(Franklin Institute). The stacking and twin fault densities, strain, grain size, and orientation were followed in the annealing process. Films as deposited at temperatures near 80°K have a mild (111) structure. A shift to (100) and (311) texture occurs on warming to room temperature or higher. Grain size increases from about 0.05 to 0.1 mm. A strain argument was used to explain the change in orientation on annealing: When the film is warmed from the deposition temperature, the elastic strain energy in the grains increases; however, this increase depends on orientation, because of the different Young's moduli in the different crystalline directions. The increase in strain energy is least for grains oriented with their (100) and (311) planes parallel to the substrate, and most for those oriented (111). To minimize this strain energy there is preferential growth of the (100) and (311) oriented grains at the expense of the (111) and other orientations.

A new degree of complexity is introduced into thin film technology when two or more component systems are involved. Formation of alloy films by the simultaneous deposition from the vapor phase allows mixing of the constituents on an atomic scale. If the substrate temperature is kept low, diffusion can be reduced so that homogeneous solid solutions can be prepared, even if there is no miscibility in the annealed bulk state. S. Mader (I.B.M.) reported on thin films of face-centered cubic solid solutions and amorphous phases of the systems Co-Cu, Cu-Ag, Cu-Mg, and Au-Mg prepared by codeposition. If the difference in the atomic diameter of the constituents exceeds 10 percent, an amorphous phase is found, provided there is not complete miscibility at that concentration.

A paper by F. Arntz and F. Chernow (M.I.T.) was concerned with the optical and structural properties of oxidized titanium films previously deposited in ultrahigh vacuum onto single-crystal or amorphous substrates. On single-crystal substrates, highly oriented titanium films can be deposited. The oxides of these films were not oriented, with the exception of those on CaF_2 substrates, where the oxide was identified as rutile with the (100) plane parallel to the surface of the substrate. The *c*-axes of the rutile were in the plane of the substrate parallel to the three <110> directions. Oxides of nonoriented titanium films were nonoriented or even amorphous.

It has again become clear in this symposium that the variation in structure which can be obtained by thin film deposition is extraordinary. The range from single-crystal to liquid-like amorphous phases was covered. The extreme sensitivity of the thin film structure to preparation conditions was strikingly illustrated.

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Learning, Remembering, and Forgetting

The New York Academy of Sciences sponsored the second conference on learning, remembering, and forgetting, which was held 27–30 September in Princeton, New Jersey. Karl H. Pribram of Stanford University chaired the conference, and Frank Fremont-Smith, director of the New York Academy of Sciences Interdisciplinary Communications Program, served as sponsor and host.

These conferences are designed to provide an opportunity for interdisciplinary "discussion in depth" on the general topics of learning, remembering, and forgetting. Arthur Melton (University of Michigan) led the first discussion session, which was focused on the organization of short-term memory. Melton covered the subject from the standpoint of human paired-associate learning. The discussion which was evoked was continued during the next session led by Donald Broadbent (Applied Psychology Research Unit, Cambridge, England). Broadbent approached the problem by means of experiments using different simultaneous inputs to the two ears. The discussion at this session dealt with the relative importance of "interference" and "filtering" with respect to what is and what is not remembered. Gordon Bower (Stanford University) discussed a mathematical and structural model of human memory. Edward Walker (University of Michigan) emphasized the importance of the occurrence of some perturbation (as shown by the galvanic skin response) to consolidation of a memory trace. Much of the evidence discussed on this day had to do with the coding processes that are engaged before an experience becomes fixed in memory.

Discussions on the final day of the conference were focused on the organization of memory in the central nervous system. Lawrence Weiskrantz (Cambridge University) discussed behavioral impairments seen in monkeys with frontal or temporal lobe lesions. He presented evidence that subjects with lesions in the frontal lobes had difficulty in controlling irrelevant sensory input, especially when attempting to perform complex tasks, while monkeys with lesions in the temporal lobe had difficulty remembering what they had learned the day previously.

The concluding session was led by E. Roy John (New York Medical College). John presented electrophysiological data recorded from chronically implanted cats working in a variety of training situations. On the basis of his data three categories of central processes important to memory were proposed and various neural structures tentatively placed in each category.

The conference was supported by funds from the National Institute of Child Health and Human Development and the Office of Naval Research. The proceedings will be published under the editorship of Daniel Kimble.

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Radio Astronomy

Radiointerferometers and some recent results on brightness distributions of discrete surfaces, as well as astronomical spectrum analyzers and observations of interstellar gas, were described at a symposium on radio astronomy held as a part of the Northeast Electronics Research and Engineering Meeting (NEREM) in Boston on 5 November.

N. Keen of the National Radio Astronomy Observatory described the recently completed 11-centimeter interferometer. The closest spacing of the two 85-foot (25.9-meter) antennas of this instrument is at present about 1200 meters, and larger spacings up to 2700 meters are provided for. However, smaller projected baselines are obtained by tracking a source over a substantial fraction of a day.

The azimuth of the baseline is 62 degrees east of north. Keen pointed out that the choice of a baseline orientation other than east-west or north-south leads to a particularly accurate determination of the exact orientation. The measurement is made by observ-