

possible advantage, and that any points of difference which might arise from the new tariff were more likely to disappear by free communication than by holding aloof. We might fairly appeal to the commercial and manufacturing interests of the kingdom not to allow the appearance of the old country on such an occasion to be in any way unworthy of what she had done in the past; and he was sure the Society would rejoice if by any means they could aid in making the exhibition a success.

Mr. Dredge, in reply, said he thought Sir Henry Wood had scarcely done justice to the hospitable character of the Americans, and the warmth of feeling which seemed to actuate them all where Englishmen were concerned. There were, of course, some ignorant people who looked on Englishmen as their mortal enemies, but on the whole it would be difficult to find a single intellectual American who was not willing to come three-quarters of the way across the Atlantic with outstretched hands to meet us if we would go the other quarter. Mr. Jeans spoke very justly about the difficulty there would be in inducing iron and steel manufacturers to exhibit; it was most unlikely that they would do so unless they were interested in some special branch, for the simple reason that the majority of them knew that we were far behind Americans in the same line of business. They had larger outputs, and more efficient processes for making a large output, and we should have to learn from them rather than teach. Mr. Jeans had spoken with some warmth from his personal experience of the custom house difficulties; but he advised him, next time he took the responsibility of personally conducting 400 or 500 Englishmen on a visit to America, to insist on them not carrying hat boxes, for he believed they caused all the trouble. Two or three reception committees informed him that they did not mind any amount of trouble, and could deal with any amount of luggage, but when they saw a row of four hundred hat boxes, it flattened them out completely. Sir Frederick Bramwell had referred to the qualities of energy, determination, and so forth as a source of success to an exhibition, and certainly those qualities were more concentrated in Chicago than in any other city. He was sorry Mr. Kohlsaat had not given them more information, as he might have done, being a member of the exhibition executive; for he had that morning showed him a telegram from the president and vice-president stating that the United States Commission had fully approved the plans which had been prepared, the sites, and financial position, and were about to recommend the President of the United States to issue the proclamation inviting all foreign nations to contribute. It had come to his knowledge that China and Japan intended to be represented on a scale they had not hitherto attempted. This was not surprising in the case of Japan; but the intention of China to come forward in this way was very significant, being another proof of her intention to break down the barriers which separated her from the western world; so that she would become, in the near future, one of the most valuable foreign markets. The South American republics had also announced their intention of exhibiting on as large a scale as in Paris. Possible exhibitors would not require to decide for some months to come, and if this paper supplied them with any material for preliminary consideration, he should be amply repaid.

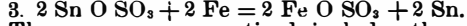
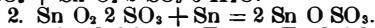
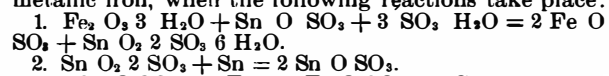
The chairman, in proposing a vote of thanks to Mr. Dredge, expressed the hope that when the scheme was more matured, a further paper, giving more detailed information, might be prepared and read.

The vote of thanks was carried unanimously, and the proceedings terminated.

RECOVERING TIN FROM TIN PLATE SCRAP.

By B. SCHULTZE.

THE solvent action of acid ferric salts upon metals is well known, but the property has not hitherto been utilized in the treatment of tin plate waste, for which purpose it answers perfectly. The solvent used may be either acid ferric sulphate, acid stannic sulphate, dilute sulphuric acid, or dilute hydrochloric acid, but in the two latter cases ferric hydrate, in the form of heavily rusted scrap iron, must be added. The tin, when dissolved, is precipitated by metallic iron, for which purpose, however, the solution must be perfectly neutral, and contain only protoxide salts, as the smallest excess of acid in the presence of persalts prevents the reaction. This condition is obtained by passing the solution through a mixture of iron rust, metallic tin, and metallic iron, when the following reactions take place:



The process, as practiced, includes three principal operations:

1. The solution of the tin.
2. The precipitation of the tin.
3. The treatment of the waste liquor.

When acid ferric sulphate is used the tin plate cuttings are placed in iron baskets and lowered into the solution contained in an open wooden vat. The tin covering is completely stripped off the iron in a very few hours. The basket is then lifted out, the contents washed in water and picked over by hand to separate portions still covered with tin, while the remainder, which is clean malleable iron, is pressed into balls for the heating furnace.

The partially stripped portions are either returned to the dissolving bath or put aside to rust, in order to obtain material for the neutralizing vat.

When the solution is saturated, as evidenced by its no longer acting upon fresh tin plate scrap, in which condition it contains mainly stannous and ferrous sulphates, probably a little stannic oxide and some free acid, it is passed to the neutralizing vat containing metallic tin and iron rust, where the excess of acid is neutralized and the persalts are reduced as shown above.

When an acid stannic solution is used, the method of proceeding is similar, the only difference being in the nature of the solvent. Instead of these solutions, dilute sulphuric or hydrochloric acid may be used in conjunction with ferric oxide or its hydrate, but with these the action is somewhat slower, from six to twenty-four hours being required to remove the tin completely.

The precipitation of the tin from the neutral stan-

nous solution is effected by running it into vats containing clean metallic iron (scrap previously freed from tin). The reaction goes on slowly, the tin separating as gray metallic powder or in brilliant crystalline grains; but the reduction is complete, the exhausted solution showing not the slightest trace of tin. The precipitate when washed and cleaned from iron by dilute sulphuric acid, is either melted or used for making tin salts. The green vitriol liquors from the precipitating vats are concentrated by allowing them to drop slowly over a large heap of cleaned iron scrap, which causes a rapid evaporation and a deposit of ferrous sulphate on the metal. This may be washed off and purified as commercial copperas by recrystallizing, or it may be used for forming the acid liquor for dissolving fresh quantities of tin.

When the tin plate cuttings are varnished, the surface is cleaned by heating them with strong sulphuric acid at a temperature of 100° Centigrade, which destroys the varnish in a very short time, leaving the tin surface exposed. When zinc is present, it should first be removed by treatment with dilute sulphuric acid as long as hydrogen is evolved.

The plant and materials required are both simple and inexpensive. From 1 to 6 cwt. of chamber acid, worth from 1s. to 12s., are consumed per cwt. of tin obtained, worth £4 10s. to £5, in addition to 25 to 40 cwt. of iron, worth from £1 17s. to £4. The amount of coal required is inconsiderable. Both tin and iron are obtained in the highest state of purity.—*Dingler's Polytechnische Journal; Chem. Tr. Jour.*

TO CLEAN TOOLS AND MACHINERY.—To clean iron parts of machinery, tools, etc., about 10 grammes of paraffin chipped fine, are added to one liter petroleum in a stoppered bottle, and during two or three days from time to time shaken up until the paraffin is dissolved. To apply it the mixture is well shaken, spread upon the metal to be cleaned by means of a woolen rag or brush, and on the following day rubbed off with a dry woolen rag.

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