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Special Issue on "The Optimization of the Scanning Electron Microscope"

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Sixteenth Pfefferkorn Conference on

The Optimization of the Scanning Electron Microscope

held at Aberysthwyth, Wales, during Aprl 5-8, 1998

Foreword

The scanning electron microscope (SEM) has become a commonly used tool for both biological and materials scientists alike. Probably because the original instruments were never conceived as high-resolution microscopes, and marketing of SEMs has generally been towards low-resolution use using secondary electron imaging, comparatively little attention has been paid to working at the limits of resolution available with such technology. Similarly, the general conception of the SEM as a low-resolution instrument has resulted from the restricted way in which many users drive their microscopes. Practically every scientific meeting one attends shows up examples of the use of poor to appallingly badly set-up instruments. Unsuitable accelerating voltages and working distances are often found to be used. Such were the reasons that a Pfefferkorn Conference on the subject of advances in the use of the scanning electron microscope was suggested. Optimising the use of the SEM should surely be a primary concern to all microscopists. The gathering together of some of the World's leading experts in scanning electron microscopy in a closely-knit environment on the west coast of Wales provided an ideal opportunity to define the state of the art as it stands. One of the major conclusions, that was agreed at the end of the conferenece, was that am SEM can, indeed, be used to image single macromolecules, and Stan Erlandsen's three-dimensional images of macromolecules emerging from a cell membrane remain as one of the most memorable of many excellent images presented to an appreciative audience. The well-established formula of the Pfefferkorn conferences was maintained at Aberystwyth, with good opportunities provided to continue discussions well after the end of the official sessions.

Most of the presentations at the conference are included in this volume. All have been peer-reviewed and reviewers' comments included, as is the admirable tradition of this journal. It can be seen that by intelligent use of modern SEMs that imaging of single molecules, in three dimensions, can be achieved. Similarly important information about the surfaces of specimens can be derived from the use of very low beam energies. Such developments will clearly pose new challenges for specimen preparation and image interpretation, and this is reflected in this volume. We would like to thank all the authors for their contributions, and the reviewers for their prompt replies, as well as generous support from the trade for the conference.

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