THE PRESENT TECHNICAL CONDITION OF THE STEEL INDUSTRY OF THE UNITED STATES, PP. 345-421

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UNITED STATES GEOLOGICAL SURVEY
J. W. POWELL DIRECTOR

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LETTER OF TRANSMITTAL.

UNITED STATES GEOLOGICAL SURVEY,
DIVISION OF MINING STATISTICS,
Washington, D. C., July 25, 1885.

SIR: I have the honor to transmit herewith a paper by Mr. Phineas Barnes on The Present Technical Condition of the Steel Industry of the United States. This paper is supplementary to the report of this division entitled "Mineral Resources of the United States, 1883 and 1884." Mr. Barnes, in this essay, gives a general view of existing conditions and practice, which is of special interest at the present moment in view of the rapidly advancing strides made by the important industry under discussion.

Very respectfully, your obedient servant,

ALBERT WILLIAMS, JR.,
Geologist in Charge.

Hon. J. W. POWELL,
Director United States Geological Survey.

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By PHINEAS BARNES.

INTRODUCTORY.

Any general statements concerning the technology of the steel industry of the United States should comprise a description of the raw materials, including fuels, which are used in connection with it; the processes of manufacture to which these materials are subjected, including the machinery and apparatus; and also the uses for which the metal is employed, including the tests by which its fitness for these purposes is determined and actually measured. Such general statements if extended sufficiently to cover only an approximate detail would necessarily be lengthy, and at best could do only scant justice to the painstaking labor and study which have been expended upon the development of the manufacture of steel at every stage of its progress and during many years past. It is needful therefore in this paper that the simplest outlines only of the whole advance in this department of metallurgy should be sketched, and that the endless detail, however important, of the remote past should be neglected in favor of the costly efforts to promote the art at the present day by a reduction of the cost of manufacture and the widening of the fields of the actual use of the metal. It should also be clearly understood that wide differences exist, some being apparently irreconcilable, between men of extended and trustworthy experience, in respect to materials, methods, and tests of finished product. Hence any brief description must be confined in large part to the useful details upon which agreement is general, and must seek to indicate the limits, more or less wide, between which these opposing views are held. In the important matter of analyses of materials, at various degrees of advancement, no general attempt can be made to strike an average of a series that shall be useful as compared with the statement of one or more analyses which shall present, either singly or in comparison, the current determination in actual business of some analyst of trustworthy reputation. It should be remembered that the managers or the melters of steel works are governed in their use of their materials not alone by the apparent indication of this or that analysis, but also by the preference which may for the moment be based