

to save the whole of it, and this can also be done now without the use of separate screen sieves. In the near future attention will doubtless be given to dredging those auriferous drifts which lie away from and at a higher level than the watercourses. This can easily be accomplished, and the dredge worked almost as economically as is being done at present. An examination sufficiently large to allow of a dredge being manoeuvred in, say 100 square feet by 8 or 10 feet deep, could be made. The dredge could then be built in or beside this hole and a small pumping plant erected to convey water from the nearest convenient stream. The hole or paddock, once filled, the additional water necessary to compensate for loss by soakage, evaporation, etc., would not be very great, and the cost of pumping would then be a trifling item. The chief advantage that may be claimed for this particular class of dredging, and one that would almost counterbalance the cost of pumping, is that the dredge would be immune from floods, which in a river are always more or less dangerous and certainly detrimental. So far I have discussed more particularly the continuous bucket dredge. There is yet another type of dredge which has occasionally been experienced with as a gold-winning machine. I refer to the Shovel and Grab Dredge. As excavating machines these dredges have done, and will continue to do for many years, no doubt, admirable work, but where large boulders or submerged trees are met with, and where continuous feed is necessary, these machines cannot be compared to the bucket dredge. Again, the labour necessary to operate the dredge in question is about twice as great as that required for the continuous bucket plant. Various other methods have been adopted, such as pneumatic caissons and dredges, but without success. One type of alluvial mining, erroneously called dredging, is that in which a centrifugal pump is employed to lift the wash, after it has been broken down and conveyed to the intake pipe of the pump by water under considerable pressure. This should rather be designated: "Steam Hydraulic Elevating." A very able paper on this latter subject has been given before the Chamber by Mr. A. J. Bensusan. I do not, therefore, intend to discuss it further.

The construction of a pontoon suitable for bucket-dredging is not so easy a task as it may seem to the layman, as it requires great strength at special points to bear the great unequal strains which may be put upon it. A visit to the hold of a well-constructed pontoon is an object lesson, and is a surprise to most people who see it for the first time. It will seem as if literally a whole forest of timber has been used to obtain the great desideratum of strength and utility. The arrangement of the plant is an important point, requiring careful consideration. When it is neglected, it is a cause of much inconvenience in the conduct of operations and often leads to loss of time, which of course means loss of money. Improvements are being continually effected, and it is necessary for the engineer to be well posted in designing a dredge of the most modern type. With regard to the provisions, under the Dredging Act of this colony I am satisfied that the government are desirous in every way to encourage bona fide investment, but it appears to me an inflated notion as to the possible gold yield has led to some misconceptions in the terms chargeable for dredging areas. It is remarkable that a charge of 20s. per acre should be made for areas that were, previous to being pegged out,

practically useless to the Crown, and had been abandoned by the individual miner. It must be seen that the inducement offered to investors compares very unfavourably with the terms offered in all the adjoining colonies. In New Zealand a small charge is made for the first year which embraces the period when the ground is yielding no profit. However, as the government propose to bring in a new mining bill, this point is worthy of consideration. Objections have been raised to gold dredging in this colony on the score that it may result in robbing the fossicker of his living and damaging the agricultural and piscicultural industries. I can confidently assert that these fears are absolutely groundless. In the foregoing remarks I have referred more particularly to dredging for gold, but my remarks may apply with equal force to the dredging for stream tin, this, however, is still in its infancy. Nevertheless, I am inclined to think that there is a great future in this colony for tin dredging.

REMARKS ON ASSAYS AND SAMPLES.**

(By W. F. Robertson, Provincial Mineralogist.)

THE assaying of any given parcel of ore is necessarily preceded by the process of 'sampling,' by which we seek to obtain, within the compass of a few ounces, a correct representative of the entire quantity of ore, which may vary from a few pounds to several thousand tons.**

"Accurate sampling is quite as essential as accurate assaying, for if the sample does not truly represent the lot or mass from which it is taken, the subsequent assay will be valueless.

"The assayer or chemist will usually receive the sample already prepared, but as he will occasionally be called upon to take his own sample, a knowledge of the art of sampling * * * is essential."†

I preface my remarks by quoting these two well-known writers and practical men to show the stress they put on the matter.

In this province, the majority of the samples brought to an assayer are taken by the prospector or other party, and, as the assay certificates are often used as "documentary evidence" of the value of the property, the assayer should be very careful to state on the face of such certificate exactly from whence he obtained the sample on which the assay was made.

If the assayer sampled the ore himself, he owes it to his client so to state, as it doubles the value of the certificate.

If he did not take the sample himself, he should place the responsibility of the sampling where it belongs by stating who did take it. Without some one known vouching for the correctness of the sample, assay certificates carry no weight as a document.

This can best be accomplished by the assayer seeing to it that his printed certificate blank is so worded as to cover the desired points, telling the whole story, and protecting him from any after-talk.

A certificate form worded somewhat as follows is suggested:—

"I hereby certify that I have assayed a..... sample marked..... handed me by..... and said to represent..... sampled by..... and I find such sample to contain:—"

If this is filled in every time, no one feels hurt, and no honest man will object to it.

**Minister of Mines Report, 1899.

†Peter's Modern Copper Smelting, page 28.

†Forman's Practical Assaying, page 25.