be read under favourable conditions at a distance of 15 m. ; but the equipment of gas-bag, pressure-bag, and other accessories make the whole instrument rather cumbrous. The bull’s-eye lamp differs but slightly from the ordinary lantern of civil life; it bums vegetable oil. The Begbie lamp, which burns kerosene, is rather more elaborate and gives a whiter light. It was in use for many years in India before the objections made by the authorities in England to certain features of the lamp were withdrawn. All these lamps when in use are set up on a tripod stand and signals in the Morse alphabet are made by opening and closing a shutter in front of the fight, and thereby showing long and short flashes.