

STRENGTH OF CAST-IRON.—In the valuable report of the experiments made on this subject by the Ordnance Department, recently published by the authority of the Secretary of War, and which the editor of the American Mining Chronicle has attentively viewed, there is a note which is worthy of notice and which is particularly useful to the iron business.

The experiments were mostly conducted under the charge of Major W. Wade, who details them in an exceedingly clear and interesting manner. One new fact developed by them is, that iron fused a number of times up to a certain point, is thereby greatly improved in strength. In trials with some iron, it was found that its tensile strength was increased by being melted a second, third, fourth, fifth, sixth, seventh and eighth times.

This is a discovery of great importance to all engineers and cast-iron founders. At the South Boston Foundry, experiments were made to test the strength of cast iron which had been submitted to fusion during different periods of time. Eleven thousand pounds of iron were cast into four six-pound guns; one after the metal had been fused one or two times, the second, third, under fusion an hour and a half, the fourth, under fusion three hours, and the fifth, under fusion five hours and three quarters. The gun first cast burst at the thirty-first fire; the second, at the thirty-fourth; the third was fired thirty-eight times, and remained unbroken. Thus the strength of the metal seemed to increase in a ratio corresponding to the period of fusion, or under which it was kept in a highly molten state, and it might have been inferred from this that the fourth gun would have been the strongest.

With the increase of time, the metal became more and more refined, and the impurities were driven off. In view of these experiments, Major Wade, in his report, says: "These results appear to establish satisfactorily the fact that a prolonged exposure of liquid iron to an intense heat, does augment its cohesive power, and this power increases as the time of the exposure up to some limit will ascertain limit, beyond which the strength of the iron is diminished. This is a new developed fact in relation to cast iron, subject to re-melting, and of deep interest to all engineers. Experiments were made to test the transverse strength of cast iron bars, two inches square and twenty-four inches long, the metal of which was kept under fusion during different periods of time. These bars were set on supports twenty inches apart, and the breaking force was applied at the middle. The results obtained from four castings were in favor of that which was kept fused longest—three hours. On this head the report states: "The iron, after four hours of fusion, increased 60 per cent. by its continued exposure to fusion. This is also a fact of importance to engineers and architects, regarding girders and beams, subject to a crushing force."

In most of the books which treat of the strength of cast iron, the resistance which it opposes to certain strains, is given; but no useful information can be obtained from them regarding the very great difference in strength in different kinds of cast iron. But as the difference between the lower and the higher grades of this metal differs as 6 to 7, it is a difference of thirty-one pounds to a cubic foot, and as the tenacity of the metal has a relationship to its density, it was found by these experiments that cast iron, having a density of 6,900, had only a tenacity of 9,000; while that having a density of 7,400, had a tenacity of 45,700.

Castings of the greatest weight, according to their size, are by far the strongest, and weighing them is a ready means of judging comparatively of their strength. Some important facts were also developed in relation to the cooling of heavy castings. At the Fort Pitt Iron Works, two eight and two ten inch guns were cast, one of each in the common way, solid, and one of each with a core on a tube of iron, through which steam was made to circulate, according to an invention of Lieut. Rodman. The solid eight inch gun burst at the 73d discharge; the hollow cast one stood 1,300 discharges, and did not burst; the solid ten inch gun stood only twenty fires, while the hollow ten inch gun stood 240. These guns were cast of the same material, and at the same time; the difference in favor of the hollow casting is astonishing. It is supposed that in cooling, the solid gun contracts entirely from the outside, and a strain is exerted upon the arrangement of the particles of the metal, in the same direction as the strain of the discharges. Lieut. Rodman goes into a very subtle mathematical demonstration to show that this is the case, and that his method of cooling the casting obviates this unequal strain. But on the fact in relation to the effect of fire, after the castings are made, and before they are used, which is also of vast importance to engineers. Eight inch guns, proved thirty days after being cast, stood 72 discharges; a gun of the same bore, proved thirty-four days after being cast, stood 81 charges, while one which was proved 100 days after being cast, stood 731 charges, and another, proved after being cast six days, stood 2,362 charges.

It is thought that iron should not be actively used until it has been kept for some time. Major Wade accounts for this phenomenon in cast iron, by supposing that the particles strained in the cooling readjust themselves in the course of time, or, nearly so, and presents some good arguments in favor of this theory.

THE WASHINGTON HORROR.—In the present adjudication of the case of the member of Congress, who shot down and killed a writer in a public dining room in Washington, there has been injustice done either to Mr. Herbert or to the Miners. If the net was done in self-defense, Mr. Herbert should have been discharged from custody immediately. If, on the other hand, it was done in cold blood, as Mr. Du Bois, the Minister of the Netherlands publishes and proclaims the killing to be, an unprovoked and deliberate murder. The ball in that event, is truly, and will give Europe an unfavorable idea of the value set upon human life in the United States. Mr. Du Bois by his refusal to appear as a witness at the hearing before Mr. Kay, the District Attorney, has placed himself in a peculiar position. He is the only person who was present during the affray, capable of giving a dispassionate, clear account of it. He conceals to declare publicly, that the act was a foul and unprovoked murder, yet under a promise to appear as a witness at the hearing before Mr. Kay, the District Attorney, he refused to comply with the solicitation of our Government, and give his testimony in the case. He was invited to testify, and he refused. He was invited to testify, and he refused. He was invited to testify, and he refused.

EDITORIAL TABLE.—The weather was delightful during the week, and everything in connection with the preparation of our columns went smoothly and satisfactorily. The weather was delightful during the week, and everything in connection with the preparation of our columns went smoothly and satisfactorily. The weather was delightful during the week, and everything in connection with the preparation of our columns went smoothly and satisfactorily.

PORT CARROLL AFFAIRS.—FROM AN OCCASIONAL CORRESPONDENT. PORT CARROLL, May 12th 1906. Messrs. Editors.—Our town does not present that happy appearance which it has of late years. Business is somewhat at a stand, few buildings are being erected, and the only cheer which appears to brighten the gloomy features of the town, is that which we have a goodly number of.

LOCAL AFFAIRS.—METHUEN NOTES.—METHUEN, May 12th 1906. Messrs. Editors.—Having a few minutes to spare for the first time since leaving home, I am glad to send you a few lines from Methuen. It is a town of about 1,000 people, and is situated on the Merrimack river, about 10 miles from Lowell.

LETTER FROM ASHLAND.—ASHLAND, May 10th 1906. DEAR JOURNAL.—Having a few minutes to spare for the first time since leaving home, I am glad to send you a few lines from Ashland. It is a town of about 1,000 people, and is situated on the Merrimack river, about 10 miles from Lowell.

THE ORE BANKS AND FURNACES OF CORNWALL, LEBANON COUNTY, PA.—FROM AN OCCASIONAL CORRESPONDENT. CORNWALL, Pa., May 10th 1906. Messrs. Editors.—I have the honor to acknowledge the receipt of your issue of the 10th inst. containing an account of the operations of the Cornwall Iron Works. It is a very interesting and valuable article, and I am glad to see that the public is becoming more and more interested in the iron business.

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