"I should be honoured," she answered. "Why, you will have enough people asking for favours now, what with Evelyn and Evelyn's husband, and Geoffrey and Geoffrey's wife. And a few months ago no one had any claims upon you."

"It's too bad," said Evelyn, rubbing her cheek against his arm.

"Or too good," said he, unable to resist, patting the said cheek.

"What is too good?" said Geoffrey, overhearing him, and coming forward.

"My family," he answered. "I have quite a large one, eh? Well, it is to be hoped I shall do my duty by it."

"We shan't be *very* extravagant in our requirements," said Miss Loveridge. "Two of us, at any rate, are nearly fogies, eh, Geoffrey?"

"I have a feeling that *you* ought to be the one who is responsible," said Briscoe, "for my present position seems somehow to have been brought about by you: how, I hardly know."

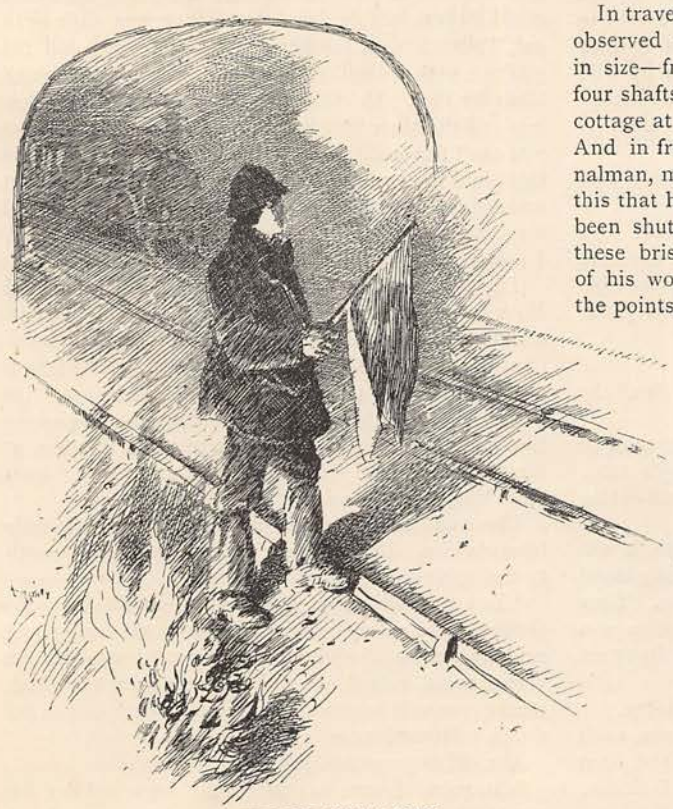
"Why, yes," said Geoffrey; "I believe it has. I should really like to give three cheers for her—*that little woman!*"

THE END.

RAILWAY SIGNALLING.

BY ALEXANDER H. JAPP, LL.D.

RECENT lamentable accidents bring vividly before the mind the vast responsibility resting on an obscure pointsman, or signalman, and the destruction and suffering and sorrow that may result from the slightest lapse on his part. They also will inevitably recall the mind to the system under which such accidents are possible, and, no doubt, lead not a few to fancy that want of system is as much to blame as the forgetfulness or mistake of an individual.

