

Tendon

Belly

Tendon

Muscle fiber (cell)

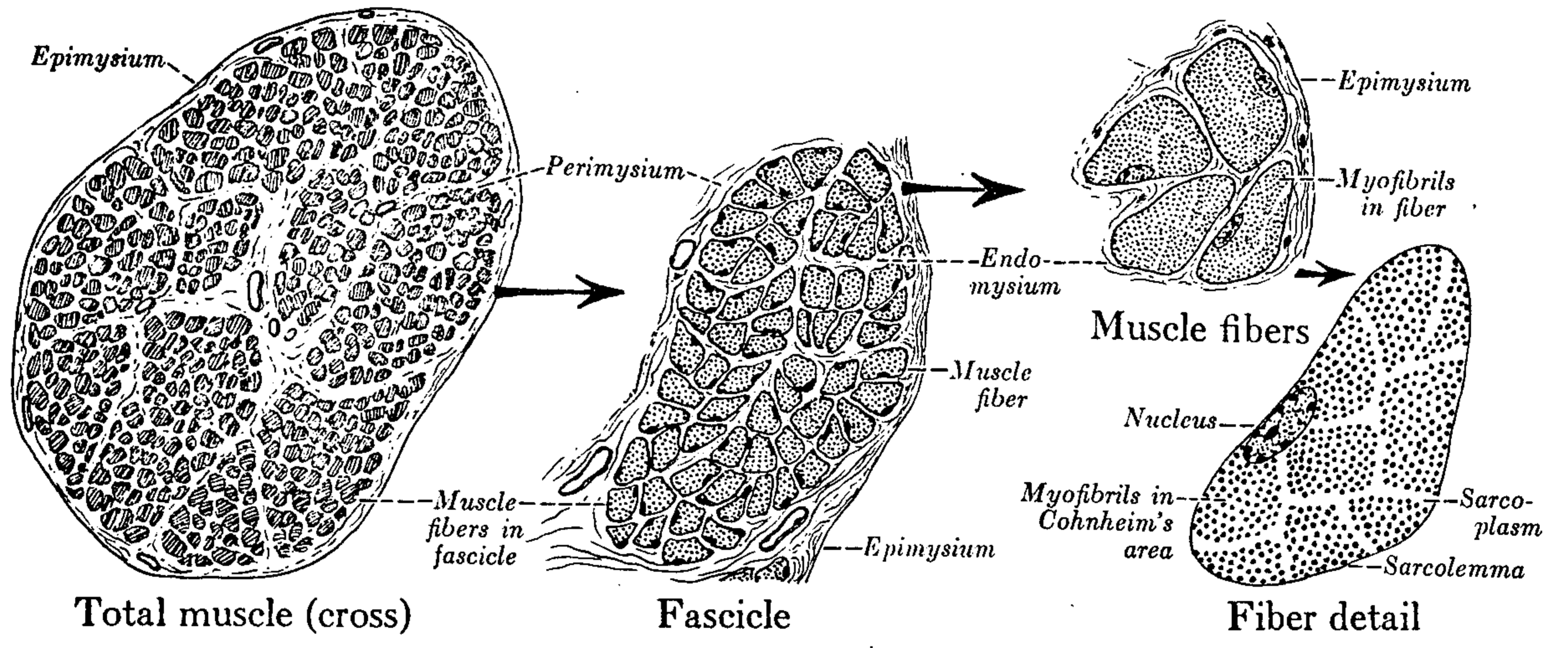
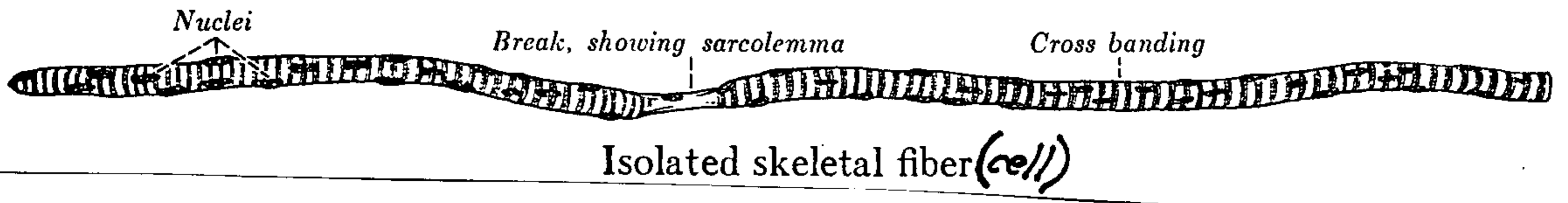
Endomysium

Fasciculus

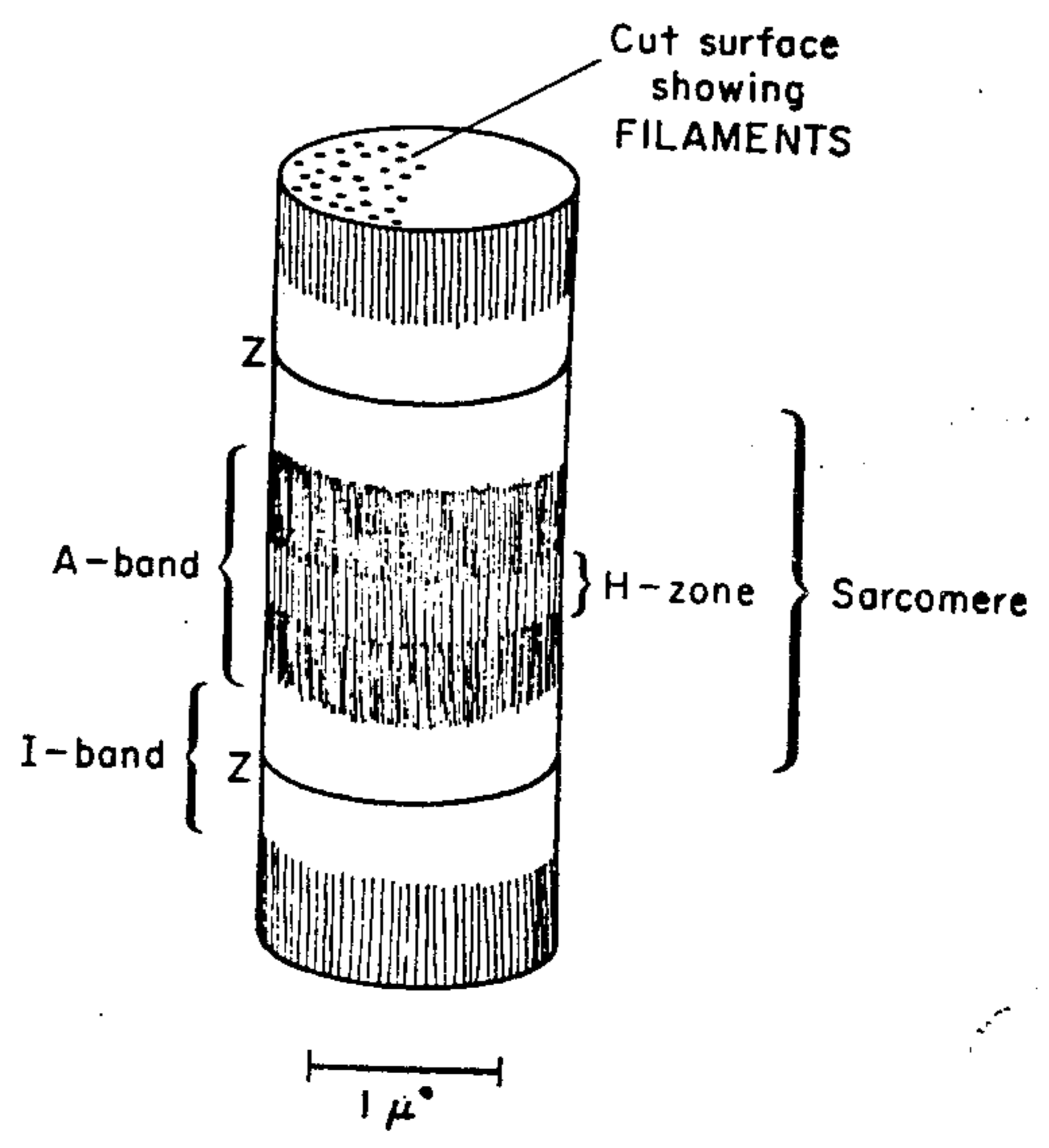
Epimysium

Perimysium

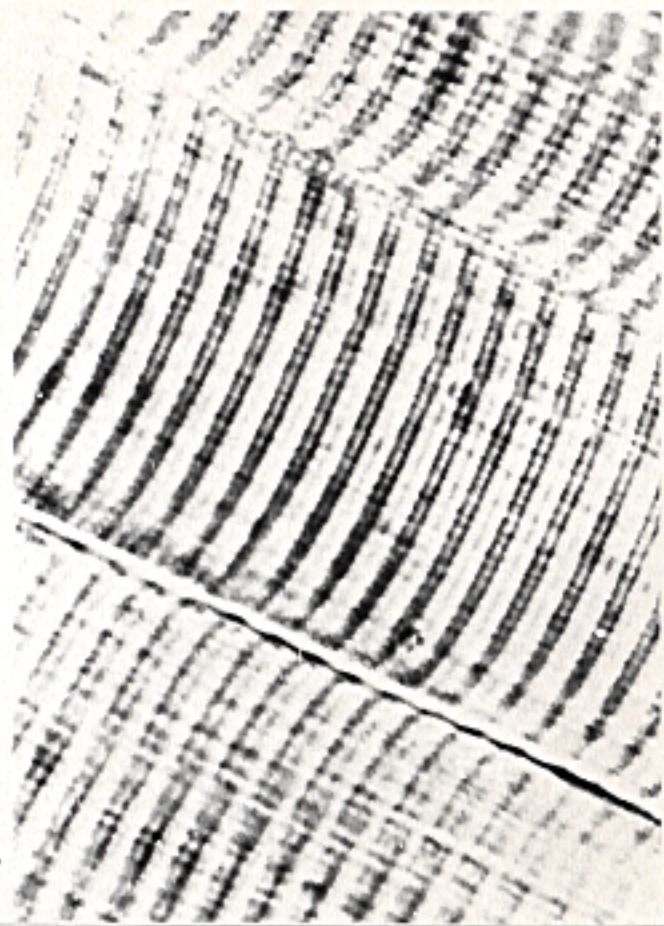
M.A.S.C.



