boxes as compared to the 2,400,000 boxes now produced by the Jönköping-Vulcan factories.

The Jönköping och Vulcans Tändsticksfabrik was formed by the large concerns at Jönköping and Tidholm to prevent undue competition and to aid the export trade. Nine-tenths of the matches produced are exported, largely through London and Hamburg, although the interests have encountered high protective duties in most countries.

The phosphorus, antimony, sulfur and paraffin used are imported, but potassium chlorate is obtained from the Swedish manufacturers. Much of the aspen wood used is imported from Finland and Russia. The success of the industry is due largely to the employment of devices for replacing manual labor; "complete machines" producing 3,600 boxes of matches per hour have been in use since 1892.

THE RECOVERY OF BRASS FROM FOUNDRY CINDERS

Wittich (*Eng. Min. J.*, **95**, 853) describes the process of reclaiming brass contained in the cinders from brass foundries. The recovery of such brass particles, heretofore almost completely lost, has been found to be satisfactory in eleven plants in this country, and the largest installation for the purpose is now being made by the Michigan Smelting & Refining Co., of Detroit, Mich. The accompanying flowsheet shows the plant in course of construction at Detroit.

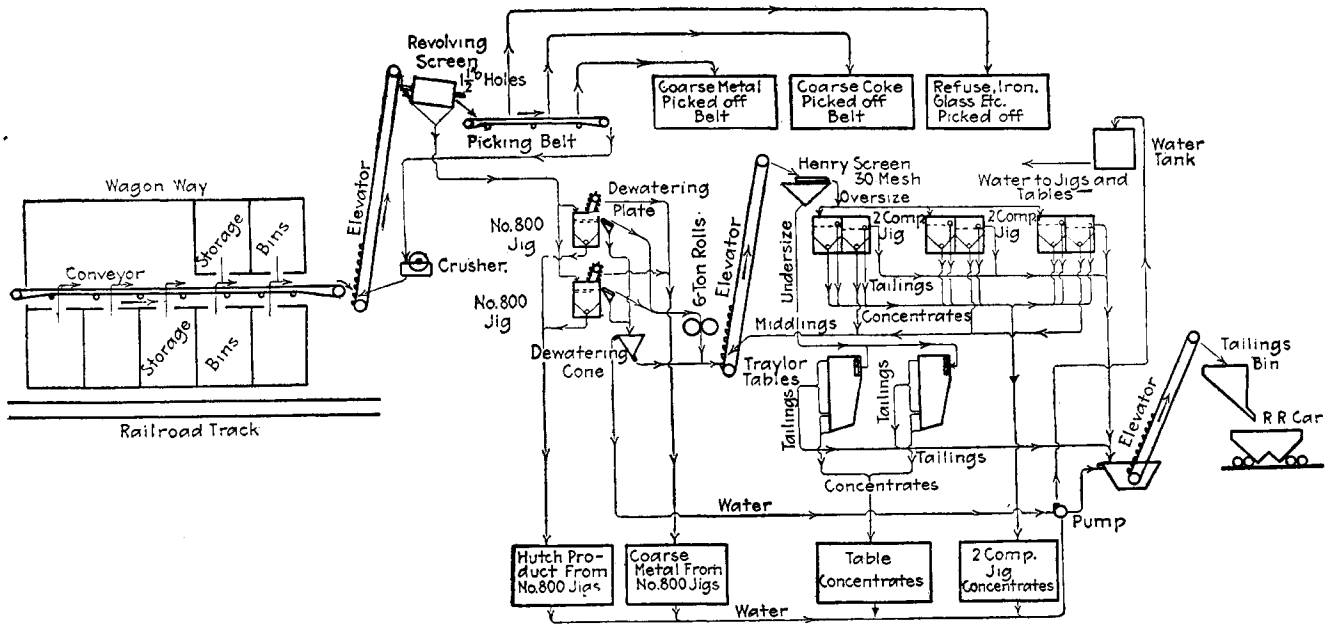
The plant will have a capacity of 75 tons daily. The original feed will carry from 3 to 5 per cent of metal, while the concentrates will carry from 25 to 50 per cent metal. The loss of metal in the tailings, it is estimated from operations at other plants, will be less than $^1/_2$ per cent. The metal recovery should be close to 7000 lbs. daily when the plant is operated at full capacity.

