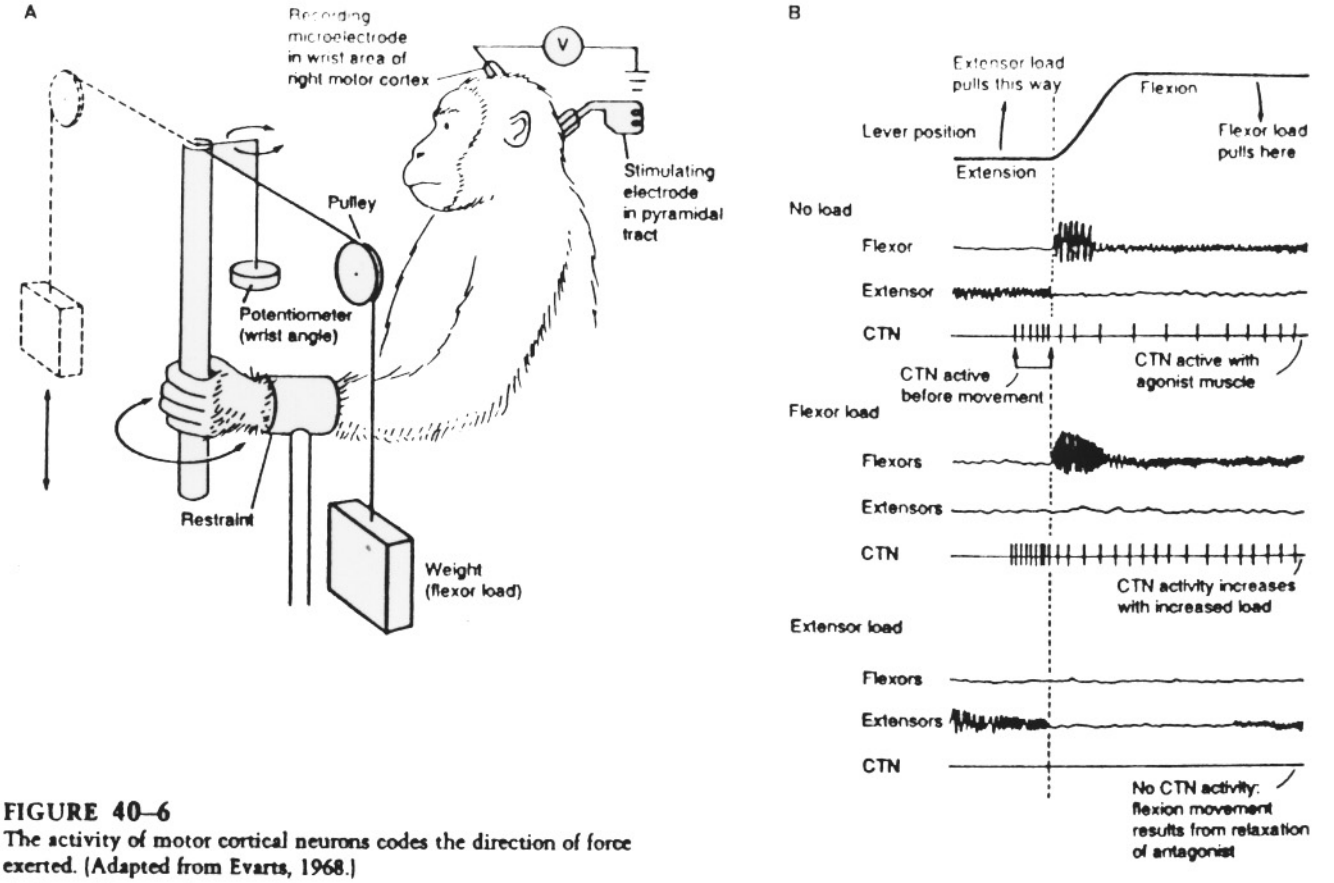

FIGURE 40–6
The activity of motor cortical neurons codes the direction of force exerted. (Adapted from Evarts, 1968.)

A. Setup for recording specific corticospinal tract neurons in the motor cortex of an awake monkey. The apparatus permits the animal alternately to flex and extend its wrist. To ascertain that the neuron being recorded projects through the corticospinal tract, corticospinal fibers are stimulated through a separate electrode implanted in the ipsilateral medullary pyramid to produce antidromic action potentials, thus activating output neurons in the motor cortex at a short and consistent latency.

B. Records of a corticospinal tract neuron (CTN) that increases its activity with flexion of the wrist. Note that the cell starts firing before movement. Electromyograms of flexor and extensor muscles and discharge records of a corticospinal tract neuron are shown under different load conditions. Absence of neuronal activity with extensor load indicates that the neuron codes for force rather than displacement.

FIGURE 40–7
Dynamic, static, and mixed neurons have distinctive patterns of firing during voluntary isometric contraction in the cat. dF/dt = rate of change of force. Broken line denotes onset of movement. (Adapted from Ghez and Vicario, 1978; and Vicario, Martin, and Ghez, 1983.)