

It is probable, indeed, that in telegraphing from one suburb to another the message has to be oftener retransmitted than in going from the City of London to India or America, because a direct transmission from any one part of London to another would involve almost an infinite number of line-wires in all directions. For this reason there must be a limit to the applicability of the Electric Telegraphs in populous districts, and it behoves us to examine whether another agent may not be preferable in dealing with a traffic of this description. The pneumatic tube seems to be well adapted to these circumstances, and having been first applied for short distances by Latimer Clark, and subsequently modified and extended by others, it will fall within the province of our society to examine fully into this and kindred methods that may be devised for effecting rapid interchange of intelligence in towns.

### THE BRITISH COAL-FIELDS

ONE distinguished geologist, at least, disbelieves in the speedy exhaustion of our coal-measures, so frequently predicted of late. At the annual meeting of the Dudley and Midland Geological and Scientific Society, Prof. Ramsay delivered an address on the existence of coal beneath the New Red and Permian strata, in the course of which he observed that for fifteen years he had been preparing to attack this subject, but it was not until he became a member of the Royal Coal Commission he had given it a really searching consideration. There could be no doubt that the various coal-fields of the Northern and Midland districts once formed one great coal-field, but had been separated by extensive denudation. Another great coal-field was formed by the now distinct fields of Devonshire, South Wales, Somersetshire, and the Forest of Dean. Between these two great divisions, the north and the south, there was no connection formed by the coal-measures, the poorer measures possibly having been deposited there, but not the rich deep ones in the carboniferous era. Referring more especially to the Midland district, he thought it highly probable that coal-measures would be found to exist between the present boundary of the South Staffordshire district and the Forest of Wyre; but it was questionable whether it would be of a workable depth. On the west side of the South Staffordshire boundary, in the direction of Bridgenorth, Shropshire, he also believed coal to exist beneath the Permian strata, at a depth of 1,500 feet, or possibly more in some places. At the north of the South Staffordshire boundary, a line drawn from Wyrley right across to the Shropshire district would, he believed, include some valuable coal-beds, a considerable part, but not all, of which would be at a workable depth. He entertained no doubt that the coal-measures were continuous between the South Staffordshire and Shropshire districts, which, although in some places disturbed by denudations, might, throughout the greater part of the area, be profitably worked. In the North Warwickshire coal-field were found, in the direction of the Staffordshire boundary, five beds of coal, which gradually amalgamated, until on nearing Coventry they formed only two measures. The shale and sandstone were split up in like manner. These features constituted most important evidence in support of the theory that the Warwickshire, Staffordshire, and Shropshire districts were united by continuous coal-measures, the peculiarities referred to in the coal, shale, and sandstone strata being identical in all three districts. In that theory Prof. Ramsay was a firm believer. From Warwickshire to the south end of the South Staffordshire boundary, there was, he believed, coal, but not profitable. Towards the northern end of the South Staffordshire boundary, however, a line drawn from Coventry would include rich and valuable coal-measures. Between Staffordshire and Leicestershire the

measures were also, he believed, continuous. From Wales to the Forest of Wyre there was profitable ground; but from Wyre on to Charnwood Forest, and east of that, there were no coals of value. The speaker expressed opinions equally assuring as to the presence of coal under the area lying between the north of the South Staffordshire boundary and the mountain limestones of Derbyshire. In one part of that district—viz., north-west of Cannock Chase—Prof. Ramsay said he should not feel the slightest hesitation in recommending a search for coal; and his belief in the presence of coal at a workable depth in the neighbourhood of Uttoxeter was equally strong. Now, supposing that his calculations were only approximately correct, the result would be surprising. It would amount to this—the coal now reckoned as available in the South Staffordshire and Shropshire districts was, in round numbers, 3,201,000,000 tons. If his belief were a true one, this supply would be further augmented by 10,000,000,000 tons. In Warwickshire the proved coal-measures are estimated to yield 458,000,000 tons, and the measures he believed to exist in addition would be 2,494,000,000, or five times more than the present estimate. The Leicestershire field was calculated to possess 836,000,000 tons, and this would be supplemented to the extent of 1,790,000,000. What was the case in regard to these districts was, he believed, equally applicable to many other parts of Great Britain. The South Wales, Forest of Dean, Bristol and Somerset districts were exceptions to this rule, the coal there lying in basins caused by denudations, the surrounding measures being destroyed. In the Midland districts these small basins are not found, the whole forming one great basin. Lancashire, Derby, and the Yorkshire coal-fields were, however, subdivided by the process of denudation. Still, he had no hesitation in believing that the estuary of the Dee and the Mersey have lying between them beds of coal, although probably at too great a depth to be of practical value.

### MR. TODHUNTER ON THE ARC OF THE MERIDIAN MEASURED IN LAPLAND

MR. TODHUNTER has forwarded us a reprint from the "Transactions of the Cambridge Philosophical Society," in which he discusses the observations made in connection with the measurement of the arc of the meridian in Lapland in the last century. He states that having recently had occasion to study the details of the two measurements of the arc, he has been surprised to find that the accounts of these operations, although written by very distinguished astronomers, contain numerous and serious errors. We must refer our readers to the memoir itself for a complete account of the various points raised, for it is too long for adequate notice in the space at our disposal. A curious point, however, is raised as to the effect of theory upon observation in a paragraph which we quote *in extenso* :—

"It would be a curious subject of speculation whether the theoretical opinions of persons engaged in geodetical surveys could have exercised any influence on their observations; I mean of course unconsciously, for it would be wrong to suspect any deliberate unfairness in any of the operations which I have examined. From a passage in the article 'Figure de la Terre,' by D'Alembert in the original *Encyclopédie*, it would appear that the school of Cassini originally believed that in consequence of the oblate form of the earth, the length of a degree of the meridian would decrease from the equator to the pole. It seems strange, perhaps, now to suppose that such an error could be seriously maintained; but there can be no doubt of it; for example, the error was vehemently maintained by Keill, a man of some reputation, who was ultimately a