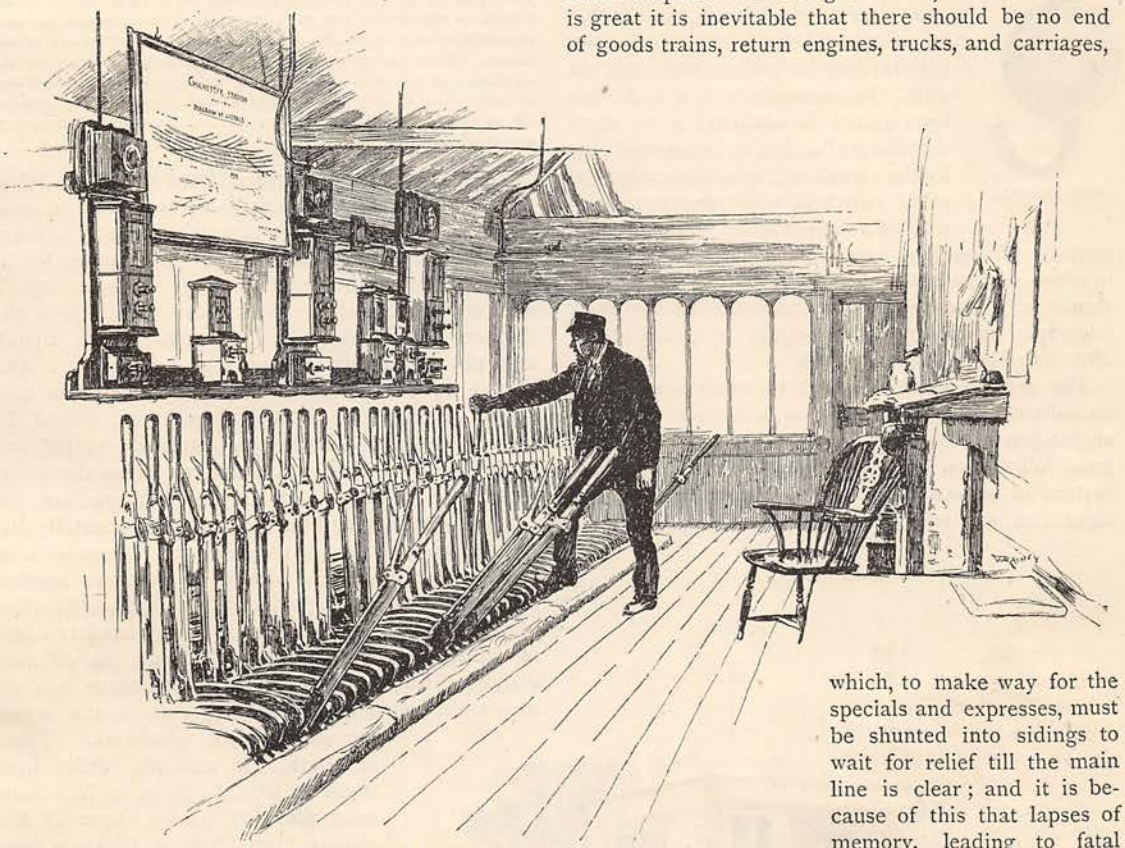


THE FOG SIGNAL-MAN.

But that this is hardly so we hope to make very plain before we have done. The system is highly developed — well-nigh perfect, indeed — and accidents are, generally speaking, only possible through lapses of memory and departures from rules very plainly and completely laid down. To show this we shall try, in the shortest manner consistent with clearness, to lead the reader round the whole system of signalling on railways, and this we shall do, as far as possible, in a descriptive and narrative manner.

In travelling in a railway train, everyone must have observed the signal-boxes, which differ very much in size—from that of a small hut, with its three or four shafts or steel handles, to that of a considerable cottage at a junction, with thirty, forty, or even more. And in front of this glistening line stands the signalman, moving backwards and forwards, now closing this that had been open, now opening that that had been shut. But the mere opening and shutting of these bristling steel handles form but a small part of his work, though these shafts communicate with the points, and open or close them. In every signal-box—at all events, in every box of great extent—there are two clocks of somewhat peculiar construction right in front of this row of handles—clocks which can be seen immediately on looking up. Then near at hand are telegraph dials and bells for receiving messages, as well as telegraph-despatching desks, and a writing-desk in the corner, on which books of record are carefully laid out. On this desk, too, is sure to be found a copy of the "Working Time Tables" of the company, with its appendix of rules and regulations. This the signalmen are expected not only to study, but, in fact, to commit to memory, so far as it applies to the station or junction at which they are placed. Now this time table is very different from a time table as supplied to

