

Mr. JOHN BETHELL remarked, that this timber, from the specimen exhibited, presented an extraordinary appearance. When he first saw it, he fancied it was a piece of creosoted wood. It would be observed that there was a dark substance in the grain, like regular streaks of creosote, such as would appear in young wood which had been subjected to that process; whilst in the heart wood there was nothing of the kind; and it was a question in his mind, whether this palm was not impregnated with some natural bitumen, or resin, which had been drawn up from the earth, and travelled with the sap into the younger layers. In the green heart timber of Demerara, which, in many cases, acted like creosoted wood in resisting the attacks of the worm, the pores were infused with a sort of resinous bitumen, and the wood itself burnt like a torch. He believed that if the Palmyra palm were analysed, it would be found to be of a similar character, and he had no doubt that it was more inflammable than ordinary woods. It was the practice of Engineers to require that sleepers should consist entirely of heart wood, and that the young wood should be cut off, and then such sleepers were sent to be creosoted; but he invariably declined to undertake it, because it was quite impossible that heart wood could be properly creosoted. If Engineers considered heart wood uncreosoted was more valuable than young wood charged with creosote, well and good. Any one, however, who knew the way in which a tree grew, was aware that the external pores remained open, whilst the internal pores were choked up, by the deposit of ligneous matter on the descent of the sap, so that the pores could not afterwards be charged with any artificial bituminous matter. Of the specimens of Scotch fir sleepers creosoted, which were laid on the Great Eastern Railway in 1841, 80 per cent. were still doing duty in the permanent way. On examining one specimen it was found that, while the outer portion which showed the dark colour of the creosoting was perfectly sound and hard, the interior portion or heart of the wood had begun to decay. The rot had commenced in the heart wood, because it had not taken the oil. So in the case of the specimen of the palm now exhibited, the heart wood was decayed already, and might be picked away with the finger, whilst the outer portion was sound and hard.

Mr. J. SCOTT RUSSELL remarked, that there were two kinds of trees of totally different and opposite natures in their growth; one class taking their young wood from the inside, and another class taking young wood from the outside. These were called by botanists, in the one case endogenous and in the other exogenous. The specimen of wood of the Palmyra palm tribe was no doubt of the endogenous class. The former kind had its hard wood in the centre and the soft wood on the outside; while the other had its hard and old wood on the outside, and the young wood gradually

filled up the inside, until it became perfectly solid at the centre, when it was in its highest degree of maturity. He believed that would explain the apparent contradiction between the two kinds of timber, and their relative density at the skin and the heart.

Mr. C. H. GREGORY, V.P., said, the Author had directed attention to the convenience of employing native timber for works of economical construction in the island of Ceylon. In many countries there were other reasons to induce the use of native unprepared woods, in preference to timber imported from Europe, and prepared by the processes in common use to prevent decay. English Engineers had found the advantage of these preparations, especially of creosoting when properly applied, with the soft pine woods used in this country. He had known cases where creosoted timber lasted for so long a period, that it became fairly worn out mechanically, without showing any signs of decay. In tropical climates the circumstances were different, and his experience led him to know, that there were climates where carefully prepared soft European timber would not stand. On the Pernambuco Railway sleepers of pine timber creosoted were used for a considerable time ; but in a few years they had become seriously deteriorated by decay. He had examined into the cause of failure, and as far as the most reliable evidence went, he came to the conclusion, that the wood had been well and properly prepared, the process having been conducted by highly-respectable houses, under the most careful and trustworthy inspectors, and he could only suppose, that the creosote had been drawn out of the wood by tropical heat and moisture. He had, therefore, adopted sleepers of native woods ; and in Brazil, Ceylon, and other tropical countries, there were woods which, when carefully selected, would withstand all variations of climate, as well as the ravages of the white ant, the dangers from which he believed were not so great as was generally supposed in sleepers, as it was found that the white ant did not attack timber which was frequently shaken.

Mr. POLE said, he was scarcely prepared for the statement in the Paper, that the transverse strength of this palm-wood was greater than that of teak, which was one of the strongest woods known. He did not think this could really be so ; but he conceived the impression might have arisen from the fact that, in these endogenous woods, the strongest and best part of the fibre was on the outside, and was therefore in the most favourable position for transverse strength, when an experiment was tried on a whole tree.

Mr. DOYNE said, he had met the Author in Ceylon, and could bear testimony to the great value of the works carried out by the Department with which Mr. Byrne was connected, which had resulted in that island being better provided with roads than

almost any other colony under the British Crown. Great judgment had been displayed in the erection of simple and economical works. The facilities and the amount of money at command were not large, and the greater credit was therefore due to the Department for the works that had been carried out, more particularly in the providing of good roads. The tree which had been referred to grew like the cocoa-nut and all other palms. It was virtually a shell containing pith, like the alder tree of this country. That portion which had been alluded to as being decayed was pith, and might be cut out without lessening the strength of the tube. The bamboo was used to a great extent in Ceylon, and though not more than about 4 inches in diameter, with a tube only $\frac{1}{2}$ an inch thick, it was surprising the weight it would carry; the hardness of its texture being such as to resemble horn rather than wood.
