

of antimony; the remainder, with the exception of a fractional amount of impurity—less than a per cent.—being sulphur.

The regulus is consequently nearly pure; the impurities being in very small amount, and of the common kinds.

I inquired the percentage of yield which Mr. Hughes professed to obtain, and was informed that he got from 60 to 65 per cent. This is a usual proportion to obtain from ordinary rough ores, but is less than that obtainable if it were all like the sample sent. Five per cent. is enough loss to allow. So far, then, as to the efficiency of the process.

Next, as to the novelty. I have already stated, in a memo. submitted immediately on the arrival of the samples, and before I received my final instructions to proceed with the investigation, that the reduction of antimony had been introduced here several years before Mr. Hughes appeared on the scene. The question then turns on the novelty and originality of his process.

I am not in a position to state what process was employed by the Messrs. Cairns, for whom I experimented in 1859, or by other firms, but presume that it was one of the ordinary methods, which vary from each other only in details of manipulation. I cannot, therefore, pronounce of Mr. Hughes's process, whether he was the first to employ it here; but it is an ordinary mode of operating on the ore, as I will endeavour to show.

Mr. Hughes first roasts his ore, to drive off some of the sulphur, and then introduces it, with fluxes, into a chamber of fire-clay, round which is a furnace-flue. The chamber is perforated at the bottom, and the metal, when reduced and melted, flows through into a receptacle placed beneath.

In the old process, which this resembles, the crucible is perforated at the bottom, and is built into a furnace, instead of the furnace being built round the crucible, as by Mr. Hughes; the crucible not being a common melting pot, but just such a close chamber as he describes. The furnace and treatment are essentially the same, and the fluxes are identical.

But, in the old method these crucibles were used first to melt the crude mineral, and to separate it from the gangue and from such other impurities as are thus separable; and the roasting and fluxing followed.

Mr. Hughes roasts first, and then charges his crucible with the material, gangue and all. This, then, is the only difference I am able to detect.

The answer to Mr. Hughes's claim will then depend upon the reading which the Board thinks proper to put on the word "novel." To make the matter more clear, I sum up briefly the facts of the case, as follows:—

1. Antimony was manufactured here several years ago.
2. Mr. Hughes produces a sample of regulus, good in quality, and passable in proportion, from the ore, but not remarkable in this last respect.
3. I see no novelty or peculiarity in Mr. Hughes's "original" process.
4. Mr. Hughes speaks of fire-clay which he has found (this is valuable); and of sulphur, and white paint—which he states that he can make (not has made)—samples of these are not submitted.

SYDNEY GIBBONS, F.C.S.,  
Analyst.

#### APPENDIX D.

I BEG to submit a brief expression of opinion upon the present subject of the agricultural premiums. I think that the Board would act unwisely if it continued to offer premiums for undertakings that cannot possibly, until a certain lapse of time and alteration of circumstances, be realized. I refer to the following instances:—

(1.) *Silk*.—In Australia there are few or none good silkworms; but if there were it would not much alter matters. It is impossible to reel silk properly without a proper instructress, and she must be brought from Italy or the South of France. I have never yet seen any really marketable silk (reeled) in Australia; but, upon the whole, in spite of the inferiority of the worms (which, by importing from Japan or Persia, the two best countries for the purpose, can be easily rectified), there is no question that first-rate cocoons can be produced. I think that Australia will be the great silk-growing country of the world, as its climate, from the dryness and purity of the air, is greatly superior to that even of Italy. The white mulberry (*morus alba*), grows here like a weed, and Australian silk ought to fetch the same price as that of Auvergne, namely, from 40s. to 60s. per lb. But  $\frac{1}{3}$  cwt. cannot be produced here for two or three years, and, if it could, would be unsaleable. I beg respectfully to recommend, supposing, of course, the Government grant to be extended to the coming year, a premium of £20 for every thirty pounds weight of marketable cocoons, and a premium for every five hundred white mulberry trees planted.

(2.) The above remarks apply considerably to the olive. What is the practical use of giving a premium for a ton of olive oil, when there are no olives in Victoria, as the olive does not come to maturity, fit to produce oil, under six or seven years? I recommend, instead, a premium on every two hundred healthy olive trees.

(3.) A large premium is offered for flax grown for linseed oil. Flax will pay, because the leakage out of the casks, *plus* freight and insurance, is a natural protection to the Australian grower. But it will not pay to grow for fibre, and any one who so grows it, in the teeth of the European competition, will find himself a loser.

(4.) It is futile to grow cotton in Victoria, because both climate and the price of labour are against it. The sea-island cotton (as the name shows) will only agree near the sea, in an equable climate and on sandy soil. The Victorian climate is immensely variable, and the soil of the sea-board unsuited. Riverina may grow New Orleans cotton, but even there a large importation of either Coolie or Chinese labour is indispensable. I should respectfully suggest, therefore, that the vote for cotton be entirely abolished.

J. J. STUTZER, M.A.