appointed by the Council would practically have power to make any suggestion as to the mode in which these standard specifications should be made, or as to how the information was to be sought.

PAPER.

BAR HARBOURS—A POSSIBLE FUTURE FOR THE NORTH COAST AND RIVERS OF N.S.W.

By H. Gilbert.

[The paper was, in the absence of the author, read by Mr. E. Clarke.]

In submitting this paper to you, I have a certain amount of doubt and uncertainty as to its suitability for the occasion, for, as far as I, as a young member, can see, it has been customary to submit papers of a more technical nature, so much so that it is difficult to obtain originality in that direction, and I venture the following, in the hope that it may claim your attention and perhaps your interest for a brief space.

It would have been better, perhaps, had I introduced a little more technical data into this subject, to substantiate my theories, but owing to the extensive nature of the scheme, that is impossible for the present.

During a short visit to Northern rivers, about nine months ago (in speaking of the Northern rivers, I must confine myself to the district between Coff’s Harbour and Trial Bay, as shown on diagram herewith), I was very much impressed with the possibilities of the country and its future prospects. These prospects at present are somewhat shadowed by the difficulties and losses that the settlers have to contend with resulting principally from the fickleness and uncertainty of the river bars.

As will be seen by referring to Figures 1 and 2, the bars I refer to are at the Macleay, Nambucca, and Bellingen rivers, each of them serving a large district as a means of transport for the produce from the interior to the ports within the bars. It is quite a common thing for boats to lie within these bars for weeks at a time, waiting for an opportunity to put to sea, and the same conditions often compel the inward bound boats to stand off or seek shelter elsewhere. These delays, which must mean enormous losses to the boatowners and settlers alike, will increase as the population and produce of the district increase in number, bulk and value. This, however, will eventually be met and overcome by a scheme that will ensure a regular service by sea as well as by land, and with this in view I would venture to submit my ideas from an engineering point of view, as follows:—
BAR HARBOURS.

I shall first give my attention to Coff's Harbour, where Nature has already done so much towards making it perfect; there remains a little to be done yet by art, where Nature has failed to complete, and this little, as far as I could see, presents no very great engineering difficulty. It will be seen (Fig. 3) that the position of the island forms a south-east entrance, and also a north-east channel, which is not used.

The worst feature and greatest drawback that this harbour has is that the main channel, or entrance, opens to the south-east, from which point the hardest gales on the coast blow. During southerly weather the harbour is closed to navigation, in consequence of the ocean swell that runs right up to the pier or jetty, where under favourable conditions, passengers often have to be landed from the derrick in a boatswain chair or basket. I have shown in red on plan the approximate length and position of breakwaters that could be constructed to secure a safe harbour in all weathers. The greatest depth of water to contend with in the constructional work would not exceed five and a half fathoms, and the material, a volcanic stone, as far as I could see, could be obtained on either of the islands.

The stone has rather a honeycombed appearance on the surface, but I am inclined to think there is good solid stone below the surface. I should recommend that the boulder method be adopted for the breakwaters, similar to the formation at Newcastle, but this would have to be decided by closer inspection and soundings, etc.

The north-east entrance, if improved and made navigable, would provide a passage in or out during southerly weather, when it would not be easy or safe to approach the south-east entrance. The water area enclosed would be approximately one-third of a square mile. Having considered Coff's Harbour, and ensured its safety for the accommodation of coastal and inter-state shipping, I should then turn my attention to the construction of a railway from that port southward as far as the Macleay, as shown in Figure 1. This, as will be seen, connects up the three rivers—Bellingen, Nambucca, and Macleay—at their ports or entrance inside the bars, which would still remain available for the reception of the produce that would be transported down the rivers in suitably constructed river boats. From the depot or ports at the intersection of the railway line, it would be conveyed by train to Coff's Harbour for shipment. By this it will be seen that the river bars are practically nullified, and the advantages gained are many, and the most worthy of consideration are that the boats that have now to be constructed with a shallow draught for the negotiation of the bars and rivers, could then be constructed with a deep-sea draught, and the river boats could also be constructed for the service for which they are intended, with a shallow draught. A regular service could then be maintained from the rivers.
Trial Bay, as will be seen on diagram submitted, also lends itself to the construction of a port, and Nature here again has played a prominent part, for it is practically secure from the south-east, from which point the most of the weather on the coast comes. A breakwater here would make a port almost secure enough for any conditions.

I am not so well acquainted with the physical features of the seaboard south of Trial Bay, but I am of opinion that the service of railway could be extended for the same reason or purpose as already described, and, in addition to this, if extended around the seaboard, it would form a very valuable line of communication against invasion in time of war; but this is a subject that requires consideration from other aspects, and separate consideration, too.

Of the rivers mentioned in the foregoing scheme, the possibilities of the Bellingen appear to be to me the greatest, as it runs right up to the foot of the tablelands of the Dorrigo district, which from Myers' Crossing rises to the height of nearly 3,200 feet in seven miles. I might here dilate upon the beauties of the landscape, but will content myself with the remark that the luxuriant semi-tropical growth of the district speaks volumes for the fertility of the soil hid from view.

On the tableland the buzz of the sawmills is to be heard, and the forest giants, pine trees principally, are gradually disappearing under the devastating hand of man. This district must eventually become a great producing district, and the road, little more than a bridle path, with sidings—that now serves as a means of access and transport, for very heavy loads of timber, etc., must eventually be improved and regraded. The railway at present under construction will of course relieve this, but in the near future the necessity will arise for outlets from the seaboard, as well as to the other inland centres of commerce. The money now being spent upon the river bars, in maintenance and dredging, if spent upon a scheme of this nature, would certainly have permanence of results to justify the expenditure.

DISCUSSION.

(The vote of thanks to the author is recorded under "Proceedings.")

The President did not think there could be any general discussion until the paper had been printed and circulated. It must be largely a question of local conditions, and they would require looking into before they could be discussed on their merits. But some views might be expressed on the question of ports and harbours generally. Hitherto most of the trade had been concentrated in a very few of the possible ports. Queensland, the Northern Territory, and the North-west coast of Western Australia had scarcely been touched. The main railways would depend on
the selection of these ports. Unquestionably the subject was of very great importance.

Mr. A. McCowan said he had heard the paper with pleasure. He happened to know a little about the conditions from seeing vessels come to this port with their bottoms very badly scoured through passing over bars. No doubt if there were barges or special vessels made for the carriage of cargo to the mouth of the river, deep sea vessels could then be laden without any damage. But a number of vessels running up the Queensland coast in particular, some of them not ten years old, had had to have plates renewed as the result of the scouring in the Queensland rivers. Plates originally half an inch thick would be reduced to a little above a quarter inch, and when they became as thin as that the vessels could not be allowed to proceed. It was a source of great loss to the shipowners. He had not been up the Queensland coast, but had, officially, seen the effects on the vessels arriving here. As time went on we would have to do a great deal more in the way of promoting navigation by duly providing harbour essentials.

The President said Mr. McCowan had mentioned the possibility of loading deep-sea vessels from specially constructed barges. Did not that open up the question of weather conditions? Would it be possible in every condition of time and tide for those vessels to load?

Mr. McCowan said it could not be done without breakwaters in many cases.

The President: That is, it would necessitate the constructing of a harbour?

Mr. McCowan: Certainly.

Professor Payne said he would like a little more information with reference to the currents and the depths of water. Certain lines had been drawn indicating directions, but no soundings had been given. These, and in addition the direction of the prevailing winds, might, if possible, be obtained and incorporated in the paper.

It was decided to request the author to furnish the information, if available.

Discussion adjourned.
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