principles were outlined and results from current research were presented.

The lectures gave rise to lively discussions which were continued during the breaks and the "Hessen Vesper" party. These many discussions and the workshop results were summarized by *H. Mecking* (Tech. Univ. Hamburg-Harburg) in his concluding remarks in the following way.

- The excellent and perfectly organized programme was a well-balanced presentation of the various aspects of intermetallics and offered a nice opportunity to "look over one's fences".
- This meeting is to be repeated, i.e. there should be a second symposium on intermetallics within two years, with more time for discussions.
- There are three stages of materials development. The first and traditional stage has been development by trial and error, with fundamental research lagging behind applications. The second stage is the optimization of existing materials on the basis of fundamental principles, e.g., as in the case of steels. The third stage is to derive concepts for the development of new materials, which is also the aim of this symposium, and which is supported by research programs of the Federal Ministry of Research and Technology (BMFT) and the German Research Society (DFG). However, the present projects for the development of new intermetallic materials have not been preceded by the necessary fundamental research, and in particular the physical mechanisms which control the plasticity and brittleness of the intermetallics have not yet been analyzed. Thus, much more fundamental research is necessary for achieving new materials developments.
- This fundamental research has to be concentrated on smaller groups of intermetallics, because the whole spectrum of intermetallics is much too broad and divergent. In view of high-temperature applications such a smaller group could be the aluminides and perhaps some silicides.
- Intermetallics have a wide-ranging potential for a variety of applications depending on the particular phases. Materials development on the basis of intermetallics is high tech—even though it may be less fascinating than space research—and must be continued.

Gerhard Sauthoff
Max-Planck-Institut für Eisenforschung
D-4000 Düsseldorf (FRG)

Biomaterials, Bioelectronics ...

Only some months after its foundation the European Institute of Technology (EIT) held its first conference on biotechnology in Verona on 7–8 November 1988. In the opening session *J. M. Marcum,* the president of the EIT, outlined the goals for the EIT in general and for this conference in particular. One of the major tasks defined by the leading companies in chemistry and electronics which have set up the EIT is to act as a mediator between industry and university.

The strategy of the EIT, which is to support and monitor existing centers for the three areas of interest, information technology, materials technology and biotechnology, rather than to set up new groups, seems to be promising and flexible. The EIT will also foster liaison between different groups and catalyze contacts with potential industrial partners.

To define its own position and to initiate first contacts between industry and university the EIT invited more than 40 speakers to Verona. Nine topics, covering the broad range from basic research in biotechnology up to current scientific work with direct commercial applicability, were chosen for this conference, including a special session dealing with the organization and management of research. The first session ranged from the different possibilities for inducing overproduction in plant cell cultures (*G. Kochs* and *H. Grisebach,* University of Freiburg, FRG) up to transgenic plants (*S. Altenbach,* Plant Cell Research Institute, Dublin, USA), and gave an impression of the future importance of these methods. *K. Mosbach* (University of Lund, Sweden) presented interesting results on the production of synthetic enzyme complexes. The method he calls "molecular imprinting" offers a new promising practical approach for the synthesis of selective new materials for purification procedures. The use of enzymes from thermophilic bacteria (*M. Rossi,* University of Naples, Italy) which retain their activity even in mixtures with water-miscible organic solvents could soon become of industrial importance. The wide range of advanced techniques for the isolation of biotechnologically produced substances on a technical scale was described by *M. R. Kula* (KFA Jülich, FRG), *C. R. Lowe* (University of Cambridge, UK) and *M. A. Vijayalakami* (University of Compiègne, France). Concluding with the session on "Genetic and Plasmid Stabilization", the first day offered a program of high "information density" to all participants, covering all current problems in biotechnology.

