Editorial

The future of the professions dealing with materials is rooted in our educational institutions. After having spent some 40 years of my life at such an institution, I would like to express my views as to what should be the content of a materials curriculum and, hopefully thereby, generate some controversy. However, before proceeding further, I am pleased to inform our readers that Mr. Douglas Granger, chairman of the *Journal of Phase Equilibria* Editorial Committee, has received from ALCOA a commitment to support an annual prize for a research paper that is submitted for publication in the *Journal* by a *bona fide* student. The paper must be based upon the student's own research. The guidelines for awarding the prize remain to be formulated, but more details will be forthcoming after the Committee meets at the fall ASM-TMS convention in October (post writing of this editorial). When the guidelines are developed, I believe they will allow coauthorship by the research adviser(s). We will use every means at our disposal to see that the guidelines are extensively distributed as soon as they are available.

Now, with regard to educational curricula, I won't attempt to detail a specific set of courses to be included in a curriculum. Faculties can and have spent many hours designing such curricula and have almost as often revised them at subsequent meetings. It is a more general philosophy that I would like to promulgate. I am a firm believer in a broad curriculum at the BS level. Competence in communication is a must. Humans are social beings, and there is a need at every level to read with understanding and to speak and write clearly and concisely. In the years of my teaching, I have witnessed a steady deterioration in the communication skills of incoming students. Since mathematics is the language of technology, a good math background is also requisite. Further, because there is ever greater international interaction, exposure to a foreign language is highly desirable.

During an average day, each of us spends as much or more time away from the job than on the job. To constructively utilize these hours, a generous exposure to social sciences and humanities is necessary. With regard to the technical areas, freshman and sophomore courses should show the student what his field encompasses with some exposure to all classes of materials. Such exposure should include metals, ceramics, polymers, and composites, and would serve the purpose of making all materials people aware of the competitive advantages and weaknesses of each class and would facilitate communication between one materials specialty and another. Junior and senior courses should move the student deeper into specific aspects of his selected materials emphasis. Concentration should be on the basics, with "know why" being the prime consideration, "know how" second, and "rote" all but excluded. Related topics should be considered together. For instance, distillation and zone refining are dependent upon equilibrium separation of phases—one of liquid and gas and the other of solid and liquid—so both topics can be treated together. The student does not need to know the specifics of zone refining Ge or of distilling petroleum. Employers are the ones to treat the specifics of their procedures, not the teacher in the classroom.

Specialization should increase progressively through MS and PhD programs. There has been a tendency in recent years to award engineering degrees at the MS level without thesis. Personally, I think this is a mistake. The awarding of an advance degree should certify that the student is not only capable of acquiring and understanding knowledge, but that he or she is also capable of applying the accumulated knowledge to some purpose. Obviously, the level, extent, and sophistication of PhD research should exceed that of MS research. The academic course work for an advanced degree should be tailored to the goals and interest of the individual student and should be of greater depth and rigor than undergraduate offerings. However, even at this level I am a strong advocate of the retention of some breadth. In my own graduate training I was required to declare two minors in related fields and to take examinations in both as well as in my major. I have subsequently found that these minors were quite worthwhile both in providing input for my own work and in allowing me more facile interdisciplinary communication.

This is one individual's point of view. What thinkest thou?

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Editor
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