

be appreciated. In order to shew, as he says, how easily a system such as the above may be built up on the most slight foundations, he himself makes a supposition and thereon erects a new plausible theory of the pyramid, which he styles a human theory.

The subject of this work is one which has attracted much attention and it cannot fail to be of interest to the general reader.

AN IMPORTANT QUESTION, BY TOTTEN.

This book originated in an Address to the International Institute for Preserving and Perfecting weights and measures, but its author, being convinced of the national importance of his discoveries, has been induced to lay them before the public, to which, he thinks, and not to scientific men, or even to its temporary representatives in the government of the country, belongs the right of deciding questions of metrology.

His principal theme, as he says, is the rectified system of metrology, by which is meant a rectification of the older system of measures still used in England and the States, which, without any important changes either in fact or in nomenclature, would thus become, in his opinion, an absolutely perfect system.

He thinks the unit of metrology should be harmonious to nature and believes that such a unit has been bequeathed to us by our ancestors and that its slight loss of exactness might be rectified by means of the study of the Great Pyramid. Independently of this, however, he shows the great adaptability of the old system, and conceding that the decimal system is very necessary for purposes of rapid calculation, etc., he shows that a new decimal system could be based upon the former, where it would possess all the advantages of the metric system without its disadvantages, as for example, the necessity of overturning a system which has been in use for so long.

The book is much marred as have been so many others of its class by the assumption of propositions which can scarcely be considered as proved, for example that Anglo-Saxons are directly descended from Joseph and being entitled to all the blessings promised to his race, are born to rule the world, by its appeal every now and then to a sort of religious sentimentalism, which is much more easily persuaded if it can be persuaded in biblical phraseology, and by its ignoring the existence of men both scientific and otherwise, who while accepting the Bible as a standard of faith and morals do not regard it as also furnishing a standard for metrology. Apart from these defects the subject is one of great interest and importance, and the treatment is clear and practical.

TELEPHONING BETWEEN LONDON AND DOVER — An experimental illustration of telephonic communication between distant towns was performed last week by the United Telephone Company. A numerous party was invited to witness the transmission of messages between Dover and London, along the telegraph wires of the London, Chatham, and Dover Railway, permitted by the chairman of that company, Mr. Forbes. The first experiments consisted of messages transmitted from the Grosvenor Hotel to Dover along a single wire brought to earth at both ends, and having in its route no less than nine block signal stations, the single needle instruments in which, and the other apparatus, being equal to over nine miles per station. These constituted a resistance of nearly 100 miles beyond that of the line wire, which was 78 miles long. The second experiment was the transmission of messages along a metallic circuit, making 153 miles of wire, to which the block instruments added 200 miles resistance, making the total traversed by the message the equivalent of 356 miles. Nevertheless, the words were clearly and distinctly heard, so much so that one listening in the Grosvenor could instantly detect the errors of the operator in mis-quoted words in the nursery rhymes which he narrated for the edification of his London audience.

AMERICAN PERMANENT WAY.*

BY JOSEPH M. WILSON.

(Continued from page 261.)

There may be cases where reverse curves come close together and this rule cannot be strictly carried out, but an endeavor is always made in such cases, if possible, to secure at least 50 feet of level track on a tangent. Where two curves in the same direction are connected by a tangent less than 100 feet long, the elevation is carried through from curve to curve without reduction, and if the tangent exceeds 100 feet the regular inclinations are made from each curve until they meet, or until level track is reached. These illustrations will serve to show the variation in practice with different roads. The rules for elevation of course do not apply in yard tracks. All rails for curves should be bent to the proper curvature before being laid on the ties.

Several different standards of gauge of track have been used on American roads; 6 feet, 5 feet, 4 feet 8½ inches or 4 feet 9 inches, (a modification adopted for compromise cars,) also the various narrow gauges, from 2 feet 6 inches to 3 feet 6 inches. There is a considerable tendency towards a uniform gauge of 4 feet 8½ or 9 inches, and there have been several noted changes on long lines from 6 feet gauge to 4 feet 8½ or 9 inches, and there have been several noted changes on long lines from 6 feet gauge to 4 feet 8½ inches, the operation being performed in an almost incredibly short interval of time.

Rails are connected together by joints and the more closely a joint approximates to a continuous rail, the nearer it reaches perfection. Some years ago the joints were placed on the supports, but they proved too rigid, the ends of the rails being hammered or battered down under service, and it was found best to place them between the supports. The use of double fish plates has now become almost universal. These fish plates or splices are made to hug up well between the top and bottom flanges of the rail, and in their best form are generally about 24 inches in length with a wide angular flange spreading out over the lower flange of the rail. Two splices are used at each joint, one on each side of the rails and they are connected together through the webs of the rails by four bolts which draw them up tightly together, rigidly binding the rails into line and surface. These bolts have semi-spherical heads allowing as little obstruction as possible, and they should be arranged so that they cannot turn in the holes, the nuts, which are always placed on the outside of the track, being provided with some approved mechanical device to prevent turning and consequently the loosening of the

* A paper read before Section G at the Meeting of the British Association in Montreal.