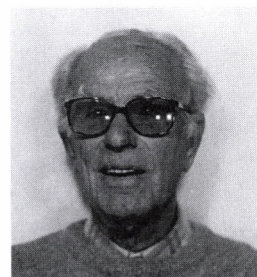


## 名誉会員からのメッセージ

# Ideas and Experiences as a Teacher in Process Metallurgy

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The Royal institute of Technology in Stockholm has during the last 35 years had an Intimate contact with Japan, mainly due to the fact that 15 Japanese “students”(University graduates) have followed the courses in Process Metallurgy during one complete year. Also several Japanese research specialists have stayed with us at the university for longer periods.

We have been impressed by the energy and enthusiasm that our visitors have shown. Just one example: Our first student, Mr. Goro Yuasa, 1961 wrote the answers in his first examination in Swedish after only 2 months in our country. Mr. Yuasa like the following Japanese students thought it was strange with 4-5 weeks vacation, used to only 3-5 days as they were.

To be frank, in the beginning some Swedish Steelworks were a bit sceptical to visits from our Japanese students. But pretty soon they got eager to receive them-not the least to get new ideas from them. A sign of this confidence is that several Japan-Sweden symposia have been arranged.

Sweden is a small country, but with a long tradition in iron and steel making. We find that an intimate contact with foreign countries is absolutely necessary. Since centuries such an interchange has been going on in technical and scientific matters to the benefit of both sides.

To travel is to learn. Our graduate students have during the years visited the major steel making countries. Furthermore they have during these industrial visits been obliged to present their research work for critical audiences. We have always tried to stimulate the students to question what they have been taught. I remember that my best lecture ever was the one where I had difficulties to go through my subject because the students were so eager to present their questions and ideas.

The Swedish students always finish their studies by spending some weeks at Swedish steelworks, carrying out small research projects. In Stockholm a seminar is held every year where each student presents a paper, normally a literature survey. Another student is then assigned as the opponent. I myself, by the way, have each year since 1961 given a lecture called “How not to give a lecture”, when I in one hour try to make all the faults and silly manners a normal (!) lecturer makes, e.g. overloaded OH:s, the back to the audience, different signs of nervousness, too low voice, reading his paper without a break, never looking at the audience etc. There are only a few examples of the very common behaviour of a normal lecturer.

Sorry, but a strong criticism must also be directed towards the organization of most international conferences. Authors read their manuscripts-with the audience following the text in the printed proceedings word for word. The chairman normally has time only to say the normal “Thank you Mr. X for your interesting lecture. Unfortunately we have too little time for a discussion of your paper”

A good relationship between the students and the teachers is founded already the first week at the university, when the newcomers by tradition are very well taken care of by older students. Those have by the way since 26 years been arranging a whole day at my home at the countryside near Stockholm. After information from the teachers we are making steel from ore in a bloomery (Fig.1) while 4 lambs are getting roasted (Fig. 2). The square dance (Fig.3) is one way of getting to know each other, teachers and pupils-130 all together this year. There are 35% girls in the group.

Direct steelmaking from ore in the bloomery results in an analysis of C=0.1% and P=1 ppm, but also with very low Fe yield and 11,000kg charcoal/ton. This should be





Figure 1



Figure 2

a challenge for all of us to reconsider our roundabout process routes! It is unlikely that we in the future first will produce high carbon iron and then an overoxidized metal, from which we remove oxygen by precipitation of stable oxides and finally have a difficult task of removing all the slag inclusions. Can process metallurgists ever carry through the same revolution as the casting-rolling people in their realization of direct and near net shape casting?

I think that we should go back to basic thermodynamic systems like Fe-O-C and try to consider if radically different process routes could be possible. Possibilities like precipitation of metal from an oxide melt, deoxidation of steel using solid electrolyte cells and other revolutionary methods should be discussed.

You may think I am a dreamer and that is exactly what they called me in China, which I was proud of. Of course we must have dreams, and visions is a more dignified name. Visions based on strict application of

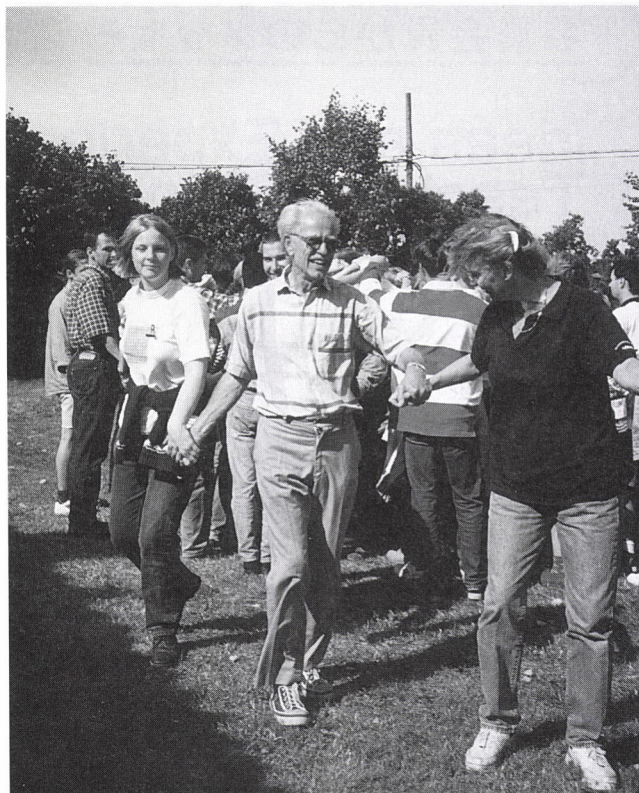


Figure 3

fundamentals.

One large scale dream was the project Future Steelworks carried out 1978-83 where we tried to attack problems not only in metallurgy but also regarding the size of the steelplant and its integration in the surrounding community, the human and technical scale, maintenance, environment, working hours etc. Many different groups of people took part in this study; architects, social experts, psychologists, union representatives, market experts, etc. Also during this work we got important impulses from Japan; my 4th Japanese student, Mr.K. Mori from Aichi Steel, went around to Swedish steelworks telling them about QC-circle.

Looking back on my years as professor in Process Metallurgy I must say it was a wonderful time. I cannot imagine anything more stimulating than guiding and organizing motivated and gifted young students and graduates. To do this in a complete freedom how to present the knowledge and the problems. Yes, the most important thing is freedom!

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