the public, and is really a large document. It tells everything about the stations on the main line and branches; gives the law of regulation of clocks in signal-boxes, and a list of the stations and signal-boxes connected with the Message Telegraph Circuits; classifies all these stations and signal-boxes which perform train signalling; sets forth in due order all main telegraph arrangements, and presents a list of leading stations in regard to which there are any special points to be attended to; then follows a long catalogue of "whistles for engines," then drawings of route-indicators, with the arms in position for the various signals, and this is followed by a list of all route-indicators. Then come "points of inclines," duly tabulated, for intercepting railway vehicles.



INTERIOR OF A SIGNAL-BOX.

The signalman's *vade-mecum* is thus intricate, and to the outsider, some points seem as puzzling as the study of a "Bradshaw." And, more than this, changes are constantly being made, which the signalman must grasp, in relation to the rest. I confess that when I look at a "Working Time Table" for one of the great lines, or pass a signal-box, I never fail to have strengthened in me a sense of the great responsibility and importance of the signalman. Whether his station is worked by what is known as "train tables" mostly in use on single lines, or by the "block system," which is now usual on double lines, he must be always on the alert.

The main end of the block system is to prevent more than one train or engine moving between two signal-boxes at the same time. Every one knows the semaphore signal—up for danger, down for clear line; and this summarises the signalman's primary duty.

Where this alone is the requirement, the work is much simplified and straightforward, but where traffic is great it is inevitable that there should be no end of goods trains, return engines, trucks, and carriages, which, to make way for the specials and expresses, must be shunted into sidings to wait for relief till the main line is clear; and it is because of this that lapses of memory, leading to fatal issues, are most likely to arise. For it has to be remembered that the signalman must give the same attention to a single engine, or to an engine with one luggage van, as to an express train; he must signal to the next station what it is that he has passed, and whether it bears a lamp behind it, and of what character, so that the next signalman may be certain, whether in dark or light, that he has passed all intact that his predecessor did, and that nothing has slipped or parted from the engine.

Everything that passes the signal-box has to be duly and correctly entered in the record book, with the exact time at which it passed, and with any remark that it is necessary the signalman should make.

The signalman in all important stations must be an expert telegraphist, and this even where telegraph boys are kept, that he may be able to supervise and direct them. It is a common direction in Working

Time Tables that telegrams must be very distinctly transmitted, especially to smaller stations, where the signalman may not be very expert and have no telegraph boy.

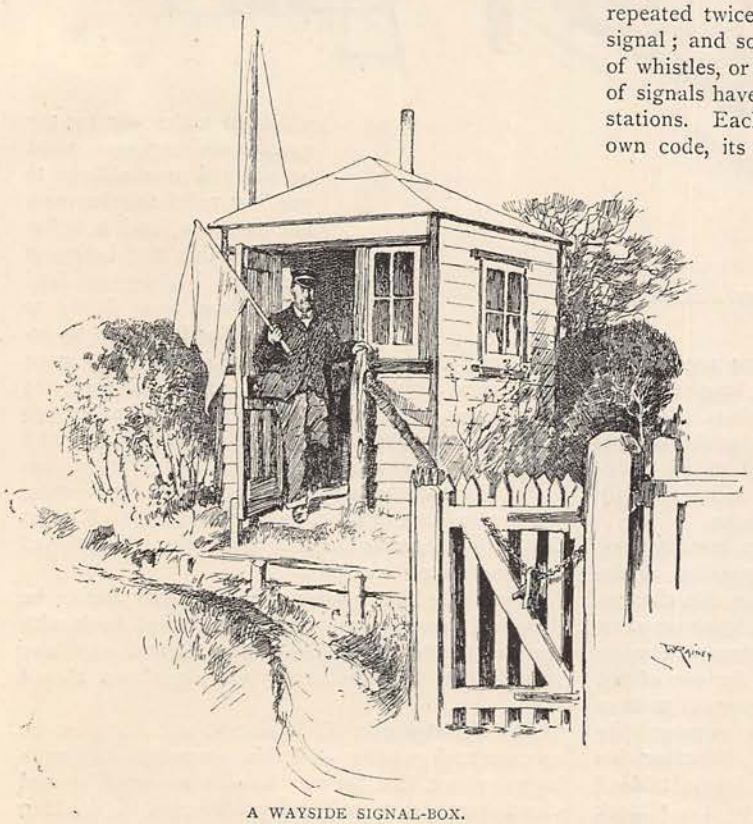
The block system is really worked by bell and gong. The bell is for up trains, the gong for down trains; and there is here, too, a complete code of signals by arrangement of beats. For a passenger train, three beats on bell or gong; for a goods train, four ditto; for a mineral train, five ditto; for light engine or engine and van, six ditto. The semaphore arm, which has been raised in advance, is to stand at "danger," and is to be lowered only by the signalman, in acknowledgment of the advice of the "preparatory signal," of an approaching train or light engine. All outdoor fixed signals are so worked as to show to drivers of approaching trains the same signals as those shown simultaneously on the block telegraph instrument. No signal is cancelled till after it has been acknowledged.

