

SYMPOSIUM ON TECHNIQUES FOR ELECTRON METALLOGRAPHY

INTRODUCTION

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The electron microscope is a powerful tool for the investigation of submicroscopical structure. Its capabilities have been clearly demonstrated in numerous applications to a variety of research problems. In its present state of development, however, it must be used as a transmission microscope. In order to employ this instrument for the study of the structure of opaque materials, such as metallurgical specimens, special techniques are needed. As in the case of optical metallography, the structure is delineated by suitable etching methods. The etched structure is regenerated in an extremely thin "replica"; this must be transparent to the electron stream which constitutes the illumination. The replication process is necessarily complex, and depends for its success upon critical attention to details of specimen preparation.

The many techniques which have been

developed to date are evidence of the ingenuity displayed in striving toward a true representation of structure. None of these, perhaps, meets all of the requirements. Nevertheless, the results show promise of eventual attainment of this goal, within practical limits.

The American Society for Testing Materials has been directly interested in the potential value of the electron microscope as a tool in metallurgical research. A few years ago, Committee E-4 on Metallography established Subcommittee XI on Electron Microstructure of Steel. The members of Subcommittee XI believe this to be an appropriate time for presentation to the Society a review of progress in electron metallography. The purpose of this Symposium is to present examples of techniques in common use or of potential value, in the hope that increased interest in the application of electron microscopy to metallurgical problems will result.

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