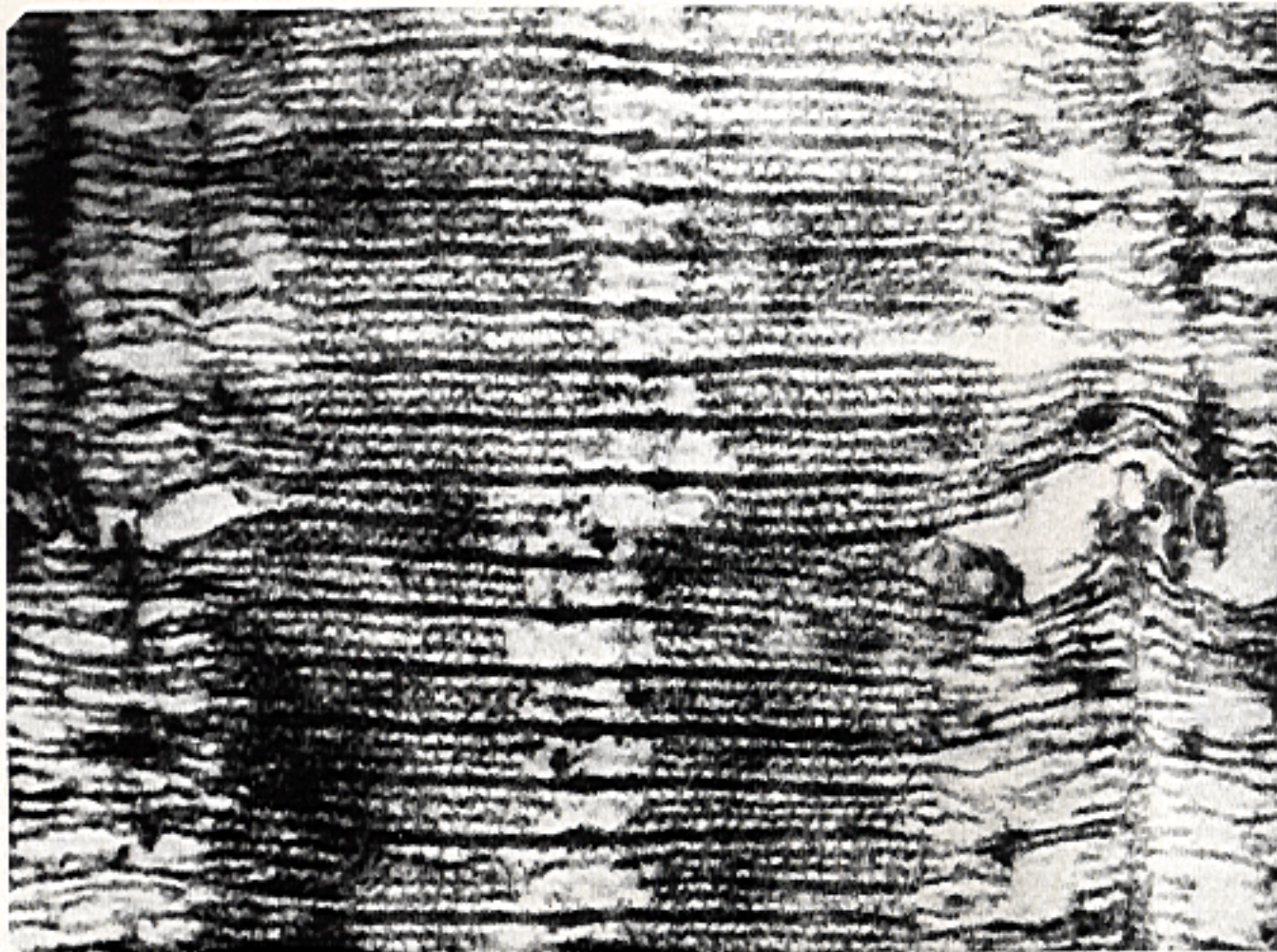
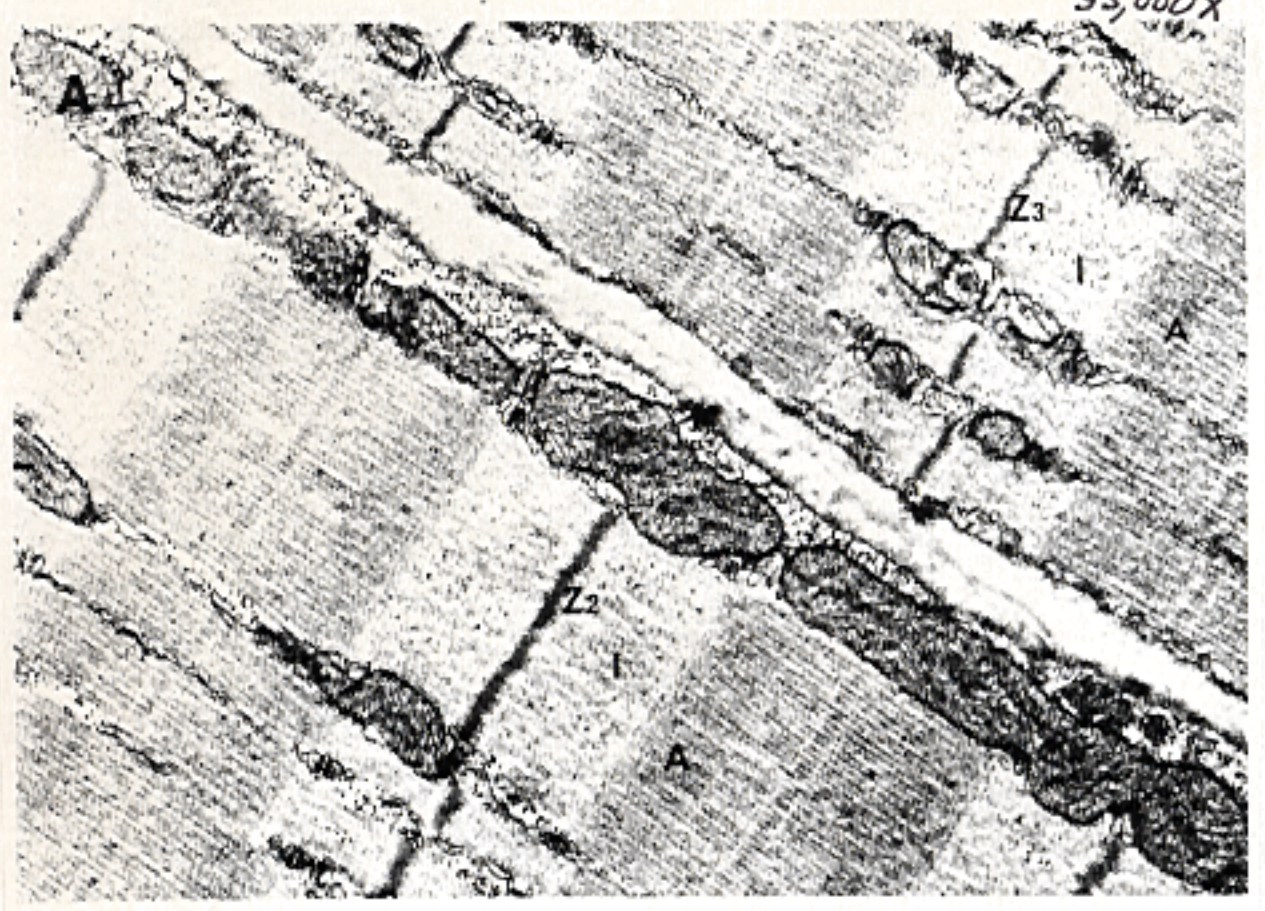
**SKELETAL MUSCLE**



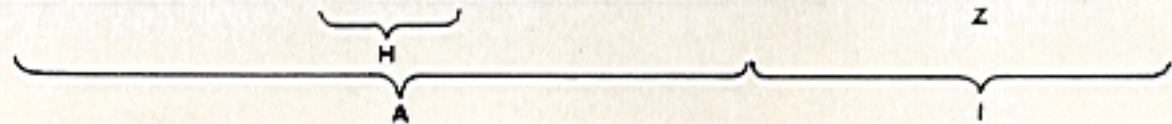
1,250X

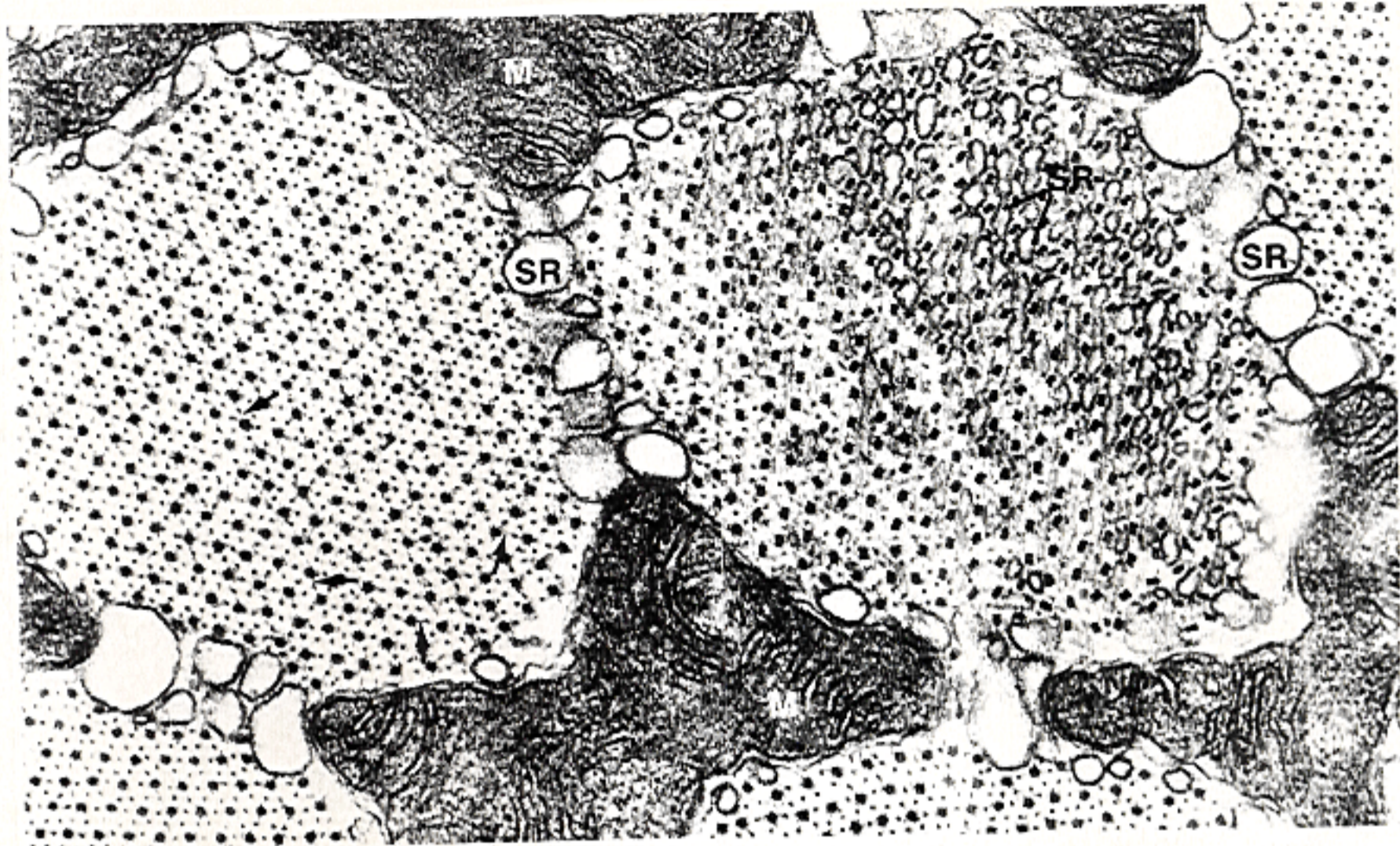


33,000X

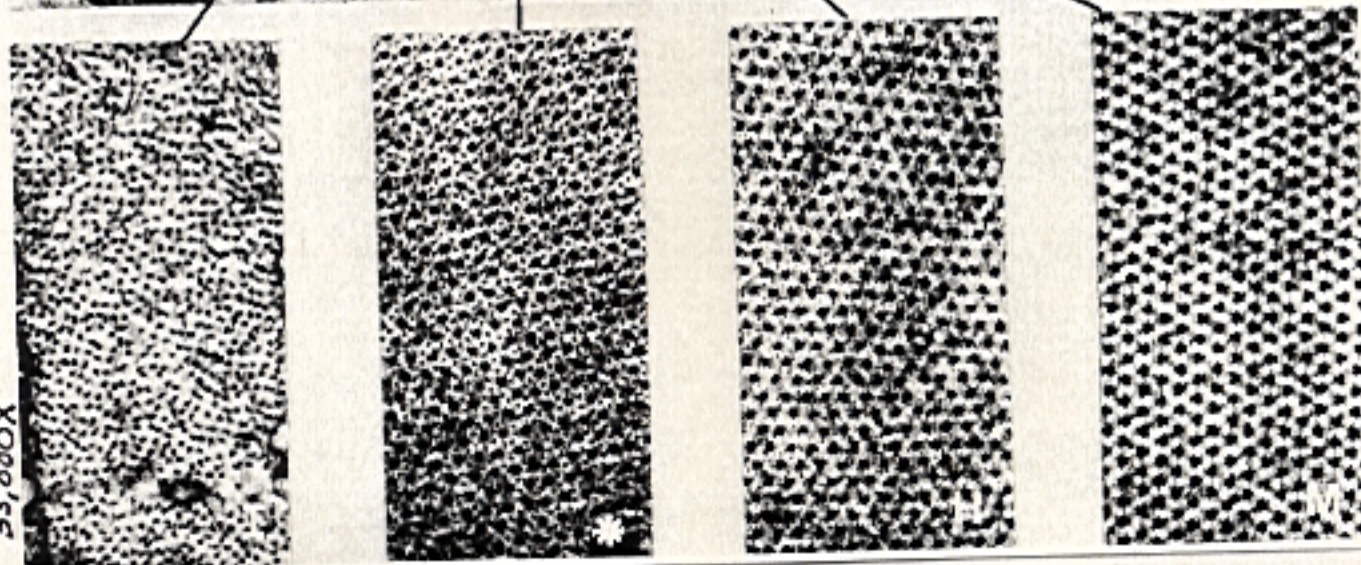
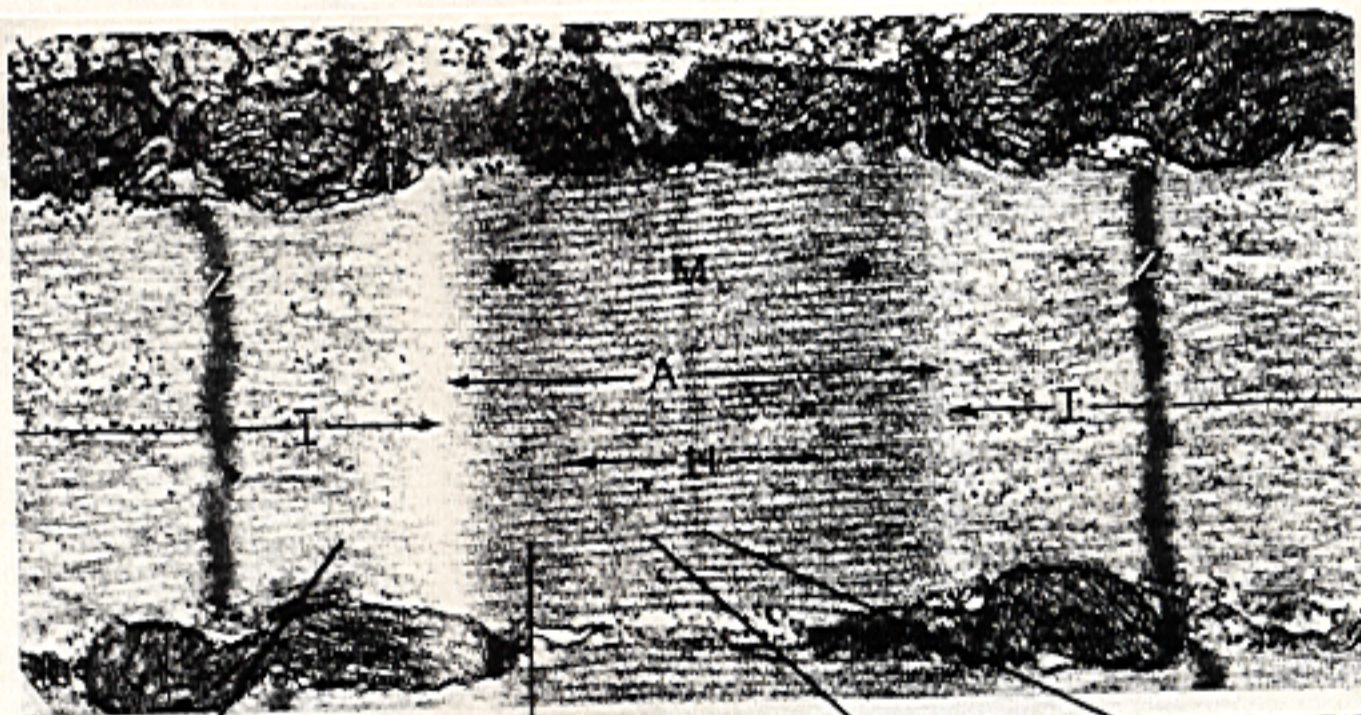


