

vary, and, as the speed of the whole line is limited for through traffic to that of the longest section, it will only be necessary to go into particulars with regard to that section.

13. On this branch of their inquiry the Committee have taken a large amount of technical evidence from electrical experts. This evidence has been in some important respects conflicting, and the Committee have been obliged to form their own conclusions, weighing one authority against another.

14. The principal points which the Committee have had to consider are: (1) The weight per nautical mile of the core best suited for the purposes of the long section; (2) the theoretical speed of transmission obtainable from a given core over a given distance; (3) the deductions which have to be made from the theoretical speed of transmission to arrive at the actual practical speed in "paying" letters; (4) the number of hours per diem during which a cable can be worked for commercial purposes.

The Core.

15. The cores recommended to the Committee varied from 500 lb. copper and 320 lb. guttapercha (Mr. Siemens) to 800 lb. copper and 550 lb. guttapercha (Mr. Preece, of the General Post Office), but the Committee have decided to select for detailed consideration from between those limits two types, which have been recommended from different points of view.

16. The first would contain 552 lb. copper and 368 lb. guttapercha, and was that recommended to the Indiarubber, Guttapercha, and Telegraph Works Company by Lord Kelvin in November, 1895.

17. The Committee do not consider that it would be wise economy to lay down a cable of any lighter type than this. The speed of transmission would be reduced to too low a figure.

18. The second would contain 650 lb. copper and 400 lb. guttapercha, and is that which was adopted for the cable laid by the Anglo-American Telegraph Company in 1894. There is a serious mechanical difficulty in handling cable of very heavy weight at great depths, and the Committee are of opinion that it would not be prudent in any case to lay a cable of a heavier core than this over the long section.

Speed: Theoretical and Practical.

19. It is, however, in connection with the speed obtainable from a given cable over a given distance that the opinions of the experts have differed most materially.

20. For instance, Dr. A. Muirhead gave it as his opinion that a cable of 552 lb. copper and 368 lb. guttapercha over the long section would, with experienced operators and by the use of the automatic curb method of transmission, give a speed of eighty letters per minute; and, similarly, for a cable of 650 lb. copper and 400 lb. guttapercha, ninety-five letters per minute.

21. Mr. Preece, on the other hand, stated that the same core as that last named, over the same distance and by the same process, would give a speed of not quite sixty-three letters per minute.

22. For the same cable Mr. M. H. Gray, Mr. Lucas, speaking for himself and for the late Admiral Sir George Richards, and the representatives of the Eastern Extension Telegraph Company estimated a speed of seventy letters per minute.

23. On the other hand, Mr. Siemens estimated the same speed of seventy letters per minute for a cable of 500 lb. copper and 320 lb. guttapercha, while, for a cable of 800 lb. copper and 550 lb. guttapercha, Mr. Preece estimated a speed of eighty-five letters per minute.

24. Lord Kelvin wrote to the Committee that, in his opinion, they might reckon on getting sixty letters per minute, and that possibly they might get eighty letters per minute, out of a cable composed of a core of 552 lb. copper and 368 lb. guttapercha over the long section.

In all cases the speed given was the theoretical speed for simplex working.

25. On the question of deductions which have to be made to reduce the theoretical to the practical speed the divergence of opinion was not less remarkable.

26. The explanation of this is to be found in the fact that much depends upon the system on which a line is worked. Thus, in the case of the trans-Atlantic lines, where the competition is very keen and the hours of business comparatively limited, and where the regulations of the International Telegraphic Convention do not apply, it has been found possible to reduce the non-paying traffic to about 16 per cent.

27. On the other hand, on the eastern lines the proportion is much higher, because the reserve power of the lines is very great, and therefore there is more margin for non-paying traffic, the working-hours are practically longer, and the regulations of the International Convention have to be followed. Mr. Preece estimated that a theoretical speed of nearly sixty-three letters per minute for the core of 650 lb. copper and 400 lb. guttapercha would be reduced in practical working to twenty-eight paying letters per minute. Mr. Lucas stated that a theoretical speed of seventy letters per minute for the same core was equivalent to four or five paying words a minute. Mr. Lamb, of the General Post Office, said that a deduction of 55 per cent. must be made from the theoretical to find the practical speed of a given cable. Mr. Ward, manager of the Commercial Cable Company, calculated that a total allowance of 16 per cent. should be made for "dead" traffic; Mr. Carson, of the Anglo-American Telegraph Company, 15 per cent.; and Mr. Gray, of the Indiarubber, Guttapercha, and Telegraph Works Company, about 17 per cent. Mr. T. B. Finch, Director-in-Chief of the Indo-European Telegraph Department of the Government of India, and having charge of the telegraphs from Karachi up the Persian Gulf and through Persia, stated that the average number of service indications which have to be forwarded with a message of twelve paying words of a length of eight letters each would, on the average, be equivalent to ten letters. Furthermore, he stated that the unavoidable use of the lines under his charge for administrative purposes would amount to less than 5 per cent. of the whole traffic. His estimate, therefore, of the total unavoidable "dead" traffic amounts to about 17 per cent.