Beneath the receiving bins a conveyor belt, automatically fed, carries the cinders to an elevator, and thence to a revolving trommel. The oversize from the screen, which is $1^1/_2$ in. mesh, goes to a hand-picking belt, which is 36 in. wide and which revolves slowly. The coarse, heavy cinders passing over the end of the belt go to a 15 in. Blake crusher, and thence return to the $1^1/_2$ in. trommel.

The heavy, coarse metal picked off the belt goes to a bin, and is ready for the crucible. The coarse coke goes to a bin and can be used in smelting. The refuse goes to the dump.

Undersize from the $1^1/_2$-in. trommel goes to a pair of bull jigs, each of single compartment, 36 × 48 in., operated by double eccentrics, at 75 r. p. m. The hutch product from the two bull jigs carries from 25 to 30 per cent brass and goes to a bin, ready for the crucible. A rotating valve at end of jigs gets the coarse metal. All tailings from the bull jigs are reground. They first pass over dewatering plates, the dry tailing passing to a set of rolls, and the water going to a dewatering cone. Both the reground tailings and the sediment from the cone pass to an elevator, thence to a 30-mesh Henry shaker screen. The oversize goes to three sets of two-compartment gast-motion jigs, each compartment being 24 × 36 ft. Double eccentrics have 175 r. p. m. The undersize passes to hopper, hence to two Traylor tables.

Tailings from the three fast-motion jigs and from the tables pass through launders to a hopper, are elevated, and stored in a bin, ready for removal in railway cars to be used as ballast or for other purposes. Middlings from the fast-motion jigs return to the elevator and are retreated, after passing through a set of baby rolls which are not shown on the flowsheet, this change having been decided on after the first plans were drawn.



PLANT FOR RECOVERING BRASS FROM CINDERS

AN ELECTROLYTIC THEORY OF THE CORROSION OF IRON

In a paper read before the Faraday Society at the Manchester meeting on April 4, 1913, Bertram Lambert (*Chem. News*, **107**, 184) expressed his inclination to the view that substances which protect iron from corrosion have the power of destroying or reducing the electrical differences which always exist in commercial forms of iron—that they have a passiviving effect—and that the substances, such as the chlorides of the alkali metals, which stimulate corrosion do so by augmenting these electrical differences. It is well known that ordinary commerical iron is rendered passive by certain substances, *e. g.*, nitric acid, solutions of the caustic alkalies, or chromic acid, and that such passive iron, so long as the passivity persists, will not rust in contact with pure water and pure oxygen, and will not cause the deposition of copper from very dilute solutions of cupric sulfate. Lambert considers that it seems probable that these substances have the power of altering the surface of commercial iron so as to destroy, temporarily, the electrical differences on its surface—to produce what might be described as an "electrically equable" surface. The result of this would be that the iron would possess

no tendency to go into solution in an electrolyte, and consequently would not rust when placed in contact with air and water. Since passivity can be produced by widely different substances, he thinks it not improbable that the "electrically equable" surface produced is not always of the same nature.

THE USE OF CAST IRON BRIQUETTS IN GERMAN FOUNDRIES

Hugo Matz (*Chem. Ztg.*, **37**, No. 37, 375) considers that the introduction of the use of cast iron briquetts is an innovation which has had a revolutionary effect in the iron industry, since these briquetts have made it possible to produce castings of high grade without employing specially expensive pig iron. At first, there was considerable opposition in the trade to their use, but Matz states that this has now been overcome in the German foundries.

Those foundries making a specialty of locomotive parts were the first to adopt the use of briquetts; extensive experiments have shown that steam cylinders manufactured by the addition of 15–30 per cent of briquett-chips to the castings, are of the same grade as those made from the special pig irons imported from England and Sweden. One great advantage derived from the use of the briquetts is a material reduction of carbon.

According to analyses made in the laboratories of the Sächsischen Metall-Brikettwerke, the composition of the briquetts is as follows: Silicon, 1.8 to 2.0 per cent; manganese, 0.6 to 0.8 per cent; sulfur, 0.10 to 0.13 per cent; and phosphorus, 0.7 to 0.9 per cent.

THE BISULFITE PROCESS FOR THE EXTRACTION OF ZINC

The bisulfite process, as practised at the works of the British Metals Extraction Co., Ltd., at Llansamlet, Wales, is described in *The Engineering and Mining Journal*, **95**, 792. The ore, after pulverization, is roasted in mechanical furnaces, the sulfur dioxide being conveyed from the roasting furnaces to the extraction towers. The roasting is done very slowly, 24 hours being required to finish a charge.

