has largely contributed to the development of this technique. Its present impact is well demonstrated in the contributions of Reimer *et al.* and of Krivanek *et al.* to the present *Microsc. Microanal. Microstruct.* issue.

Nevertheless it is obvious that EELS has established itself as an essential component of the analytical electron microscope only during the seventies, independantly in France and in USA with the thesis studies of Colliex and Isaacson, then followed by Egerton, Leapman and many others. Progress in all aspects (instrumentation, scattering theory, quantitative analysis of spectra and applications) has been very thoroughly discussed by R. Egerton in his textbook "Electron Energy Loss Spectroscopy in the Electron Microscope" (Plenum Press, NY 1986) which has remained, together with the EELS Atlas due to O. Krivanek and C. Ahn (1983), the reference document for the whole generation of scientists coming to this technique during the last few years.

The new monograph edited by Disko, Ahn and Fultz contains ten chapters derived from the oral presentations at a symposium "Applications of Transmission EELS in materials science" which was held during the 120th annual TMS meeting at New Orleans in january 1991. Its scope is to respond to the growing demand from materials scientists to combine this new analytical tool and problem-solving approaches, in order to achieve productive EELS experiments. To meet these requirements, the five first chapters are dedicated to energy loss methods that are general to all areas of materials studies. They cover experimental techniques and instrumentation (R. Egerton), quantitative analysis (R. Leapman), spatially resolved EELS (C. Colliex), EELS fine structures (P. Rez). In all cases, the availability of efficient PEELS devices has contributed to great changes in data acquisition, processing and interpretation. It is particularly true for the methods of multiple least squares fitting on difference spectra discussed by Leapman, which push the detectability limits to useful values in the 10^{-4} atomic concentration range. When combined with a small probe and a high flux of primary electrons delivered from a field emission source, the identification of single individual atoms is then accessible, see Colliex. Finally the high energy resolution now available, has made EELS very competitive with X ray absorption spectroscopy studies on a synchrotron line to record and investigate fine structures (of XANES or EXAFS types) on core edges, more specially when they concern inhomogeneous specimens (see P. Rez). Simultaneously, theoretical advances (molecular orbitals calculations, band structure and multiple scattering descriptions, many particle effects...) have also largely contributed to increase the practical interest of using these fine structures, as beautifully demonstrated by R. Brydson *et al.*

In fact one originality of this book is to devote its second half to specific areas of materials science : minerals (R. Brydson *et al.*), ceramics and catalysts (J. Bentley), metals (J. Okamoto *et al.*), semiconductors (P. Batson) and advanced materials (N. Zaluzec), which all bear witness of the vitality and richness of EELS as a local analytical tool in the electron microscope.

Great care has been taken by the editors to harmonize the different chapters so that the whole volume is readily self understandable, the texts are clearly written with many illustrative figures, many unpublished data are included. Altogether the volume elegantly fulfills its scope and can therefore be recommended to a large population of readers.

Microscopy. The key research tool. Compositional imaging. New microscopies
A special publication of the Electron Microscopy Society of America, 1992

Finally I feel that it is worthwile to mention briefly at the end of this Books Review section this special EMSA publication for its 50th anniversary. It is the first time that this society has published an entire volume of full-length research papers in a journal format. It is to be put to the credit of

its President, C. Lyman, who had organized the 1991 EMSA Presidential Symposium on the topic "Compositional imaging", which he introduces himself in a very elegant manner. The following articles are devoted to different aspects of compositional imaging with X-rays (by D. Newbury), Auger electrons (by M. El Gomati *et al.*), EELS (by R. Leapman and J. Hunt) and large angle electron scattering (by S. Pennycook). They provide a very clear and well documented review of the present state of techniques available for elemental mapping with different types of signals.

Maybe can we regret that the quoted references do not pay the right tribute to the pioneering work of non north-american scientists, the more as this thema naturally derives from the early studies by R. Castaing and his french students. The only mentioned exception, we must recognize, is the recent concept of image-spectrum put forward by C. Jeanguillaume in Orsay in the late eighties, which is now very well demonstrated and used in several of these contributions.

Commission paritaire N° en cours

 Directrice de la Publication : Jeanne BERGER

Composition : MATHOR-TEX : Composciences,
1, Miniparc du Verger, 91940 LES ULIS Cedex, France
Impression JOUVE, 18, rue Saint-Denis, 75001 PARIS
N° 205307J. Dépôt légal : Octobre 1992