74,000X

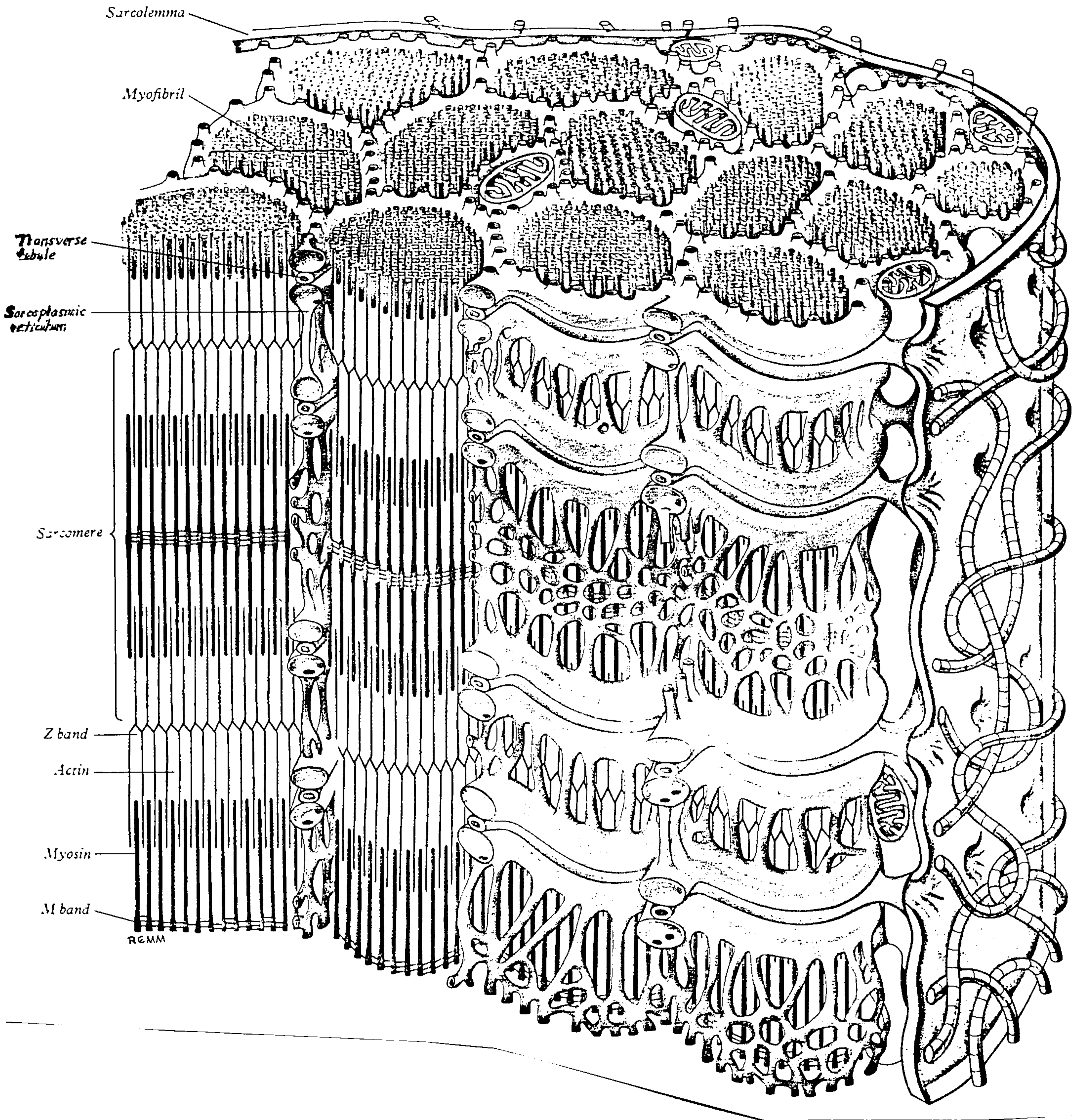




97,900X



33,000X



Sarcolemma

Myofibril

Transverse tubule

Sarcoplasmic reticulum

Sarcomere

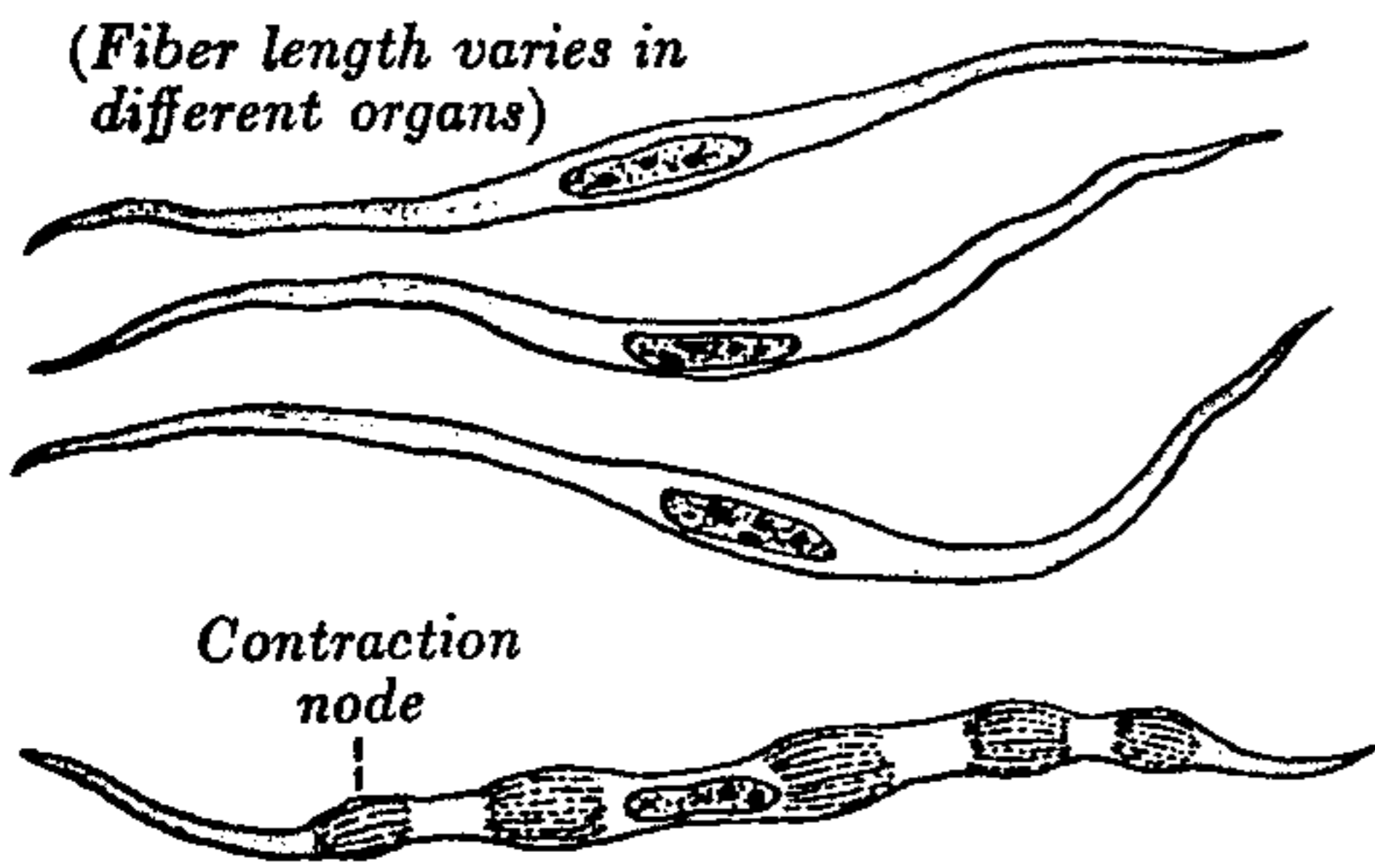
Z band

Actin

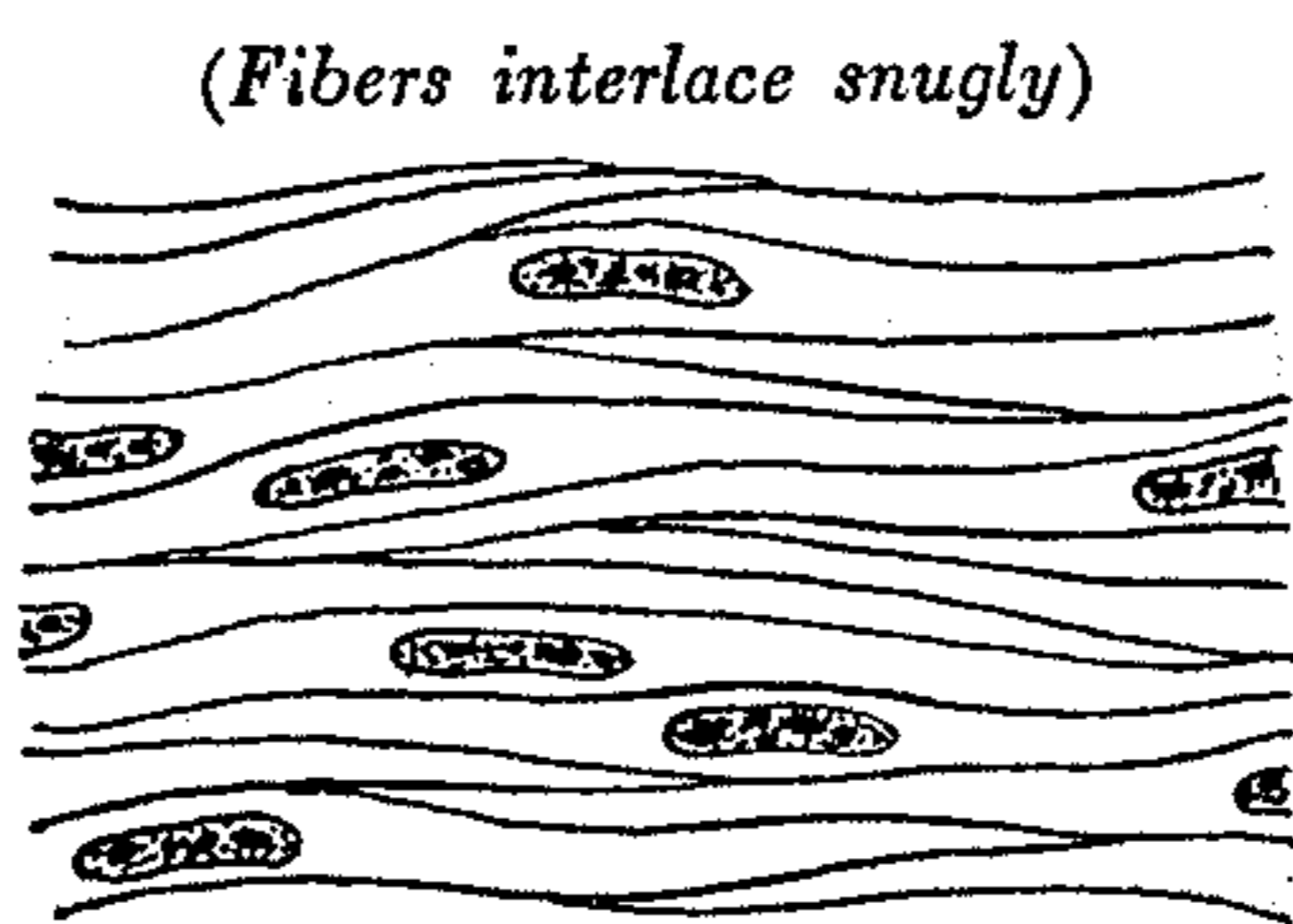
Myosin

M band

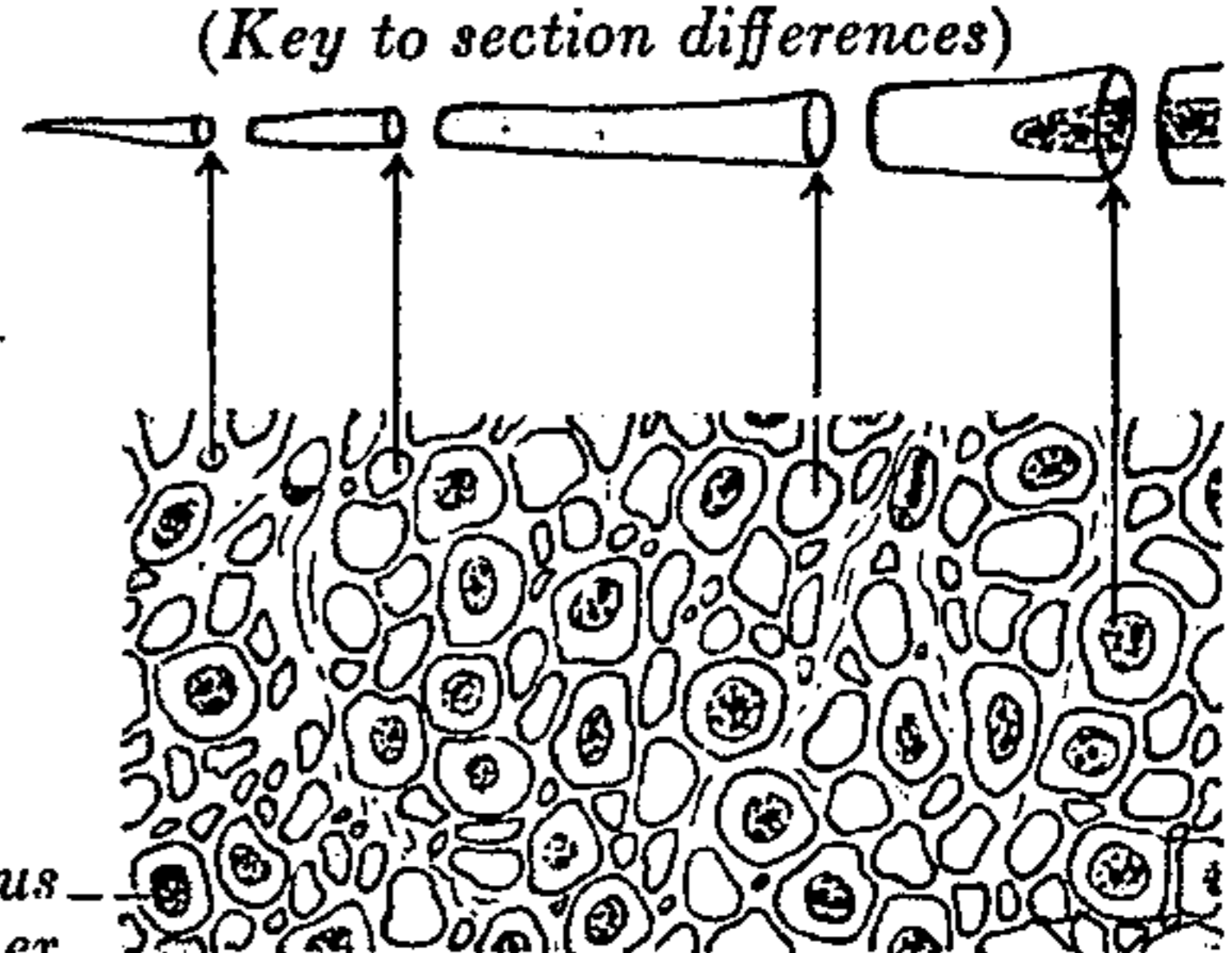