FOG SIGNAL.

The railway whistle, which to many seems only an indiscriminate maker of noise, a weapon which the engine-driver wields in sheer delight of torturing good folks' ears, is really a most carefully arranged system of signals, by which the engine-driver and signalman are brought to an oral understanding when the train has come within a certain distance of the signal-box and signals are visible. Nothing is more specific than the directions in all Working Time Tables "that the whistle is not to be used unless when absolutely necessary." This is a common form of direction :—

"The signalman at ———, guided by the time table, by indicators on engines, and verbaliy by the station officials, being in possession of information as to the trains for which points are to be put in position and signals cleared, drivers are not to sound the engine whistle more than is absolutely necessary—such as a short whistle before putting on steam when the starting signal is given, a whistle to warn anyone who may be on the line, or when instructed by any of the station officials to give any particular whistle as a signal to the signalman or otherwise; *and it must be distinctly understood* that no such thing as long and repeated whistling for signals to be taken off, or from any other motive, except in some extreme emergency, can be allowed."

When, therefore, we are inclined to fret at delay, as not infrequently happens, just when we have come within sight of the station at which we mean to leave the train, we may be sure there is good reason for it. The whistle is the great language between signalman and engine-driver; by it, more especially in the darkness, the driver can gently hint to the signalman the desirability of "moving on," etc. etc. And though to the outsiders' ears railway whistles may sound very much the same, there could, indeed, be no greater error. Railway whistles are varied, and each means something very different from the other. There are whistles and whistles. There are, for example, the long and the short whistle—carefully distinguished—and there is the cockcrow. Short whistles repeated twice are one signal; three times another signal; and so of long whistles. By the combination of whistles, or the repetition of them, complete codes of signals have been elaborated for all the different stations. Each station of any importance has its own code, its whistles applying even to the separate sidings and platforms. Those at Bath, for example, differ from those at Bristol; those at Newcastle from those at York; those at Buchanan Street Station, Glasgow, from those at Waverley Station, Edinburgh.



A WAYSIDE SIGNAL-BOX.

This may be set down as the ordinary daily duty of the signalman. He must open signals the moment any train is telegraphed to him, and enter the same with the exact time in the proper columns of his record book. Then he must set his points where this is necessary, and when the train has passed he must telegraph to the next station, enter the time and fact in another column of his book, and then relieve his points again, and be ready for the next train. The signalman's record book is an absolute index of all the traffic of the company that passes the point where he is.

