

gold; therefore it is necessary that the pyrites should be subjected to such a heat that will set the sulphur free before the gold it contains can reasonably be expected to mix with the mercury.

Considerable attention was given to this subject by the Victorian Government in 1873, when His Excellency the Administrator of the Government in Council appointed the following persons to investigate and report upon the methods of treating pyrites, and pyrites-vein stuffs, as practised on the goldfields, and to make a recommendation as to the best and most economical system of extracting gold from auriferous pyrites—namely, Robert Malahy Sergeant, to be chairman; Rivet Henry Bland; J. Cosmo Newbery, B.Sc., &c.; George H. F. Ulrich, F.G.S., &c.; William Sheris, and J. L. Lewis.

These persons framed a series of questions relating to the subject under inquiry, and copies were sent to mine managers and others interested in the treatment of pyrites in the colonies and in Europe, with requests that their replies might be forwarded to the Board. After taking a deal of evidence, and receiving replies from a number of scientific men in Europe, who treated at great length on the various methods adopted in Hungary, Spain, and Portugal, for extracting the various minerals the pyrites contains, and of utilizing the sulphur for manufacturing sulphuric acid, this Board furnished a valuable report, of which the following is an extract:—

“The important question of the best and most economical method of extracting the gold from auriferous pyrites has been fully dealt with, and the salient features carefully set forth in the report.

“Information has been obtained relative to methods in operation in other parts of the world; and one of these, dealing with the waste products, and which for convenience we call ‘Claudet’s Process,’ we deem sufficiently important to warrant a somewhat detailed description. The results obtained by this system may be considered extraordinary, inasmuch as the gold in the stuff treated, though not found in weighable quantity, on assay, nevertheless yields sufficient to more than cover the cost of the operation. Messrs. Foord and Miller, in their evidence, dwell strongly on the merits of this method (the former gentleman terming it *a complete process without waste products*). The special expense of extracting the precious metals by this method is about 6½d. per ton of roasted pyrites, and the net profit about 3s. 6d. per ton, the material operated upon being very poor pyrites, obtained in great part from Spain and Portugal for vitriol manufacturers on account of the sulphur it contains. Mr. Miller, in his evidence, says, ‘Should the process prove available here, it would probably give rise to the formation of a new industry in the manufacture of iodine from the seaweeds of the coast.’

“Very little practical attention has yet been given in this colony to extracting other constituents of pyrites, such as silver, copper, nickel, cobalt, and other metals, and also sulphur and arsenic, which from a purely commercial point of view are of vast importance, and capable of adding very materially to the wealth of the colony. Most of the waste products, as they are termed, are such no longer, as their presence has increased the value of, and demand in Europe for, pyrites of all kinds; we have therefore deemed it necessary to dilate at some length on this branch of the subject, from a conviction that any information which tends to open up a new and profitable field of industry is of great use.

“A statement from the annual returns of the Customs Department shows that, from 1869 to 1872, including a period of four years, 1,558 tons of sulphur, valued at £18,528, were imported; and when it is considered that this article could be produced here in large quantities, sufficient not only for our own use but for the supply of other countries, it is time that public attention should be directed to the matter.

“We are fully of opinion that the establishment of large central works for the treatment of pyrites, on the most thorough and approved system, would be a very great advantage to the colony in every respect. Such works would give rise to the foundation of many new industries, besides tending to the production of larger quantities of gold. It would be necessary to establish works in situations easily accessible to railway communication from the goldfields, whence the supply of raw pyrites could be regularly and easily obtained. There could be no objection to the occupation by such establishments of advantageous sites on the ground of injury to public health, as the fumes given off in the process of roasting pyrites would be condensed for the purpose of saving the sulphur and arsenic. The operations to be carried on would be the receipt of pyrites, the extraction of the gold and other metals as well as the sulphur and arsenic contained, the subsequent treatment of the residues, and the preparation of the sulphur, &c., to fit them for the market.

“As portions of the evidence deal with the subject under inquiry in the relation to the effects of pyrites-burning on health and vegetation, and as such evidence has been mixed up with other portions, we have directed the secretary to make a digest of the whole of it. This has accordingly been done, and we think a more ready comprehension of the question will be obtained by reference thereto. Where, however, apparent discrepancies exist, they may be accounted for by the local features in connection with each case. The digest of evidence is subdivided under the following heads:

- (a.) Advantages and disadvantages of burning pyritous quartz previous to crushing.
- (b.) Methods of concentration.
- (c.) Methods of roasting, &c., and evidence as to the best description of furnace.
- (d.) Amalgamation, including losses of mercury, use of sodium amalgam, &c.
- (e.) Effects on public health and vegetation, and methods of condensation.

“*Advantages and Disadvantages of Burning Pyritous Quartz previous to Crushing.*

“From the evidence it will be seen that crushing pyritous quartz raw is decidedly the more advantageous method; and on this point the information supplied by the majority of mining managers examined is corroborated by the professional evidence given.