Metallurgical Comment

T. R. LOUDON, B.A.Sc.

Correspondence and Discussion Invited

DROSS MELTING BY ELECTRICITY.

A new form of electric furnace for the melting of drosses, scrap metal and cyanide precipitates is described in the Brass World, January, 1912. This furnace is the invention of Raymond S. Wile, of the Pittsburg Electric Furnace Company, and is a combination of the arc and resistance furnaces. Four carbon electrodes are used, two passing up through the bottom of the furnace and the other two down through the top. When melting is to be begun, the furnace is partly filled with broken glass and the carbon electrodes arranged so that they touch. After the current is turned on they are drawn apart and an arc is formed, which soon melts the glass in its neighborhood. As the glass melts it becomes a conductor of the electric current, where before melting it was a non-conducor. The electrodes are now drawn farther apart so that the current passes through the molten glass and finally the whole charge becomes fluid, the glass being kept liquid by the resistance offered by it to the passage of the current.

When all of the glass is in a molten condition, the metal or dross to be melted is charged directly on top of it. The initial heat of the glass melts the metal, and then, on account of its great specific gravity and the fluid condition of the glass, it sinks to the bottom of the furnace where it is completely protected from oxidation. After several months the glass becomes more or less impure and must be tapped off and replaced, but broken bottles form a cheap mixture for refilling it. The furnace is lined with chrome brick, as that is found to be the best resisting material for such work. A furnace with a capacity of 1,000 lb. of brass will pour about one ton of metal per hour and, if run continuously, consumes about 68 kw. in doing so. If the current is not run continuously, and electric current costs 2c. per kilowatt-hour, it has been found that the current cost for melting 1,000 lb. of brass is about $1.36. This is somewhat higher than the cost of melting with oil or coke, but the waste in melting is less and is said to more than compensate for the extra power cost.

STRENGTH OF ROLLED ZINC.

When it was proposed recently that zinc be used for the hangers of electric cables the fact was brought out that data on the strength of American zinc were lacking, and tests were made by the Materials Testing Laboratory of the University of Illinois on this subject. Thin zinc plates were found to have an ultimate tensile strength of about 24,000 lb. per sq. in. The modulus of elasticity was found to average 11,500,000 lbs. per sq. in. Under the action of punches and shearing tools, zinc plates developed about 40 per cent. of the shearing resistance of mild steel and required the expenditure of about 30 per cent. of the energy required for plates of mild steel of the same thickness. No clearly defined elastic limit of yield point was found for cast or for rolled zinc. Zinc plates was found to break under pull with much less stretching than steel, but a zinc cylinder could be flattened without cracking. The result of tests of American zinc showed that its strength does not differ from that shown by European laboratories for foreign spelter. The results of these tests are published in Bull. 62 of the Engineering Experiment Station of the University of Illinois.

NEW COPPER ALLOY.

A copper alloy with the hardness of steel and great tensile strength is claimed by a French metallurgist. It is made by melting together one pound each of chromium and aluminum and adding 22 pounds of copper, 5 of nickel and 4 of zinc, with intervals of half an hour or an hour between the successive additions to the fused mixture. By varying the proportions of chromium and copper the alloy can be given a considerable range of properties, with adaptation to many uses.

WATER POWERS IN UNITED STATES.

On March 14th Herbert Knox Smith, United States commissioner of corporations, submitted to President Taft a report on the concentration of control over water power by large interests in important localities. The report recommends that the government should preserve title to the remaining power sites and develop them to prevent their possible monopolization by public utility companies. They should be developed at once, not only to conserve the fuel supply of the country, but also because they are rapidly passing into private control. The public can either develop and operate these sites, selling the energy at market rates, or lease the sites at a rental. Mr. Smith says that the water power developed and practically capable of development of this kind probably does not exceed 25,000,000 h.p. The total developed water power to-day is about 6,000,000 h.p. The total stationary power used in the United States, steam, water and gas, is probably more than 30,000,000 h.p. The enquiry showed that there was concentration of water powers in three distinct phases: first, there was concentration of control in each important locality; second, large interests influenced some of these local concerns, and finally, there was a growing relationship among large interests.

In California six corporations, of which the most important is the Pacific Gas & Electric Company, with 118,343 h.p., together control 375,000 h.p., which is over 80 per cent. of all developed water power in the State. In Washington two companies control 210,000 h.p., or about 70 per cent. of all developed water power. In South Carolina the Southern Power Company owns about 101,000 h.p., or 75 per cent. of the total development, with 73,000 h.p. undeveloped. In the southern peninsula of Michigan the Commonwealth Power & Light Company controls 52,000 h.p., or 73 per cent. of the whole commercial development, together with probably 71,000 h.p. more undeveloped. Practically similar conditions are reported to exist in Montana, Colorado and Georgia and at Niagara Falls.

More important than this local concentration are the operations of ten large groups of interests which possess control or influence over 1,821,000 h.p., about 60 per cent. of the water power already developed, together with 1,449,000 h.p. undeveloped. The General Electric interests are said to control or influence 939,000 h.p. of developed water power in eighteen States and 640,000 h.p. of undeveloped resources, a total of over 1,500,000 h.p. Next are the Stone & Webster interests with 278,000 h.p,. chiefly in connection with public service concerns. They exercise control over fifty-