REMM



Isolated fibers



Long. section

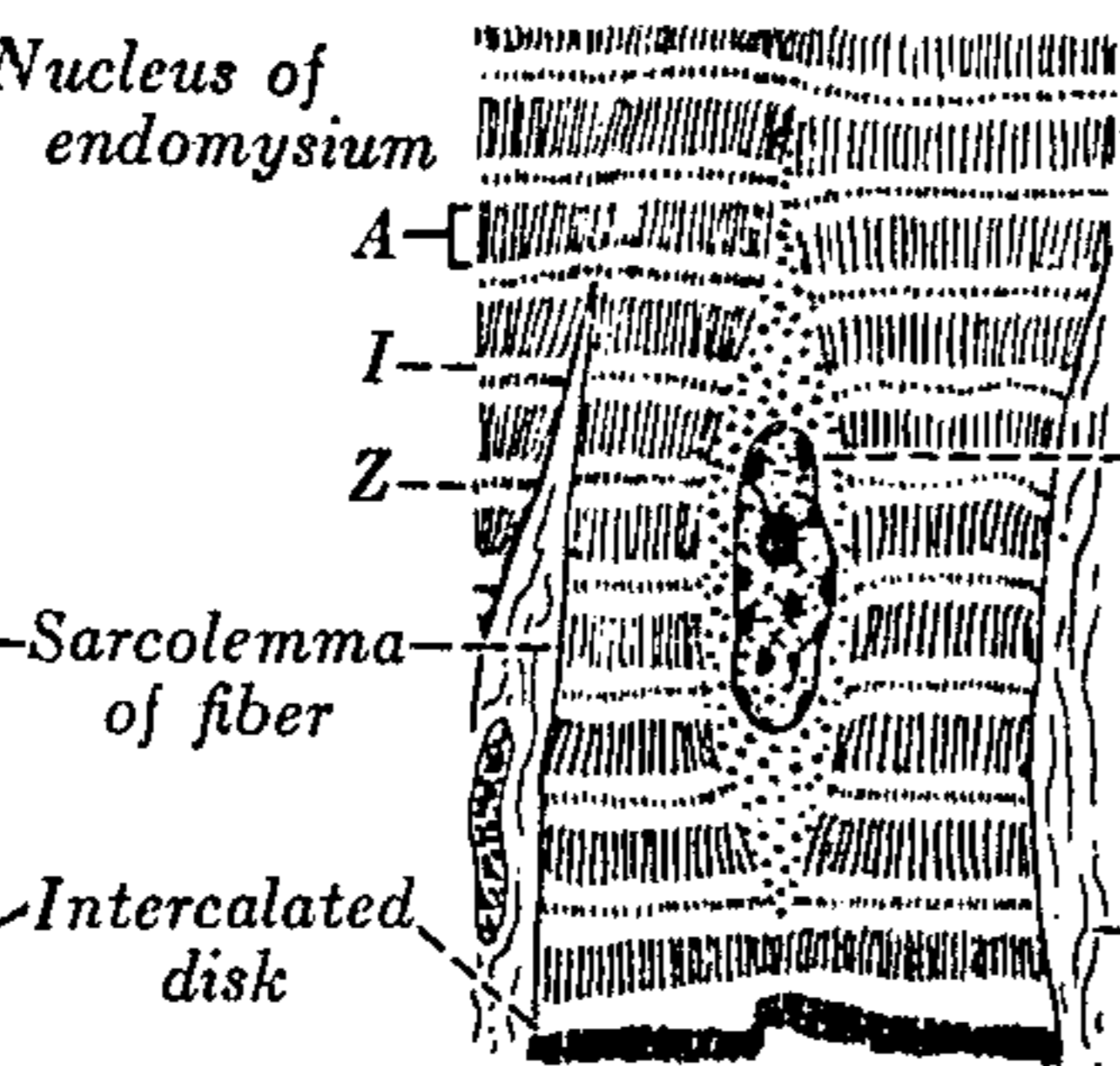


Cross section

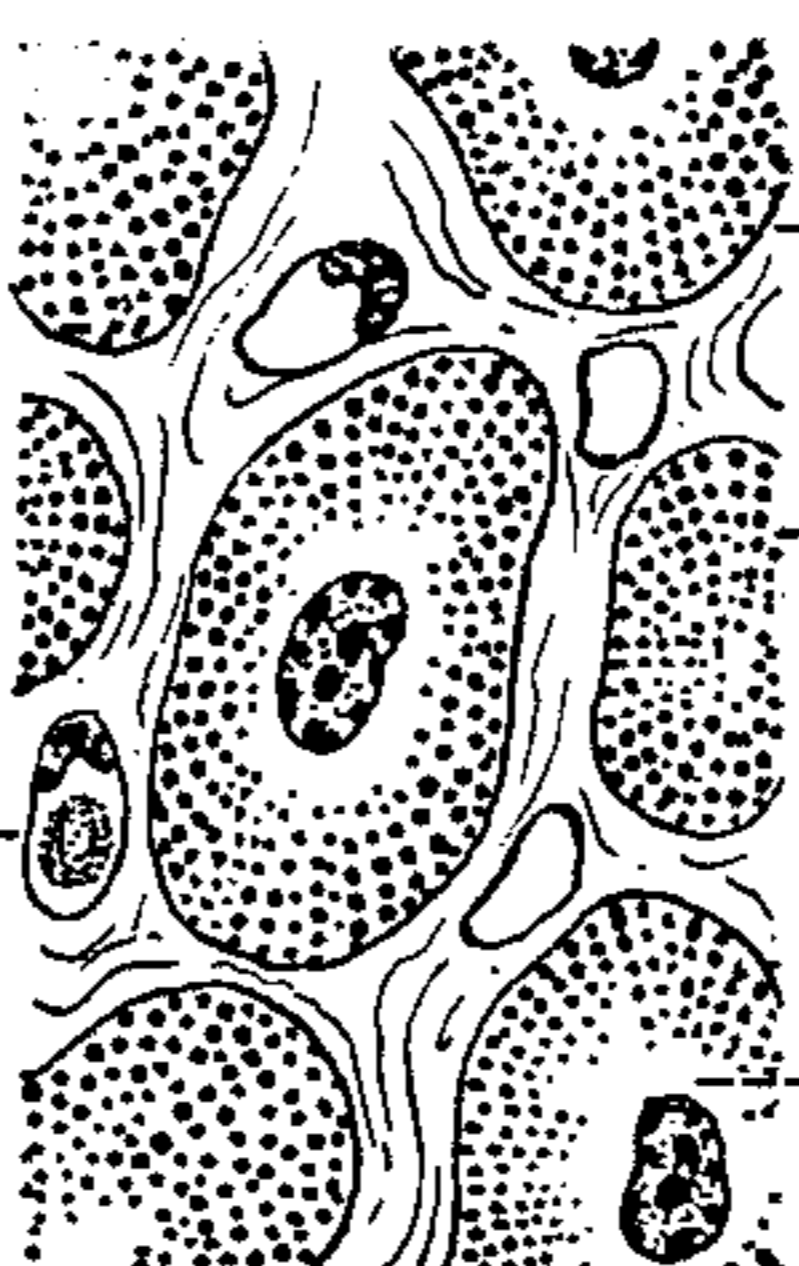
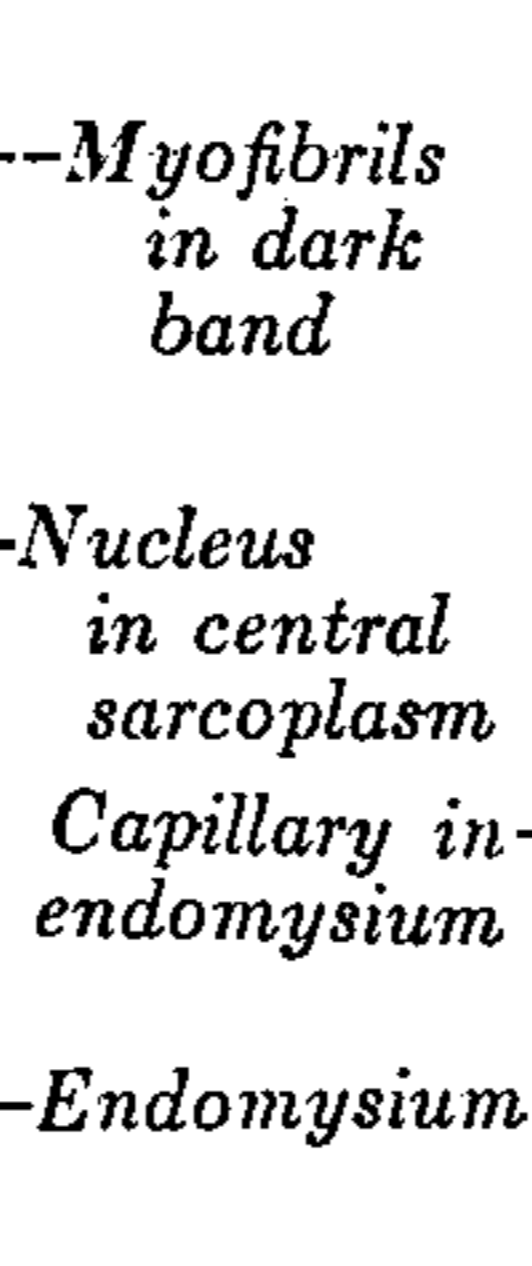
**SMOOTH MUSCLE**



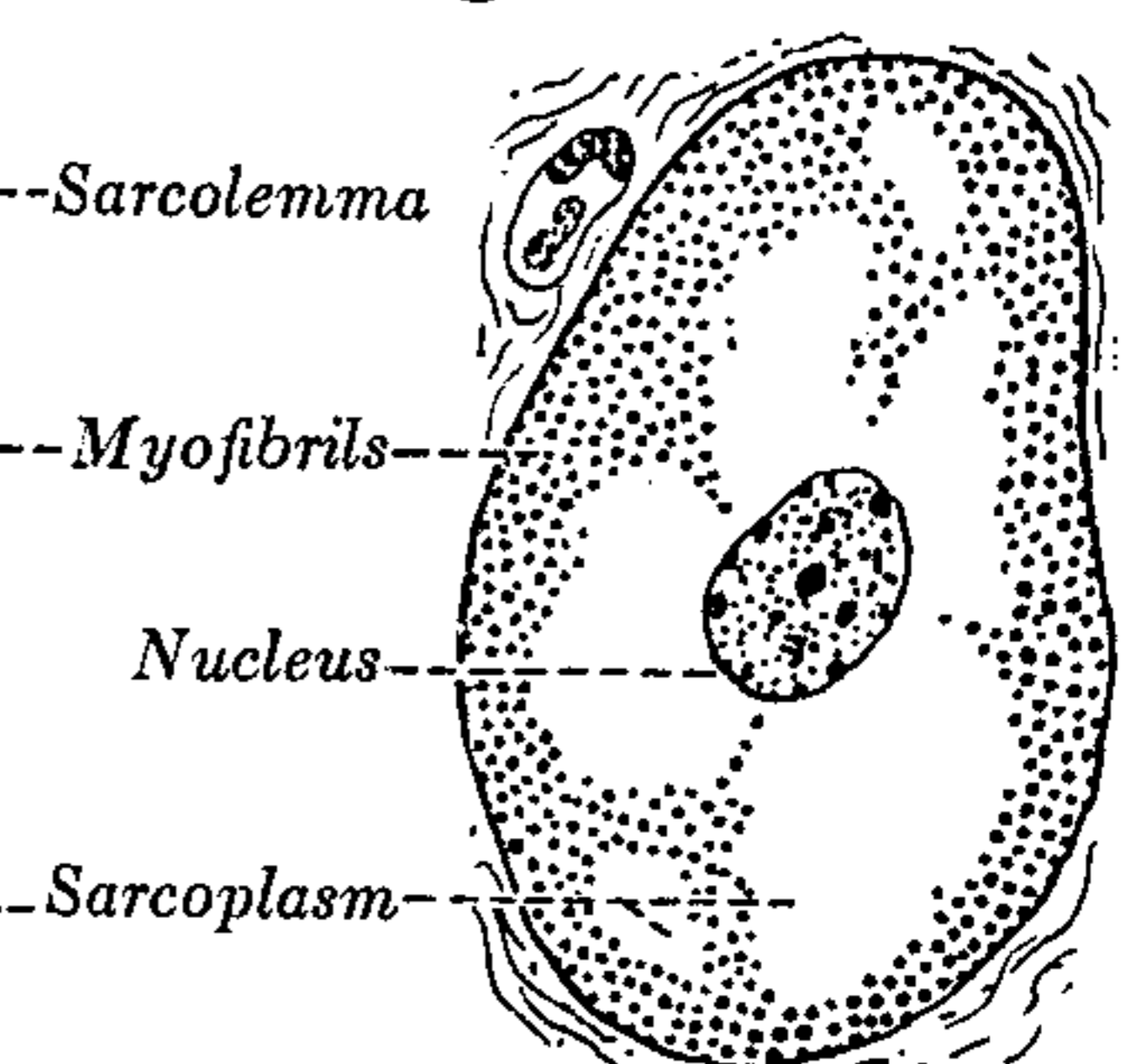
Long. section



Detail (long)