The second day was devoted to more interdisciplinary sessions, on themes such as "protein engineering" and

"bioelectronics and biomaterials". Here I will focus attention especially on the latter topic. Biosensor research is clearly the dominant theme in this area. *I. J. Higgins* (Cranfield Institute of Technology, UK) reviewed the rapid development in the field of biosensors during the last few years. He expects protein engineering to make important advances in improving the stability of the biological components of biosensors, the most serious problem in current biosensor research. *Higgins* also reported on basic approaches to the development of biochips and biocomputers. He and others believe that bacteriorhodopsin will play an important role in that field. However, this work is still in its infancy, and it could take several more years to achieve a real breakthrough. *M. Thompson* (University of Toronto, Canada) gave a comprehensive overview of the problems of chemoreception and its role in biosensor development. The talk by *I. Karube* (Tokyo Institute of Technology, Yokohama, Japan) illustrated the steady progress being made in Japanese biosensor research and its industrial applications. This again reinforced the impression that Japanese leadership in the field of semiconductor-based biosensors is unchallenged. *M. T. Flanagan* (University College, London, UK) described the rapid evolution in the field of optical biosensors and the impressive achievements of his group in this technology. Thin films of trivalent metal phosphates have been developed by his group as new materials for optical waveguides. The cheap production of such films, their excellent structural integrity, and the ease of immobilizing proteins on their surfaces, could lead to wide use of such materials in the field of optical biosensors.

A special session of the conference was devoted to "research planning and training in biotechnology". National institutions such as the "Lund Science Park" (*S. J. Holm*, Lund, Sweden) provide a unique opportunity for scientists to offer their results to industry. Whereas such "technology parks" (usually in the neighbourhood of a university) work more on a local level, organizations such as GBF (*I. Klein*, Braunschweig, FRG, and EUREKA (*K. Draxler*, Vienna, Austria), aim to coordinate research projects on an international level. The EIT will also operate in this way. If the nearly perfect organization of this conference by *M. Chopplet* (EIT, Paris, France) can be extended into the EIT's work as mediator and communicator between industry and university, this institution will provide new leadership in this field.

Norbert Hampp
Institut für Physikalische Chemie
der Universität München (FRG)

The 1988 Fall Meeting of the Materials Research Society in Boston

The MRS held its Fall Meeting, approximately the 15th in its history, in Boston from 28 November to 3 December. 24 symposia, each lasting three or four days, incorporating more than 2000 papers in total, plus the traditional lunchtime symposium on 'Frontiers of Materials Research', constituted the main agenda. The printed program, incorporating abstracts to all papers, occupies 644 folio pages. The list of authors' names alone, just short of 5000, printed in very small type in three columns, fills 18 pages. In addition to the main programme, 27 short technical courses were on firm offer, at prices ranging from $ 320 to $ 770, with a further possible 23 courses on 'sale or return'. In addition, Prof. *Thurow* of the Massachusetts Institute of Technology delivered a lecture telling his compatriots what their country needed to do to maintain technological leadership, and Prof. *Jacques Friedel* of Paris gave a lecture of reminiscences to mark the occasion of his receipt of the MRS's annual award for distinguished materials scientists.

About 4000 participants crowded the two linked hotels which housed the Meeting (not all authors of multi-author papers were present), many spilling off at intervals to drink gallons of Coca-Cola, view the extensive exhibition of equipment and books or to consult the in-house employment exchange put on offer by the American Institute of Physics for the MRS. (This offers an indication of the type of jobs favored by MRS members.) The total membership of the MRS is now over 8000. Two peculiarities certainly help the MRS to recruit new members: all those who paid the $ 165 registration fee were automatically registered as MRS members for the coming year, and all (except students with their reduced fee) were entitled to a free subscription, not only to the Society's *Bulletin* but also to the *Journal of Materials Research* published by the Society.

The Society, which only twelve years ago was run on a part-time and shoestring basis by a single industrial scientist, now has 18 full-time headquarters staff, most of whom seemed to be in Boston being kept extremely busy. Certainly the symposia were faultlessly organized: timekeeping was so precise that it was possible, for those nippy on their feet, to run from one symposium to another to hear a particular paper. The Meeting as a whole was masterminded by a triumvirate of scientists; these selected the symposium topics (which are proposed by enthusiasts