ECS 235B Module 2
Basic Components

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- Confidentiality
  - Keeping data and resources hidden
- Integrity
  - Data integrity (integrity)
  - Origin integrity (authentication)
- Availability
  - Allowing access to data and resources

McCumber Cube
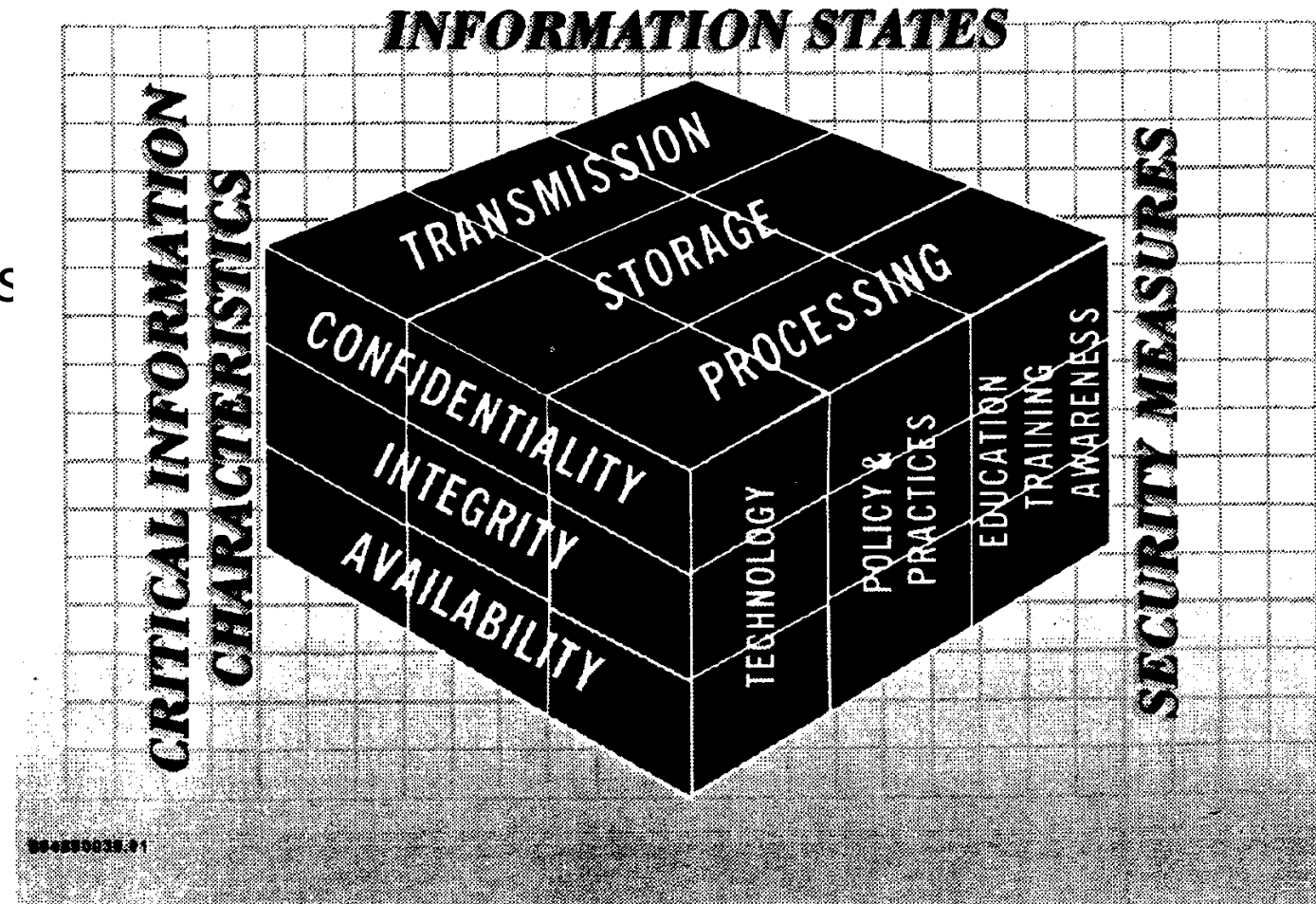
Critical Information Characteristics
- CIA Triad

Information States
- Stages in handling information

Security Measures
- Controls for information access and handling

Picture from J. McCumber, "Information Systems Security: A Comprehensive Model", *Proceedings of the 14th National Computer Security Conference* p. 328–337 (Oct. 1991); on p.334.

Information States

- Storage
  - Where data is kept
  - Examples: disks, USB memory sticks

- Transmission
  - How data moves from one place to another
  - Examples: network connections, pipes

- Processing
  - Computations using the information
  - Examples: computing statistics, drawing pictures

Security Measures

- Technology
  - Something implemented and used to ensure critical information characteristics maintained through information states
  - Example: encryption, access controls

- Policy and Practice
  - Something which says what information can be accessed, by whom, and how; a procedure to enhance security
  - Example: students may not access one another's homework files

- Education, Training, and Awareness
  - Make people understand security at level appropriate for them
  - Example: cybersecurity training UC Davis folks must take

Assumptions and Trust

- Underlie *all* aspects of security

- Policies
    - Unambiguously partition system states
    - Correctly capture security requirements

- Mechanisms
    - Assumed to enforce policy
    - Support mechanisms work correctly