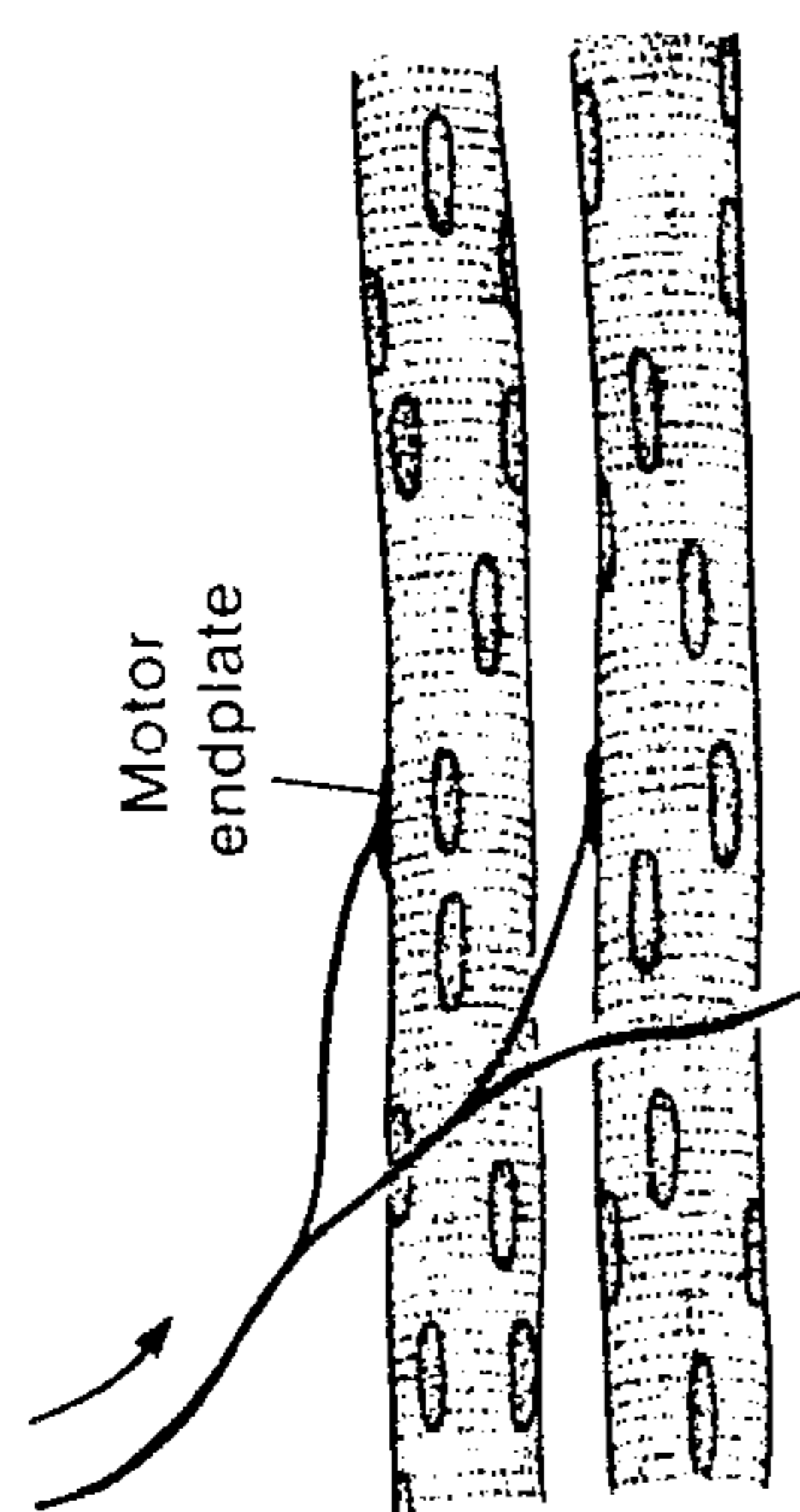


Detail (cross)

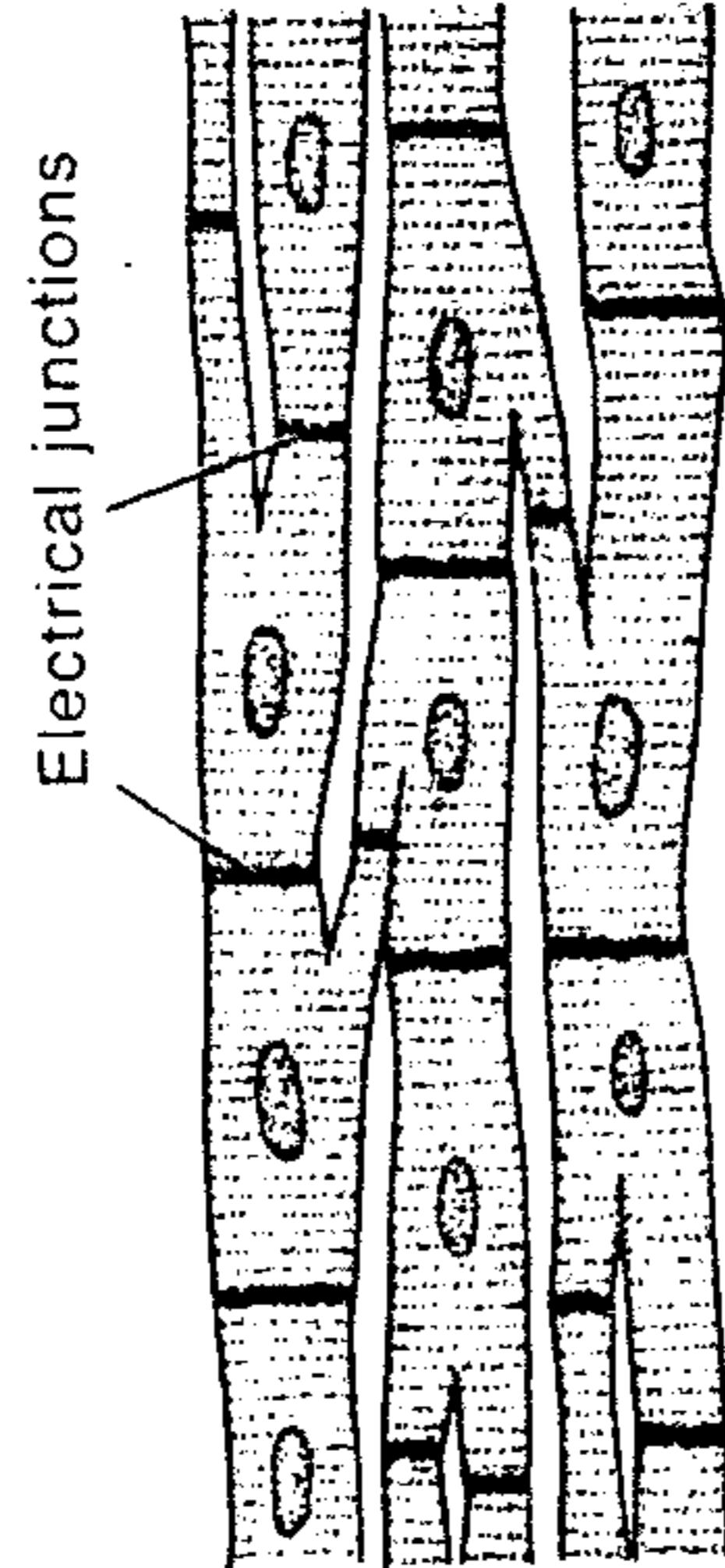


*Muscle fiber*  
(cross)

