Preface to Papers on Mechanics of Materials

The principal subject of this issue is an aspect of analytical design that we call "the mechanics of materials." We define this term to mean "the study of the natural properties of engineering materials so as to control their behavior in use," and have selected seven papers representing work to which it applies.

There are at least two reasons for special treatment of this subject in the IBM Journal: First, we think of it as a discipline, not easy to recognize as such but pervasive nonetheless, that touches upon nearly every technology with which IBM is concerned. Second, it affords a perspective on development work not bound by any one application, yet devoted to practical results. Besides giving a fair picture of the range and diversity of problems to be found in materials work, this perspective can show how frequently a variety of the traditional sciences must be applied to some particular problem. Physics, chemistry, mechanics and electronics are all represented here, as well as several other specialties, but the distinguishing element is that always one of these disciplines, aided by one or more of the others, is brought to the common question: How, *and why*, will a material respond if one alters its natural condition?

We present the following examples: A paper by Jones and Lavin discusses impact printing mechanics, and the significant effect of paper and ribbon deformation. Papers by Bayer and Sirico and Engel and Conway describe new results on the behavior of metals in contact. Thin-film diffusion barriers and their effect on impurity profiles in silicon are considered by Makris, Ferris–Prabhu and Joshi, while Howard and Smith report on an improved approach to x-ray analysis of transistor junction defects. Anderson, Bartkus and Reynolds have examined thermoplastic polymers as a recording medium and report some applications of molecular engineering in controlling critical properties. Finally, a communication by Pesch describes a correlation between optically-measured domain size and coercivity in magnetic silicon–iron, which provides a practical measurement when electrical means are not possible.

In each of the papers the viewpoint taken is unusual, and our thanks must go to C. J. Tunis and J. M. Copeland of the Systems Development Division in Endicott, and most particularly to C. W. MacGregor, now retired from that laboratory, for their help in bringing this issue together.

J. L. Hibbard
Associate Editor