

invalidated by conjectural opinions that this was not the kind of ground which required such stuffing, or that the stuffing would not be found after so many years. The state of the cap itself is, however, the principal feature to be considered. The cap-pieces are all described as of black-birch, a timber spoken of in high terms in Mr. O'Connor's report on the sludge-channel, dated 16th September, 1880. But many witnesses have alleged positively that this timber is not black-birch, and they say there is no black-birch in the Blackwater Forest, from which the caps were obtained. They mostly call it brown-birch. This is a question which I cannot determine. Perhaps the same thing may be called by different names, and perhaps different things may be called by the same name; but the attention of the Government department concerned may well be called to the statements made, and particularly to Mr. Seddon's assertion that this timber has more recently been condemned by the Minister and Under-Secretary for Public Works. The broken cap itself has knots in it, which are considered a defect, and it was probably taken from a higher part of the tree than it should have been. But it does not appear that the knots had anything to do with the fracture. Concerning the quality of the timber itself, it is remarkable what different statements are made by different witnesses, all having the same sample under their eyes. Some say it is good sound timber, capable of doing ordinary duty as a cap for three or four years longer; others say it is unsound, decayed, 'dozed,' perished, dead, affected with dry-rot, &c.

"My own opinion, after examining the pieces, is that the wood is not affected with any decay of a kind which makes timber soft. If any molecular change has taken place in its fibres, it is of a kind which produces brittleness and diminishes toughness. The wood is very hard indeed, but evidently of a very short grain and very little toughness. The surface of fracture shows this clearly, and the general character of the cap strongly supports the view that it was suddenly cracked through by a fall from above, and that it shortly afterwards fell quite down, either by a second fall of earth coming on it, or from the gradual pressure of what had already fallen. I certainly do not think this timber can be regarded as suitable for caps in a tunnel having a span of 10ft. between the props, and I think it leads to the inference that all such caps ought to have centre props—i.e., at the sides of the channel—except where the ground is known to be safe and without cavities overhead. But I cannot find any reason for imputing blame or neglect to the channel-overseer, or any other person, for having failed to centre-prop this particular cap. I do not see how he was to have ascertained that it required under-propping. It would assuredly have resisted the thrust of a miner's candlestick, the usual instrument for this sort of testing. It would have rung hard and sound to a blow with the back of a tomahawk; and there is no evidence to show that the dust brought out by a borer would have indicated anything wrong. I believe therefore that, whilst other timbers, presenting marks of what is commonly called decay, were from time to time strengthened by centre props or intermediate sets, this particular one might have been tested a score of times without any reason for interference becoming apparent. And I doubt if there is a miner in Kumara who, after applying the usual tests, would have pointed out this as a faulty cap.

"My opinion, therefore, upon the question submitted to me by your Excellency's Commission is that the break in the sludge-channel which occurred on the 18th December, 1889, was caused by the snapping of a cap-piece by reason of a sudden subsidence or fall upon it of the earth and stones overhead; that no officer concerned in the channel-management is chargeable with neglect in the ordinary discharge of his duties, inasmuch as no examination such as it was his duty habitually to make would have led him to think any measures of protection necessary. But the evidence seems to show that the timber employed is not of a suitable sort for horizontal weight-bearing beams, and that in a tunnel having a span of 10ft. between the uprights, and after the lapse of several years, it is safer to underprop all such beams, or to insert intermediate sets, wherever there is any doubt about the ground.

"There are still one or two matters which require a brief notice before I conclude my report. I have already said that the upper break occurred after the lower one, and therefore could have had nothing to do with the cause of the accident. The fall at this spot probably occurred through some rotten laths giving way, and this was caused by the water, which was backed by the lower break, rising into the roof and disturbing the earth overhead. Undoubtedly, if this had been the original seat of the accident, and it had occurred without the aid of the water, it would have been said, and plausibly so, that the overseer was culpable in leaving the laths there. But this is a hypothetical case, for the break did not occur here first, nor at all until the water got into the roof. Attempts were made to show that the inspection and repairs of the channel had been generally neglected, and particularly latterly, in view of the expected abandonment of the channel to the care of trustees. Such charges might be relevant if the particular cause of the accident of the 18th December were in any way doubtful; but they are not so in the present case. They could only be substantiated by a precise enumeration of all the repairs done in a given time, and by proof of individual instances of repairs needed and neglected. The cause of the accident having been exactly ascertained, this part of the subject may be dismissed, the statements being irrelevant and insufficiently proved. A good deal of evidence has been given about the means in use for quickly turning off the water. This, of course, can have nothing to do with the cause of the accident; but if life had been lost the subject might have had immediate relevance and importance. As a matter of fact, if the water could have been stopped in time to prevent the second break—a matter of impossibility by any means—it would inevitably have resulted in the death of five men. Nevertheless, it is unquestionably important that there should be as perfect a system of signalling as possible, and means of stopping the water in the shortest possible time when the signal is given. In these respects some important deficiencies appear to me to have been proved; but, as they have no bearing on the immediate subject of my inquiry, they call for no further remark from me.

"In conclusion, I trust that your Excellency will be of opinion that the question submitted to me has been adequately investigated. I have appended to this report, in an appendix, a few notes