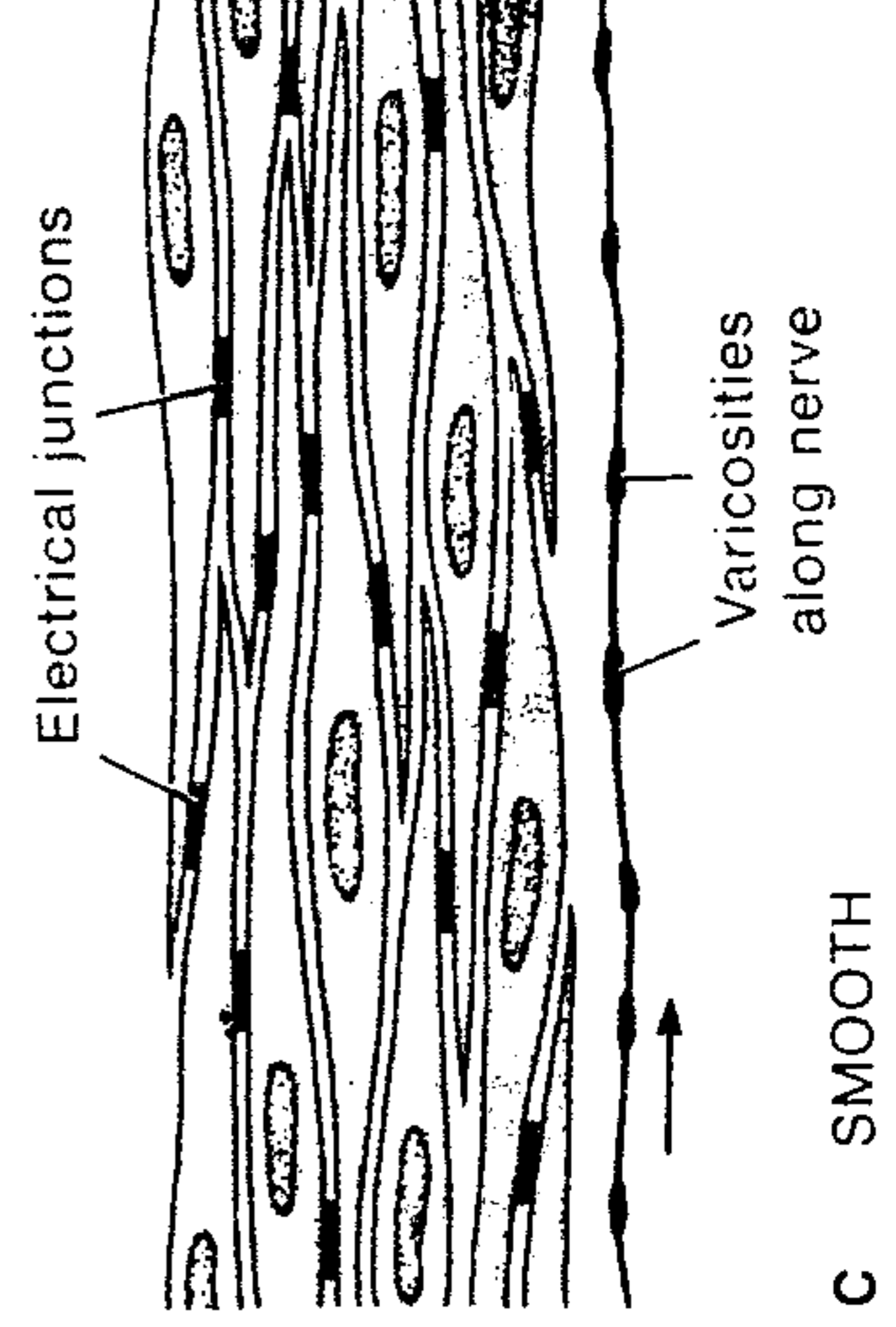
**CARDIAC MUSCLE**



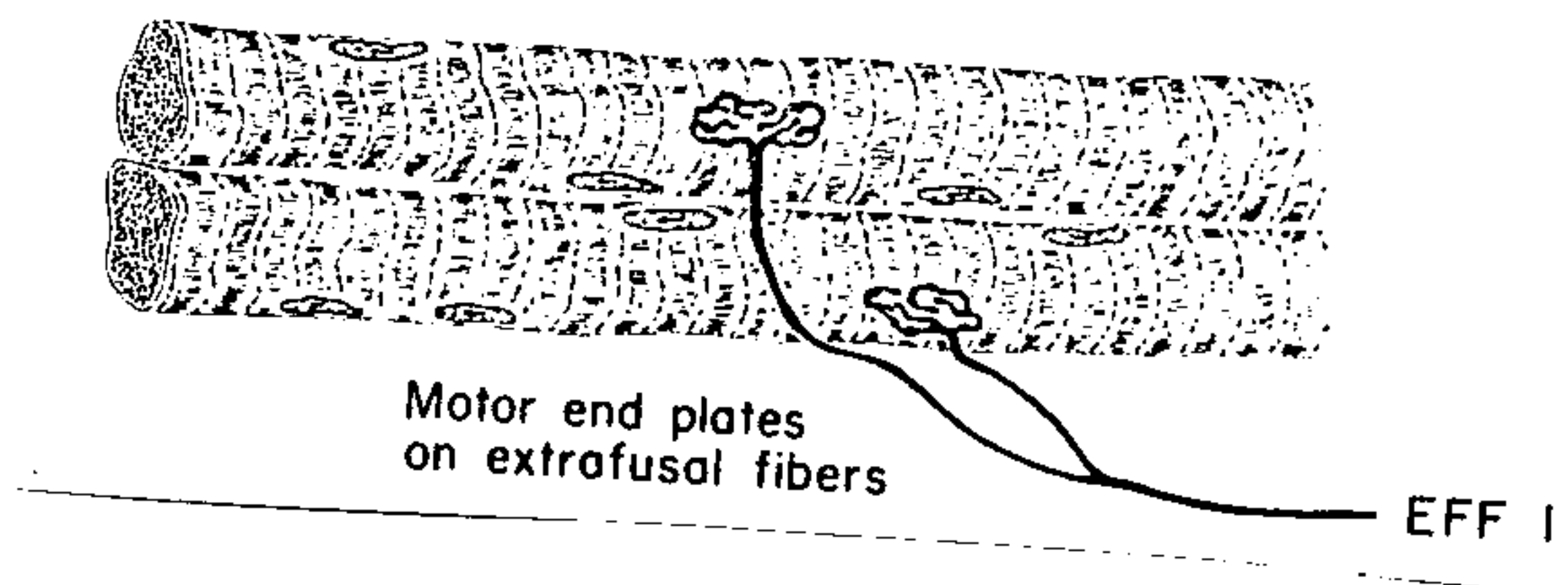
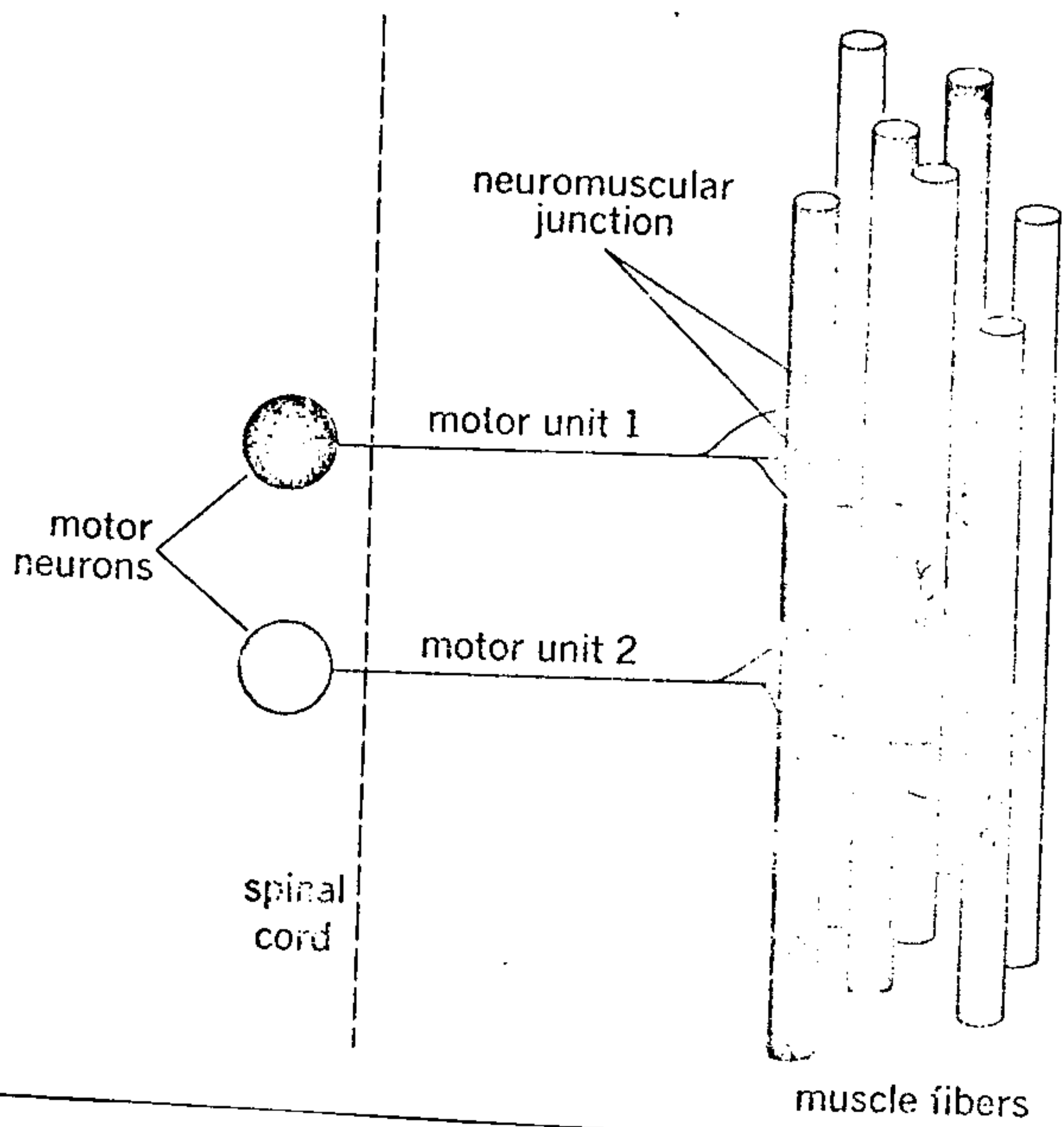
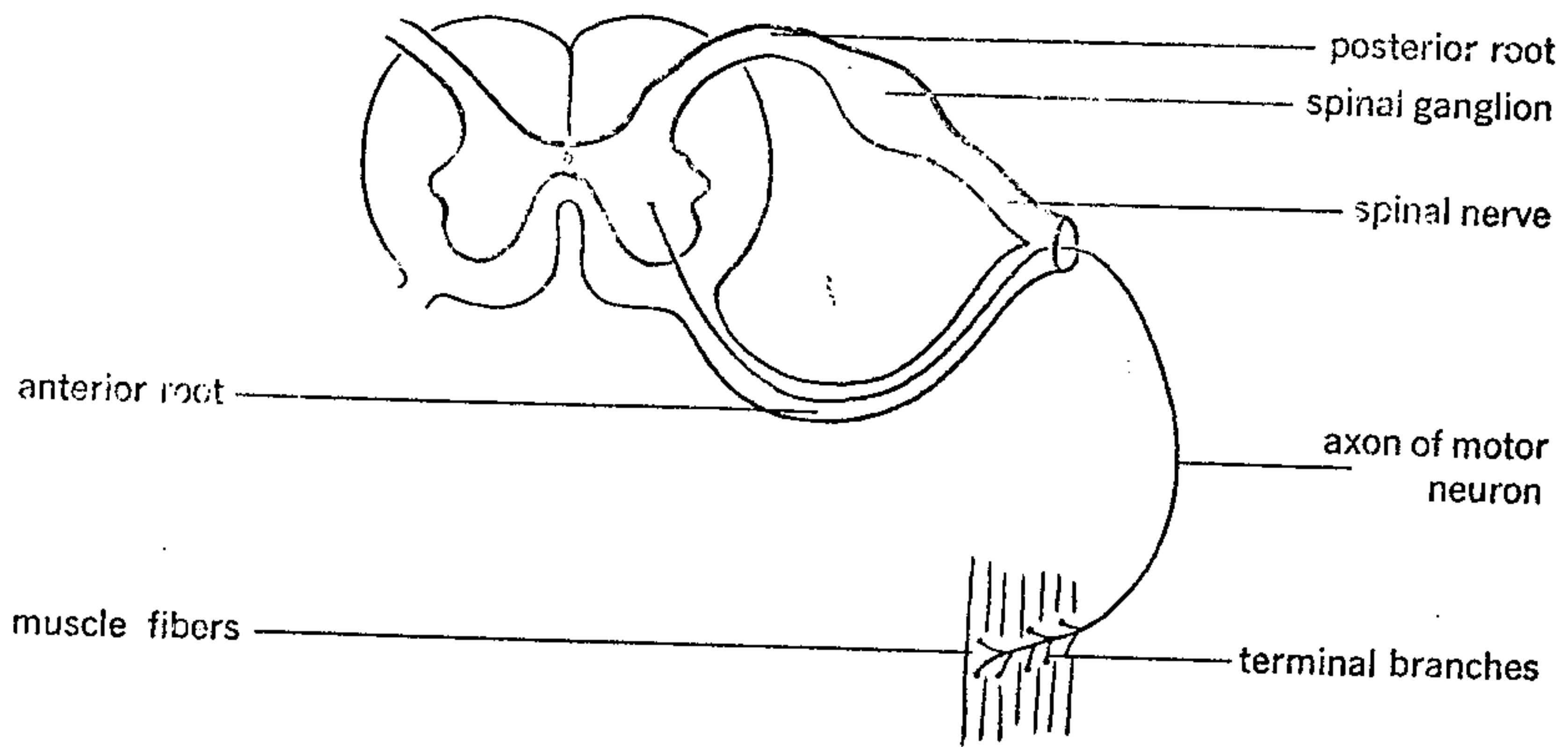
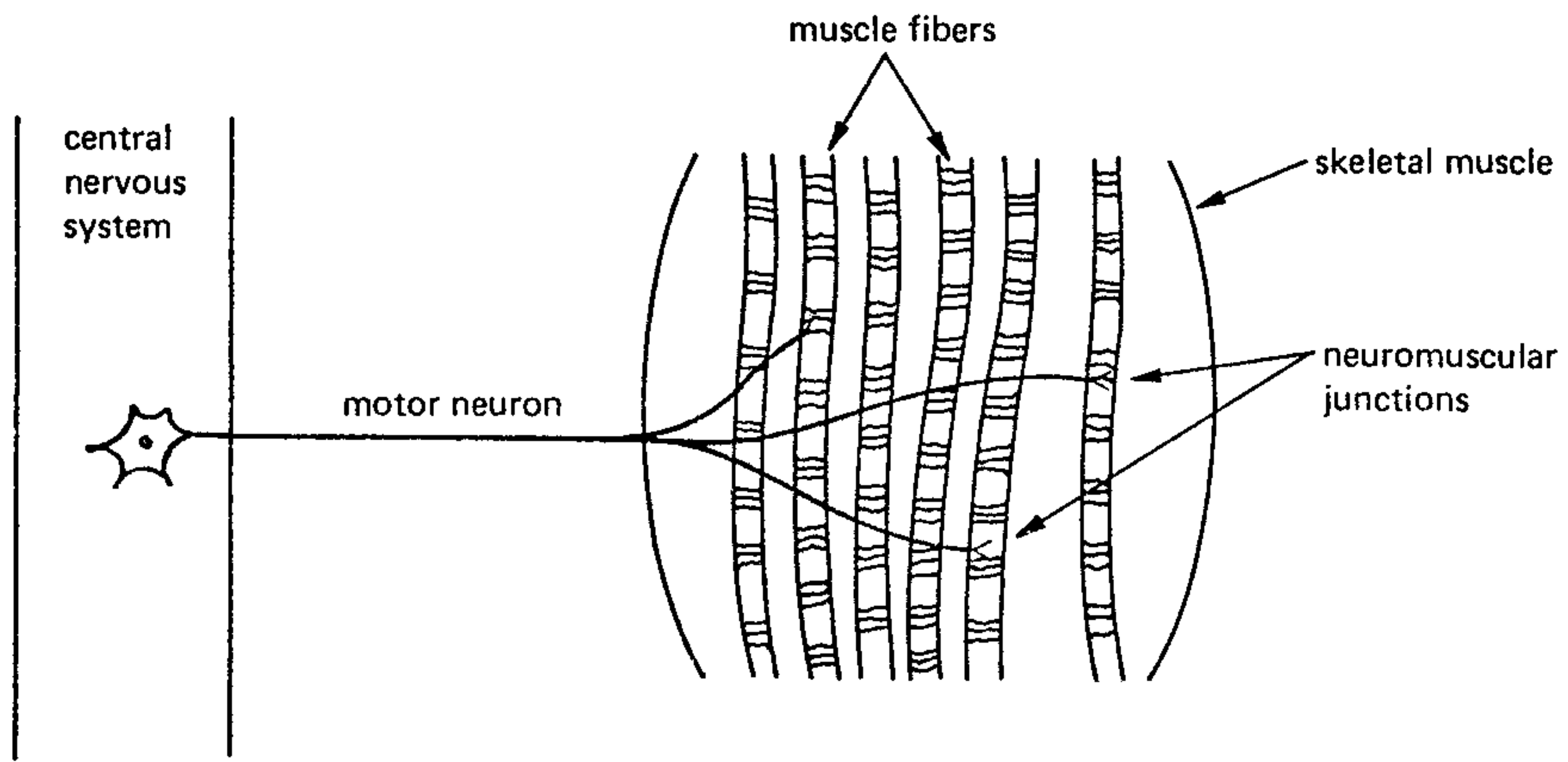
**A** STRIATED