And there is no end of extra and special work to which the signalman

must attend. For example, there is the fog-signal, which in the dark of winter is most important. The fog-signal stands to him what an engine indicator is in the daylight. When he has cleared one train out, he goes a little distance up the line and affixes to the metals by a sort of wire a kind of slightly raised band, containing an explosive material.* He can hear when he cannot see, and this is the means by which he makes hearing do the work of sight. To give some idea of the work that falls to the signalman in special cases, we may quote the following :—

"In the event of a line being blocked near a telegraph box, information must be sent along the circuit at once, stating the time the line is likely to be blocked, and the stations on the circuit must be advised when the line is clear again."

Over and above the duties we have named, in most cases the signalman has to enter in his record book the numbers of all engines that stop at his box. In some cases, as we have said, there are at large stations as many as forty or fifty shafts, which have to be constantly in use. These are separated from each other by a space of six or eight inches.

ENGINE HEAD BOARDS.

The mere putting of the hand on one instead of the other might lead to a fatal accident.

Considering the amount of attention and care required from the signalman, and the great responsibility resting upon him, it has often struck us with surprise that he is so poorly paid, compared with the driver. The most he may hope to get is from 25s. to 30s. a week; the drivers may easily earn, with Sunday work, from 50s. to 60s. We do not wish the drivers to have less; we would fain see the signalmen have something more.

* At large stations and junctions, however, this duty is largely done by porters.

"PARDS."

"CYCLONE!" laughed our driver, 'way back to his yellow "wisdoms." "Lor, no! Why, this here's only a genteel seffer. Don't you never git fussy 'bout a cyclone till you don't find yourself nowhere. Cyclones don't stop to say 'beg pard'n' 'fore chuckin' a feller into 'Kingdom come!' See that there barn?"

We saw it: the only frame building within ten miles.

"Well, 'taint two weeks sence I sed to my woman: 'looks kinder droll yander.' I hadn't more'n got the words off'n my tongue 'fore that there barn throwd off all its shingles, and went a waltzin' straight inter that there slew. In two minutes the slew was full o' roofs and winders, with the walls all broke up, and the cattle a-looking out of the doors after their hindquarters, which was a skippin' along somewhere towards Helena. But *that* warnt a cyclone! Lord, no! A cyclone don't leave hair or horn. I tell *yew*, a sod house is a heap safer'n a palace in *these* diggins!"

That was a bit of comfort, at any rate. But why did the old settler strive to score our "tender feet" * so?

The thing before which we three women dismounted was of extraordinary aspect. Unwarned, we could scarcely have guessed what it was, or why. Two lurid eyes glared at us, hot and fierce. It looked like some crouching monster, with back humped and legs drawn under for a spring. We might even have imagined it ready to spring upon us, had we not recognised that fiery stare as the reflection of a westering sun upon panes of glass, set deep in a bank of brown earth.

"The 'Maidens' Burrow'!" cried "Pard."

And so it was from that day forth; and he who miscalled it "Maidens' Bower" was straightway sat upon and corrected.

We "Pards" were to keep the letter of the law by living each upon her own "claim." We did not break its spirit in having our burrow half upon each one's territory, each conscientiously bunking upon her own land, although eating, drinking, and making merry, or otherwise, upon limits undefined. Dill, our third partner, "took up" no acres from the Government, but agreed to work for us for a portion of ours, and an undivided right to the "Burrow" when we and it parted company. Dill had a Joe "back east" whom she intended to establish as lord of the manor, provided he "didn't sozzle hisself into a brute beast" before she could do it.

The "Maidens' Burrow" squatted a few rods from the *Boulevard des Vieilles Filles*. Weeds grew in that boulevard; the foot of man almost never trod it; wild beasts ranged it; the owl hooted over it; the bat flapped its ominous wings, just as over Balbec and Palmyra, yet not because its doom was sealed, but because its story was scarce yet begun in a faint waggon track on the sward. Rough sods climbing each other's backs like summer-rifted ice-flots, were the "Burrows'" protection against prairie fire. They

* "Tender foot" is "Western" for new comer.