

number of days per annum on which rainfall exceeded 1in. = $9\frac{1}{2}$ days. Calculated discharge in extreme floods (assuming rainfall at from 5·48in. to 1·92in. in twenty-four hours), say, from 650,000 to 230,000 cubic feet per minute; in ordinary floods (assuming 1in. of rainfall in twenty-four hours), say, 120,000 cubic feet per minute; and under normal conditions (taking average rainfall as 0·12 inches per diem), say, 15,000 cubic feet per minute.

There is also, of course, the discharge of tidal water, but this is likewise very insignificant in amount, when dealing with the question of navigation and scour through sandspits, being probably not more than about 40,000 cubic feet per minute even at high spring-tides.

Something might possibly be done to supplement the effect of the Turanganui River, by bringing into it a portion of the Waipaoa River (which has about seven times the drainage-area of the Turanganui, and, consequently, probably about seven times its discharge under the several conditions detailed above), but this was not, so far as I have seen, mentioned in connection with the project in question, and therefore, presumably, formed no part of it.

The whole brunt of supporting the contentions in favour of deviating from Sir John Coode's design, would therefore appear to devolve on argument No. 4, to the effect that the probable cost of Sir John Coode's design was beyond the resources of the Board, while the probable cost of the alternative design proposed was within those resources. This argument is not, however, I think, any more supportable than the other ones. It is quite true that Sir John Coode's estimate for his design was £246,400, while the estimate for the alternative design ultimately adopted (which does not go so far out to sea, or afford such facilities for future improvements) was £175,000, but there are several very important qualifications which have to be applied to this fact. In the first place, Sir John Coode's design and estimate provided for sheltering-arms or jetties at a cost of £51,490, which are entirely absent from the adopted design and estimate. Omitting these sheltering-arms from Sir John Coode's estimate, the cost of remainder of his design, taking his own figures, would be only £194,910. A further reduction which should then be made, in order to bring things more nearly on same basis, is in the estimate for the work between high- and low-water mark. This, Sir John Coode shows as masonry with rubble filling, and he estimates it accordingly at £10,750, while if constructed of timber, as in the adopted design, it would only cost about £2,750, leaving a saving there of fully £8,000. This would make total estimate only £186,910. A still further reduction is due to the amount which Sir John Coode has put down for his breakwater pier, 900ft. long, which he estimates at £135,180. This is based on a very high estimate for the concrete work, and if that item were put at same rate as in the estimate for the adopted design (including £35,000 for railway to quarry, blockyard, buildings, surveys, plant, and machinery, and without allowing anything for proceeds of sale of machinery, &c., when done with), which, moreover, has been found to be sufficient, it would come to quite £27,000 less. Thus it would appear, that putting both on same basis, the work on Sir John Coode's lines, while better situated, with much less risk of failure, and greater facilities for future improvements, would only have cost about £160,000, as compared with about £175,000 for the adopted plan. The argument that the probable cost of Sir John Coode's design was a bar to its adoption, would therefore appear to be untenable.

Another matter, which has struck me very forcibly, is the implication, in some of the reports on the subject of the best site for the harbour, that the scheme known as the harbour of refuge, indicated on the plan herewith in purple, and estimated to cost £450,000, was the only feasible alternative to the river plan. This, however, must surely have been merely hurriedly stated, without purporting to be exact. The site selected for the harbour-of-refuge plan has great advantages, and, is even, I think, superior to that selected by Sir John Coode for his works. It is in fact, I think, the best site in the vicinity, and, so far as the information I have got enables me to judge, I should recommend its adoption hereafter, in the event of a really efficient harbour for large vessels being undertaken at Gisborne in the future. In comparing it with the river scheme, however, the mistake appears to have been made of assuming, that if the harbour-of-refuge scheme were put in hand at all, it must be undertaken as a whole, whereas, as indicated on map herewith in blue, it is evident that a portion of it, with a slight modification in position, and adopting Sir John Coode's principle of an open viaduct from low-water mark to the 3-fathom line, could be carried out for a moderate cost, while having great advantages as regards depth of water. Thus the probable cost of the work indicated in blue on map herewith, would be, with the sheltering-arms complete, about £180,000, or without the sheltering-arms, about £130,000. This project, therefore, or at any rate a portion of it sufficient for immediate wants, came quite within the range of reasonable comparison with the other schemes in question, and it seems a pity that it should have been shut out of all practical consideration, by assuming it to be only approachable in the event of funds to extent of £450,000 being available.

In conclusion, as regards this phase of the subject, I may say again that I think it is much to be regretted that the main principle of Sir John Coode's design was departed from, and that, moreover, a distinctly less satisfactory site was adopted, whereas an even better site is probably available a few chains to the eastward. A sum of practically £93,000 has been expended (exclusive of value of materials in hand, and available for further works, £6,851), and even if the value of machinery in hand and available for sale—£11,390—be deducted from this, it leaves, say, £81,600 as the cost of constructed works, from which there is at present practically no return whatever. That these works can to some extent be utilised by a further expenditure of about £21,000, as hereinafter described, is probable; but I very much doubt if they could ever conveniently become part of any thoroughly satisfactory harbour for the accommodation of large vessels. The absence of an open viaduct for some distance out from low-water line is in fact, I think, fatal to the prospects of attaining any really satisfactory results on an extensive scale, by the present design, for a reasonable cost, there being no certainty, that I can see, that the sandspit would not make out considerably further if the mole were extended. It is needless to say, therefore, that I could not recommend any extension of the present works on the basis of the approved plan, and, although the results which may be obtainable from a further expenditure of £21,000, or so, in utilising the work