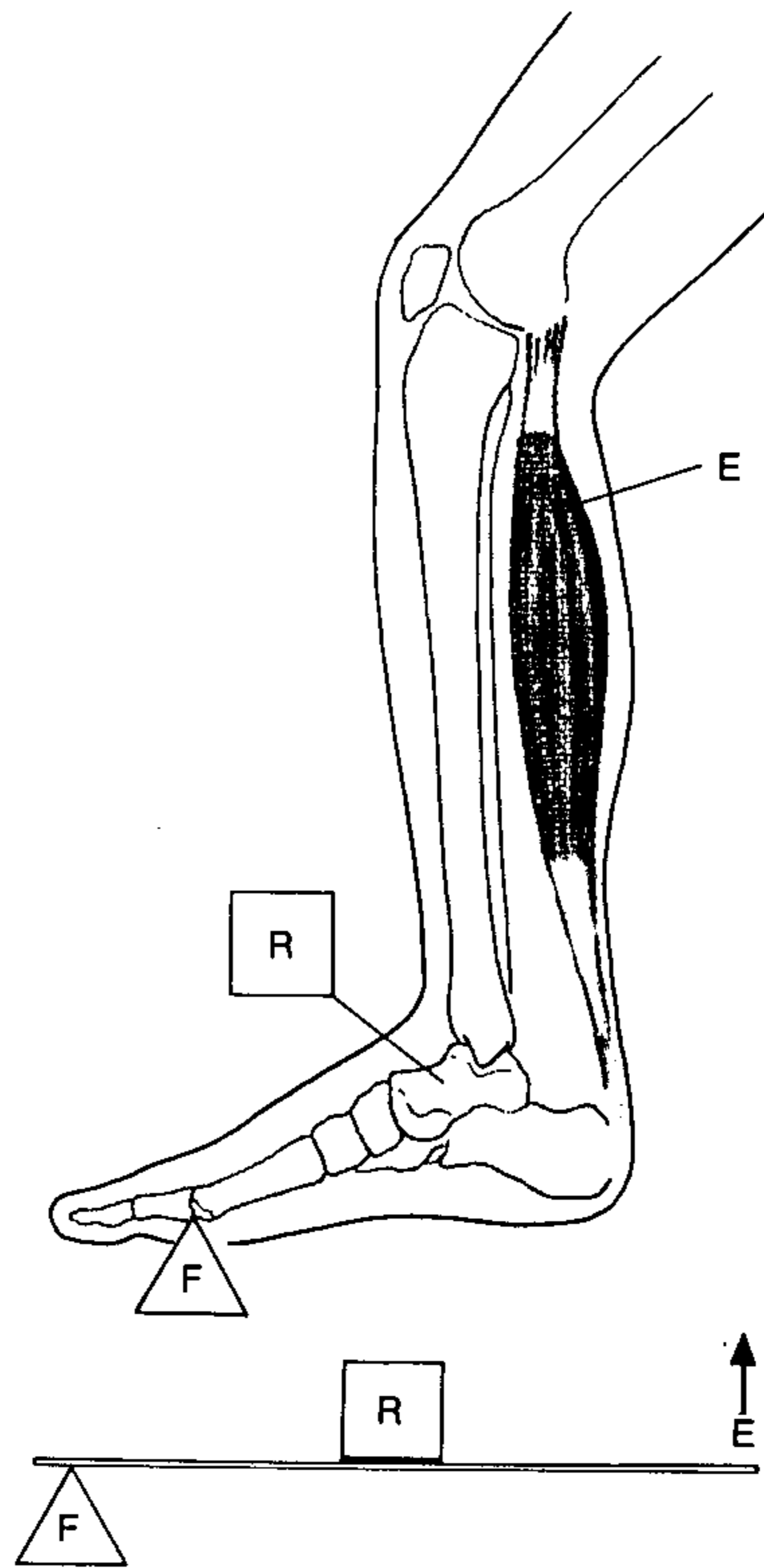
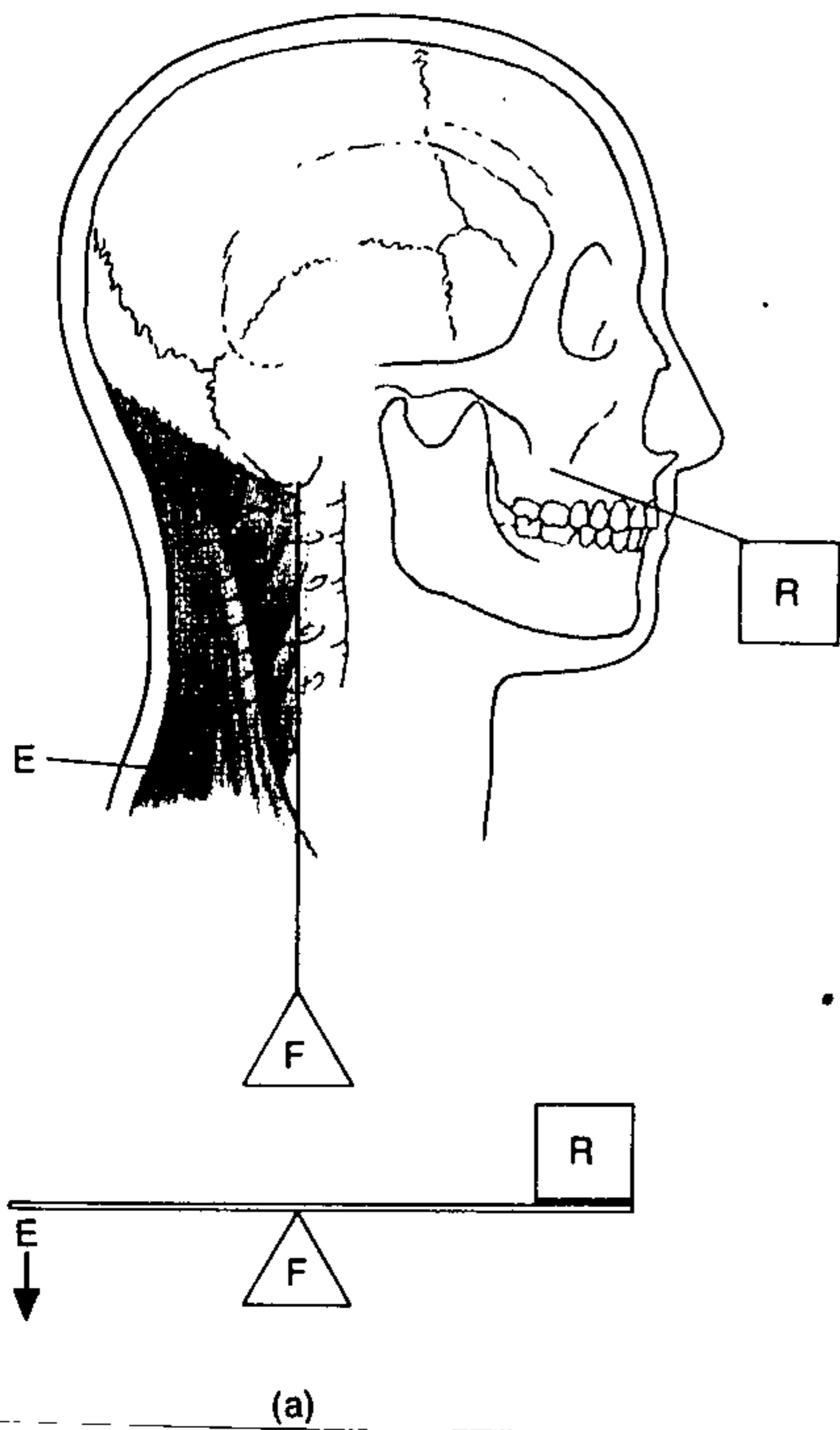
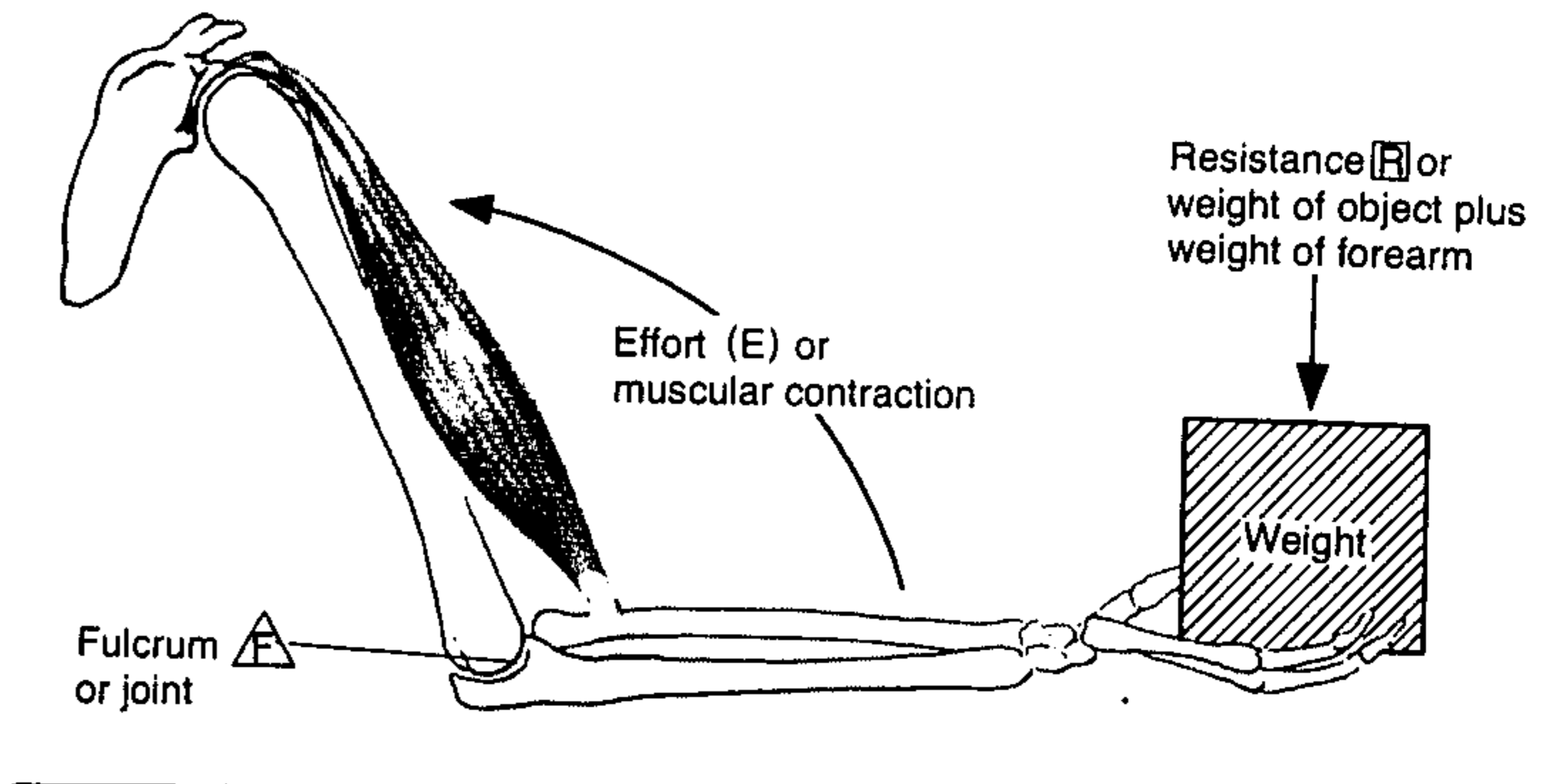
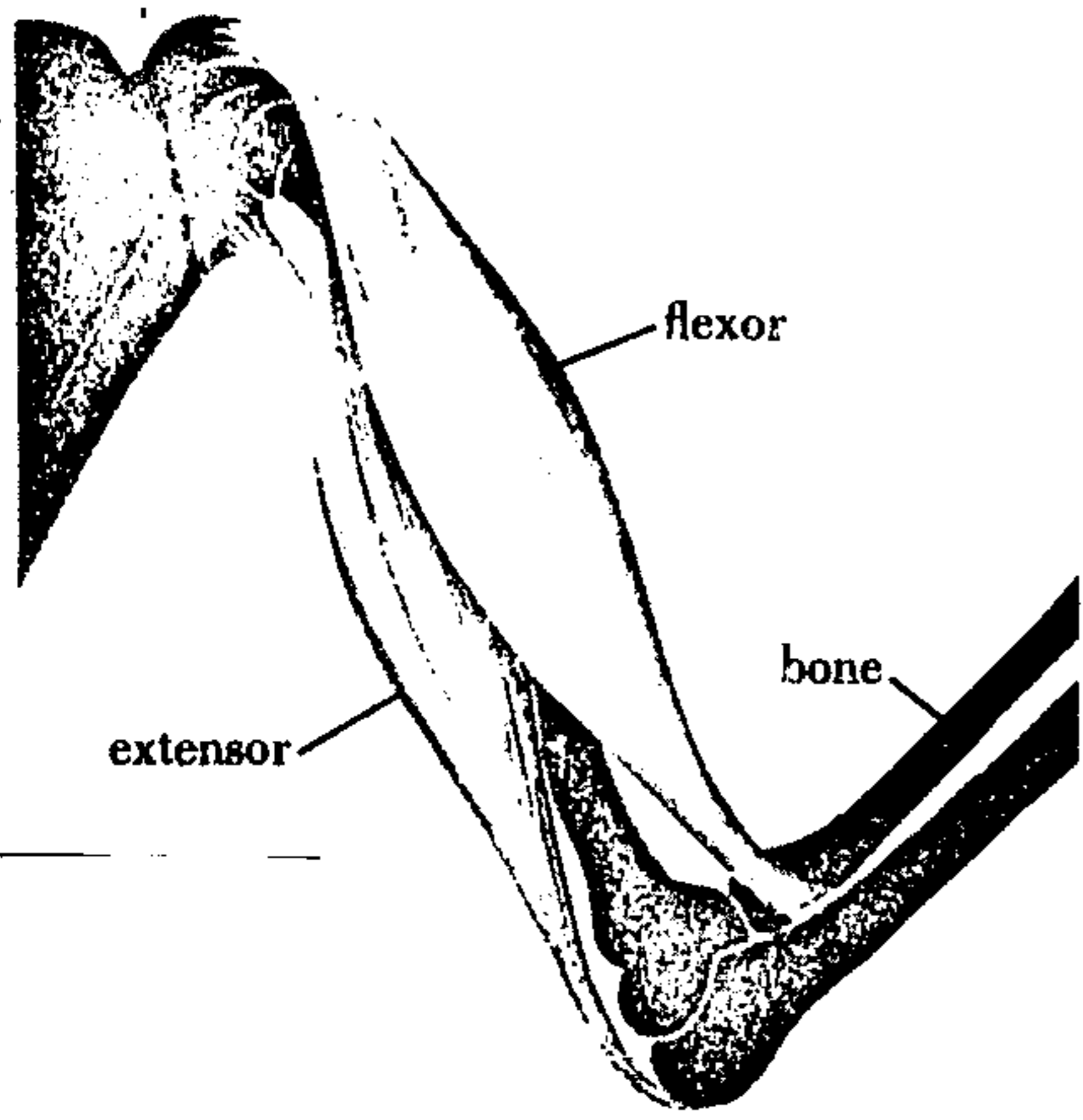


