a low temperature, and then re-treating the refractory portion in the greater heat of the blast furnace. Finally, a large proportion of lead ores are either non or poorly argentiferous; with these less valuable ores, large output and low costs are essential. These are obtained, in the English method, by forcing the extraction by a rapid elevation of the furnace temperature to the highest permissible limit, and by retreating the residues in the blast furnace.

V.-THE PRODUCTS OF REVERBERATORY SMELTING.

The products of reverberatory smelting, together

and, in passing, will also make a few remarks anent hydraulic elevating and sluicing. I do not propose to dwell at length on the technical detail of a dredge, because to describe a dredge from beginning to end sufficiently clearly to be understood by the layman would take too much time, nor do I intend to refer largely to the earlier history of bucket-dredging in New Zealand. I shall rather endeavour to illustrate to you the immense advantage of the bucket-dredge as a gold producer. As you are all well aware, there are immense tracts of country in this colony known to be highly auriferous, but which on account of their



Cobeldick Dredge No. 1-In Course of Construction-Fraser River, Lytton, B.C.

with the subsequent treatment to which they are submitted, are shown in the following table:—

PRODUCTS.	TREATMENT,
Lead-Termed "Work-lead"; or, if argentiferous, "Base Bullion."	Refining-Desilverisation.
Gray slag-The charge residue.	Either crushing and concentration to save the metallic lead; or, espe- cially with argentiferous ores,
Flue dust-Chiefly oxides.	resmelting in the blast furnace. Either resmelting with fresh charg- es; or, if very impure, bricking
Hearth bottoms-Hearth material impregnated with metals.	and smelting in the blast furnace. The same treatment as gray slag.

NOTES ON GOLD DREDGING.*

By J. W. H. Piper, M.I.M.E.

I gives me great pleasure to address you this evening on a subject which I think is likely to prove one of the most important branches of the mining industry of our colony. I refer to bucket-dredging,

*Paper read before the New South Wales Chamber of Mines.

wet nature have baffled all attempts of the miner to extract the hidden treasure. To overcome this difficulty the bucket-dredge has been designed and brought to its present pitch of perfection; although this class of mining has for some years been carried out successfully in New Zealand, it is only within the past eighteen months that it has made its advent into New South Wales. The modern gold dredge, as used so successfully, is the outcome of years of practical work, and the brains and experience of many inventors are embodied in its mechanism. Bucketaredging is unlike all other systems of mining, the principal outlay being the first cost of machinery, very little preliminary preparation of the ground to be treated being necessary. The chief advantage claimed for the bucket dredge is the enormous quantity of material which may be operated upon at a surprisingly low cost, owing to the economy effected in labour. Under favourable conditions two men can handle and treat, with a suitable plant, 800 loads in a shift of eight hours, at a cost of about 1d. per