The roasted ore is conveyed to the top of a specially designed tower where a weighed amount is mixed with a weighed amount of water, so as to form a thin pulp. This pulp descends through the tower, meeting the sulfur dioxide coming up. The agitation produced by the interior construction of the tower brings about such an intimate and effective contact of the pulp with the sulfur dioxide that by the time the pulp reaches the receiving tanks at the bottom of the tower nearly 90 per cent of the zinc has been extracted. The solution of zinc bisulfite is drawn off into an apparatus, wherein it is heated, precipitating zinc monosulfite. The latter is calcined, yielding zinc oxide, which goes to spelter furnaces, the Villiers works having been purchased for smelting it. In that works spelter assaying 99.85 per cent zinc is produced; this spelter is said to bring about $20.00 per ton more than ordinary spelter. The extraction of zinc in the bisulfite process proper is said to be from 84 to 89 per cent in the case of the better roasted charges. In the treatment of ore containing 28 per cent zinc, the residue, which goes to the lead smelter, contains about 8.5 per cent zinc.

THE TOXICITY OF LEAD PAINTS

In 1911, Baly (see *Oil and Colour Trades J.*, May 6, 1911, 1518; *Chem. Trade J.*, May 13, 1911) stated that "a definite volatile lead compound is given off in the drying of white lead paint. It appeared to be peculiar to basic carbonate of lead and to explain the prevalence of lead poisoning among painters." Later, Baly (*J. Soc. Chem. Ind.*, **31**, 515) again referred to the toxicity of white lead; he claimed that his experiments established the fact "that a poisonous volatile substance is given off paints made with white lead or red lead."

Armstrong and Klein (*Idem*, **32**, 320), after a full consideration of the subject, conclude:

1. That the vapors produced during the drying of white lead pastes and paints do not contain lead.

2. That the vapors given off as paints dry consist of turpentine, for the most part, together with oxidation products of the oil, and that these latter are common to paints generally containing oil so treated that it will dry.

3. That the oxidation products formed from the oil during drying are harmless under the conditions of practice, as shown by experiments upon animals.

4. That the toxic effects sometimes experienced from drying paints are to be ascribed to turpentine and that due allowance must be made for this in dealing with the hygienic phase of the problem. Their inquiry also shows that in many cases effects have been regarded as due to "lead poisoning" which are attributable to other causes, especially to turpentine.

5. The whole available evidence indicates that the dangers attending the use of lead compounds are only the well-known mechanical dangers.

6. There is no foundation for the importation of a new element of danger into the consideration of the question of paints. Lead paints are to be objected to only on the ground that they may enter into the system through careless handling or in the form of dust such as is produced by rubbing down old paint.

THE POTASH SITUATION IN AUSTRIA

While it is hardly to be expected that the Austrian potash deposits, said to be the only ones of apparent importance outside of Germany, will be able to compete with those of the latter country, either now or in the future, *The Chemical Trade Journal*, **52**, 393, reports that there is every prospect that they will be exploited on an efficient scale in the near future. A combination has been organized for the purpose of working the potash measures in the Calicz district and abutting areas, and it is hoped to be able to supply this fertilizer to a large portion of Austria at reasonable prices and at the same time to pay a remunerative dividend. The concession on which the new combination will work is to extend over a period of fifty years, and the interests of the Austrian consumer have been protected by a special clause requiring that certain limits in sale prices shall not be exceeded for domestic transactions. It is hoped, also, on behalf of the inland consumers, that the Austrian Government may be induced to impose a high export tariff on goods sold outside the country, the object being to reduce the price to consumers to a lower level even than the limit beyond which the exploiters may not invoice their goods. It has required a long time to effect this combination; but considerable political difficulties had to be overcome in respect to the Government's monopoly claim, which extends to the salt deposits of the country, in close association with which the potash deposits are found. This can, it is said, be got over by certain conditions attaching to the sale of the salt produced along with the potash. This will be the first commercial test of the value of the Austrian potash reserves.

WASTE SULFITE LIQUOR AS A FERTILIZER

The fact that waste sulfite liquor contains a large amount of organic matter and certain chemical compounds of value as plant foods has led, at various times, to experimental investigations as to its employment in agriculture. According to *Paper*, May 7, 1913, the subject has recently received full consideration in Germany. A contributor to *Fühling's landwirthschaftliche Zeitung*, **1913**, No. 4, found that a cellulose mill of medium capacity, producing 500 cubic meters of waste liquor daily, was discharging 50,000 to 60,000 kilograms of organic matter in a dissolved state into a stream, to its manifest detriment, particularly in the summer. After giving the matter