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Semiconductor devices today utilize circuitry that cannot be visualized with the unaided eye. For example, a 0.040 in. square may contain 15 transistors, 25 diodes, and 45 resistors, with 1000 such circuits on one 1/10 by 1/10 in. silicon chip. New technology being developed using electron beam techniques will permit 10,000 such circuits on the same size chip. Each magnitude reduction in size is accompanied by an increase in the magnitude of problems of measurement, fabrication, and specification. Progress in improving the measurement of the materials used in these devices is discussed in the four papers beginning on p. 301.

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