Developments in Operating Knowledge and Skill

by G. Derge

It is a great privilege for me to participate in this celebration of 25 years of successful conferences of the Electric Furnace Steel Committee of the Iron and Steel Division of the AIME. I have always enjoyed reading history, but have never before had an opportunity like this to make it. I was at the first conference and have registered at every one since and remember the buildup to the fifth, tenth, and twentieth birthdays, but this twenty-fifth seems to carry the real weight of maturity, and it is a very sobering thought for me to realize how slim the chances are that I can be present for that next big landmark—the fiftieth. We are indeed happy to have with us today Harry McQuaid, Chuck Briggs, and all other elder statesmen who put the early conferences on the right track. I take this opportunity to congratulate them personally on the success of their efforts.

In checking facts on the "Developments in Operating Knowledge and Skill," which is my formal assignment for this talk, it was of course necessary to use only one source of information, the annual *Proceedings* of these Electric Furnace Steel Conferences. In volume No. 1, it was interesting to note that a good many of our supplier friends were not so confident that electric furnaces were an important segment of the steel industry, as evidenced by the fact that their advertisements showed pictures and referred otherwise to open hearths. The 1946 volume was the first one where some piece of

open hearth equipment could not be identified, so I would say that our first major accomplishment was that in three years the electric furnace was recognized as an independent, self-sustaining steelmaking process.

When developments have been as continual and as substantial as they have been in all aspects of electric furnace steelmaking in these 25 years, it is as unfair as it is difficult to pick out any few items of special significance. I would like to avoid this embarrassment by focusing attention on the close relation between our programs and progress in one area, "gases in steel," because this relation seems to illustrate why the Conferences are constructive and successful.

If we interpret "gases in steel" to include oxygen and its control, we, of course, have defined a good part of our steelmaking problems. At that first meeting, Frank Sisco pointed out that open hearth operators were aware of the need for good oxidizing practice and that it was about time for electric melters to follow their example. They have accepted that challenge, and the exchange of information between melters, metallurgists, management, suppliers, and even professors, at these Conferences led to rapid progress. Such good practice, of course, requires temperature measurements, good sampling, rapid analyses, and the application of computer control, as well as an understanding of how to use this information. These items in all their aspects followed in rapid succession. I well remember Norman Stotz urging the Program Committee to always include something as far out as we could get because "it is much healthier to think something ahead is ridiculous than to be satisfied with what you've got." This resulted in

continuous casting, vacuum melting, and lance oxygen sessions, though it was not until 1948 that the adventurous operators no longer considered ore as their principal source of quick oxygen. More advanced treatments of all of these items followed in two or three year intervals and nitrogen and hydrogen control were not neglected. These improvements were related to raw materials, and increasingly rigorous specifications on cleanliness and physical properties. With some exceptions, electric furnace operators have led other segments of the industry in the development and adoption of many of these novel features. In fact, they completed the circle and had a paper on "The Use of Air as a Substitute for Oxygen." Many factors have contributed to this, but the organized programs of our Conferences have certainly played a major role. An important factor in this has been the recognition of common basic interests in spite of widely diversified individual problems in the "Castings" and "Ingots" sections. This was further exemplified by the formation of the "Special Arc" group and the fact that these *three* have found it constructive to hold "Joint Sessions." It is a real compliment that the Extractive Metallurgy Division has elected to continue meeting with our Conference after their initial three year trial period.

Let us continue to look as far ahead as possible in our programming, and continue to consider whatever merits there may be in peripheral engineering and scientific developments and hope that many of them can be used in electric steelmaking. I feel that with this kind of policy we will not go the way of the puddling furnace and the fiftieth anniversary record will be just as satisfying as the twenty-fifth.

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