Practical Treatise on Hydraulic Mining

" A Practical Treatise on Hydraulic Mining in California," with descriptions of the use and construction of ditches, flames, wrought iron pipes and dams, flow of water on heavy grades and its applicability, under pipe-pressure, to mining, has been written by Aug, J. Bowie, Jr., the well known mining and consulting engineer of this city, and published by Van Nostrand. The work is really a textbook, and probably the best one contributed to the literature of mining for some years, Mr. Bowie has had large experience in the subjects of which he treats, and has had access to sources of information which have not been open to other engineers; and he has, moreover, carried on, at his own expense, extensive surveys during a number of years for the purpose of obtaining exact information. He has made a special study of ditches, dams, etc., and his descriptions, tables, and conclusions will save a great deal of money and time in the future to any one engaged in this class of work.

The book is handsomely illustrated. A large map accompanies it, this being a map of the lower portions of the Sacramento and San Joaquin rivers, showing the principal auriferous deposits in California, and the tributary streams draining the mining districts. It is on a scale of IS miles to the inch, and is handsomely and accurately made.

The preliminary chapter is devoted to the records of gold-washing all over the world, and is replete with most interesting information. The second chapter is on the history add development of placer mining from its incipiency in California. The third is on the general topography and geology of California. These subjects are treated in concise style, and the general features of the geology and geography of the country are sketched, so as to enable the reader to picture to himself the regions which are described in other chapters, and to thoroughly understand the working of the hydraulic mines. There is also a chapter on the distribution of gold in deposits, and the value of different strata, and on the amount of workable gravel remaining on the western flank of the Sierras. Mr. Bowie then describes the different methods of mining gold placers, both surface and deep. The chapter on reservoirs and dams is a specially useful one, describing their construction, and the principal ones in the State. His remarks on the measurement of flowing water are excellent and of great value.

As a matter of fact this is the first time that it has been practically demonstrated what the coefficients of discharge are for water flowing in ditches on heavy grades. The text books heretofore have never treated this subject, and the engineer has been left to grope in the dark and apply the old formulas, which has caused endless loss, and in some cases entailed financial disaster. The deductions given in this chapter are drawn from the facts as therein shown, viz: The area of the ditches is stated, the grade or slope given, the quantity of water turned in at the head of the ditch is accurately measured and stated, and the amount discharged at its outlet at varying distances given. The results are then formulated. It is a noteworthy fact that"; all experiments for the determination of coefficients for the flow of water in ditches and canals, have been made on short lines and on light grades, and even Higham, in his work on hydraulics, gives 10½ feet per mile as the heaviest grade on which water would probably be made to run in ditches or canals, The instances cited by Mr. Bowie show grades from 12 to 25 and 30 feet per mile, and the distances over which the water is run and delivered are 40 and 50 miles and over.

The chapter on ditches and flumes gives the location and construction principles, examples of ditches, flume construction, dimensions, cost, etc. In the treatment of this subject drawings are given which show in detail the construction of the various forms in use and which have been proven by long experience to be the best. The cost per foot or per box is given in every instance, and the rate of labor and material is stated, so that any person is enabled to make estimates by substituting other rates, as the case may require. In the chapter on pipes and nozzles is a very useful table giving the amount of iron,

weight, etc., in different sized pipes, with varying thickness of gauge used in their construction. This is accompanied by a table of rivets. In the chapter on blasting, details are given which have never before been published. Descriptions of notably large blasts are given, with systems adopted,
cost, etc. This chapter is a very useful one, as the methods are carefully described, with diagrams, etc. That on the distribution of gold in sluices is an interesting one, giving tables which show proportion of gold caught at certain distances in the sluices, undercurrents, etc.

Mr. Bowie's remarks on the "Duty of the Miners' loch" are practical and to the point. This subject has been usually handled in general terms. Absolute data are here given, and the facts from which they were deduced are stated. This is specially useful as showing what has been done with water on different properties, serving as a guide to those who wish to know what can be done with various quantities of water under the conditions stated.

The other chapters are on "mechanical appliances," "blasting gravel banks," "tunnels and sluices," "tailings and dump," "washing or hydraulicking," "loss of gold and quicksilver," and "statistics of the working and the yield of gravel." There are 72 engravings in the work, and a number of useful tables for reference derived from the experience of our largest companies.

It will be seen from this brief summary of the contents of the book, that it is not only to hydraulic miners that it is useful, but to placer, drift, river, beach, and other surface miners. The data concerning ditches, flumes, reservoirs, dams, etc., will be found of service even to those engaged in irrigating work or other users of water. Mr. Bowie has brought to his task experience and ability and has produced a book of value not only to the profession of mining engineering, but to miners as well. He has confined himself to the technical discussion of his subject, without going into the vexed "debris question" at all. He gives his authority when quotation is made, and chance statements are entirely avoided. The work will be found useful to all miners and will serve as a *vade mecum* for engineers in the branch of which it treats. All the subjects in the book are treated from a practical standpoint, and the results of actual experience are given: it is not a question of what may be done, but a question of what has and what is being done.

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