**B** CARDIAC

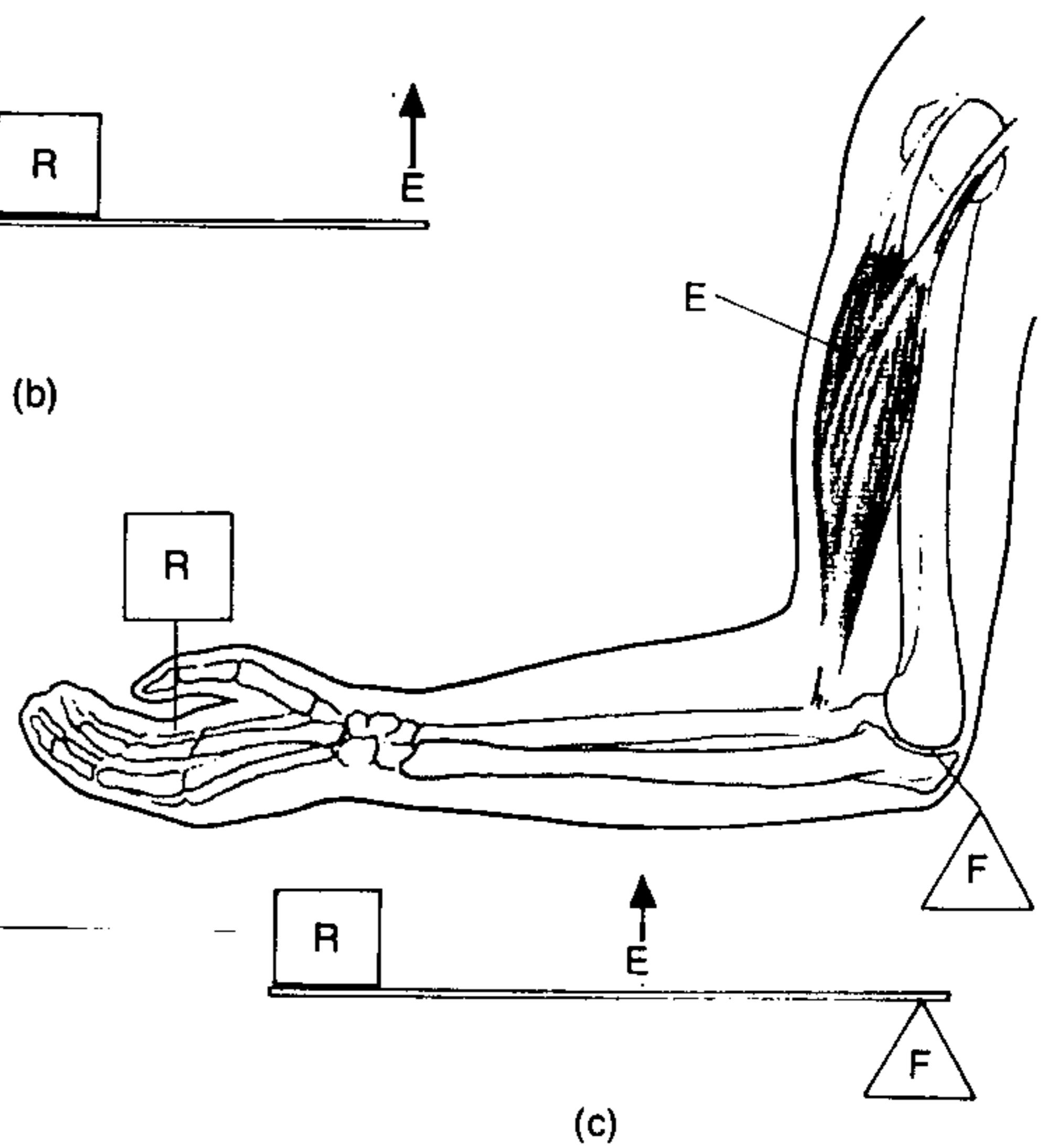


**C** SMOOTH



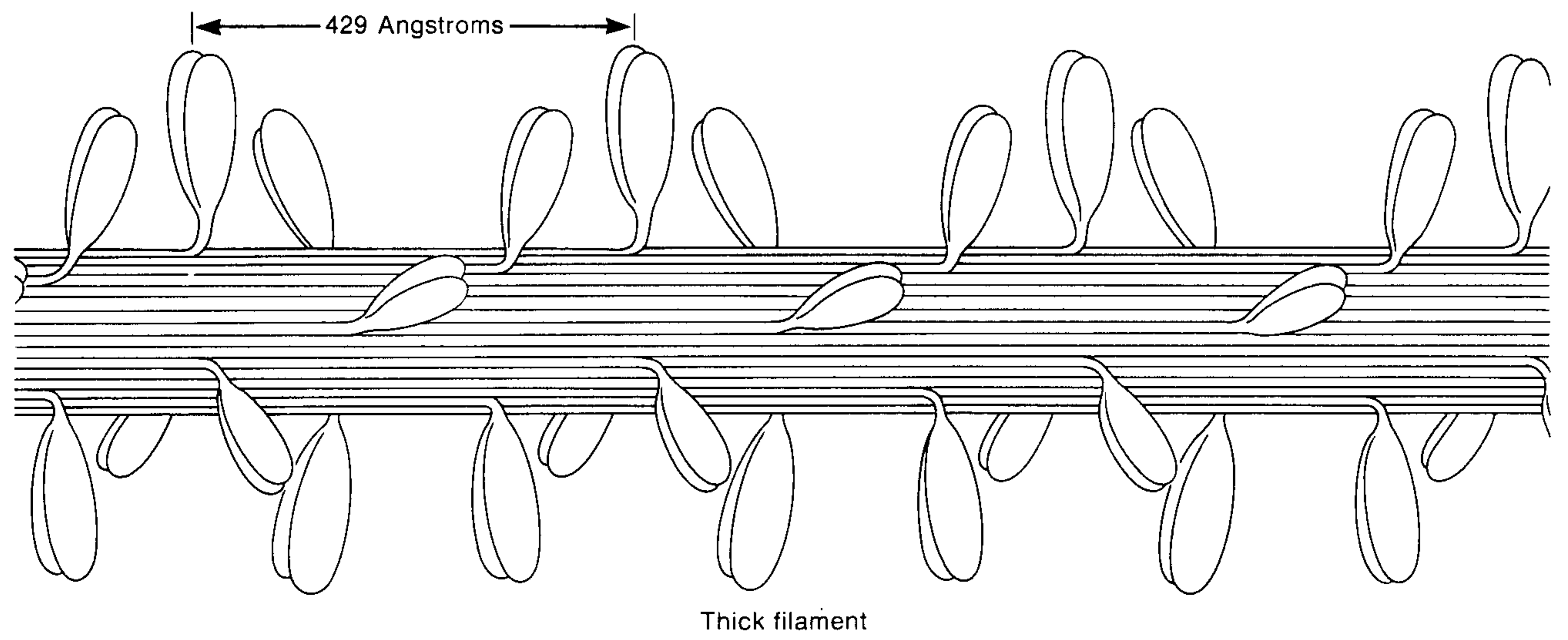
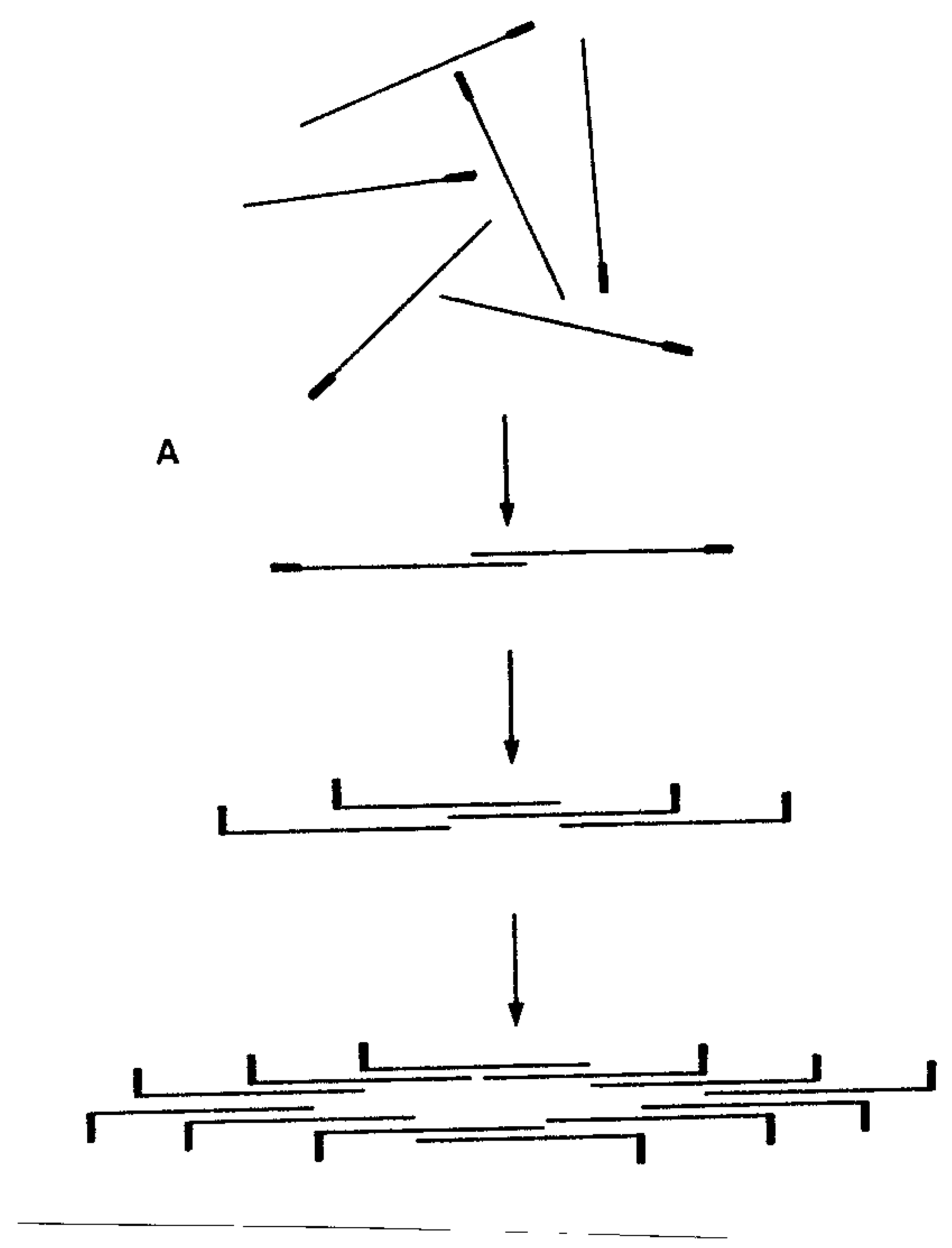
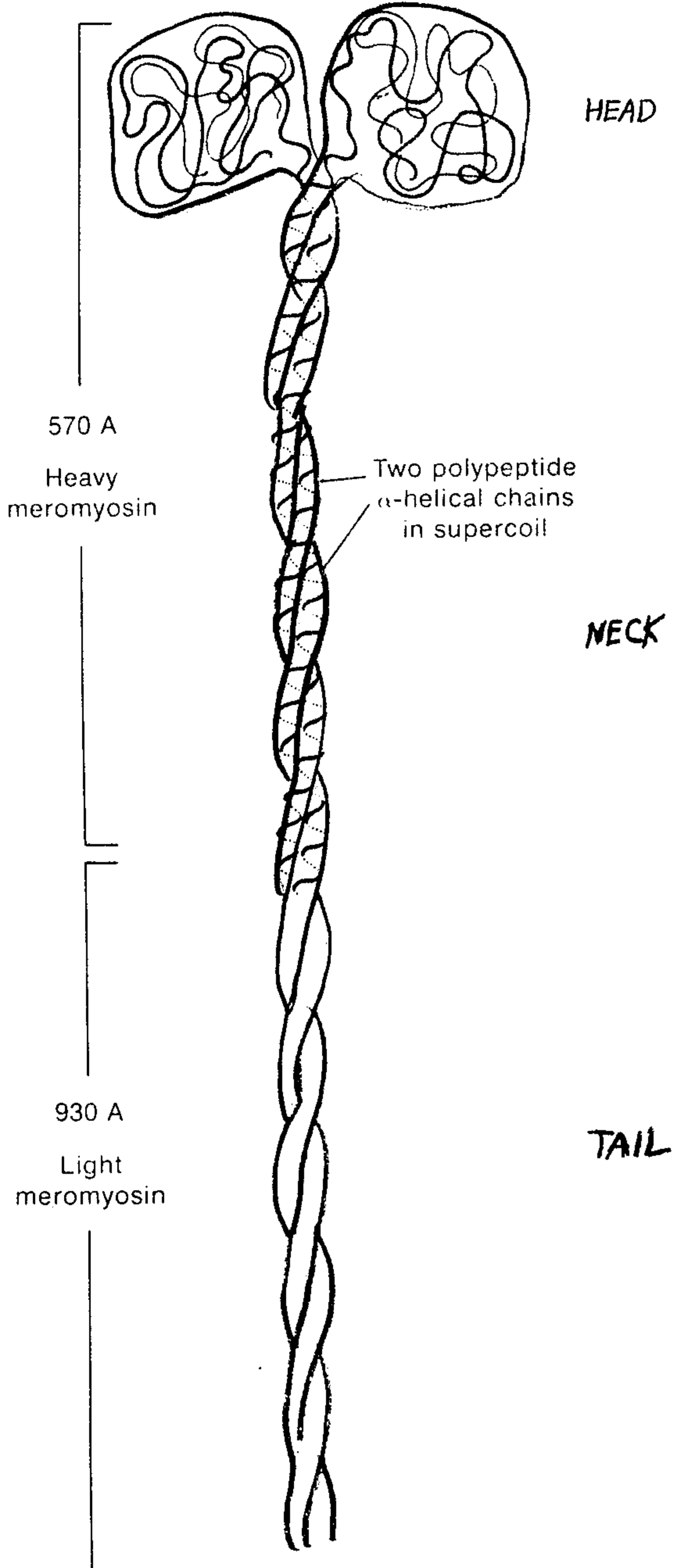


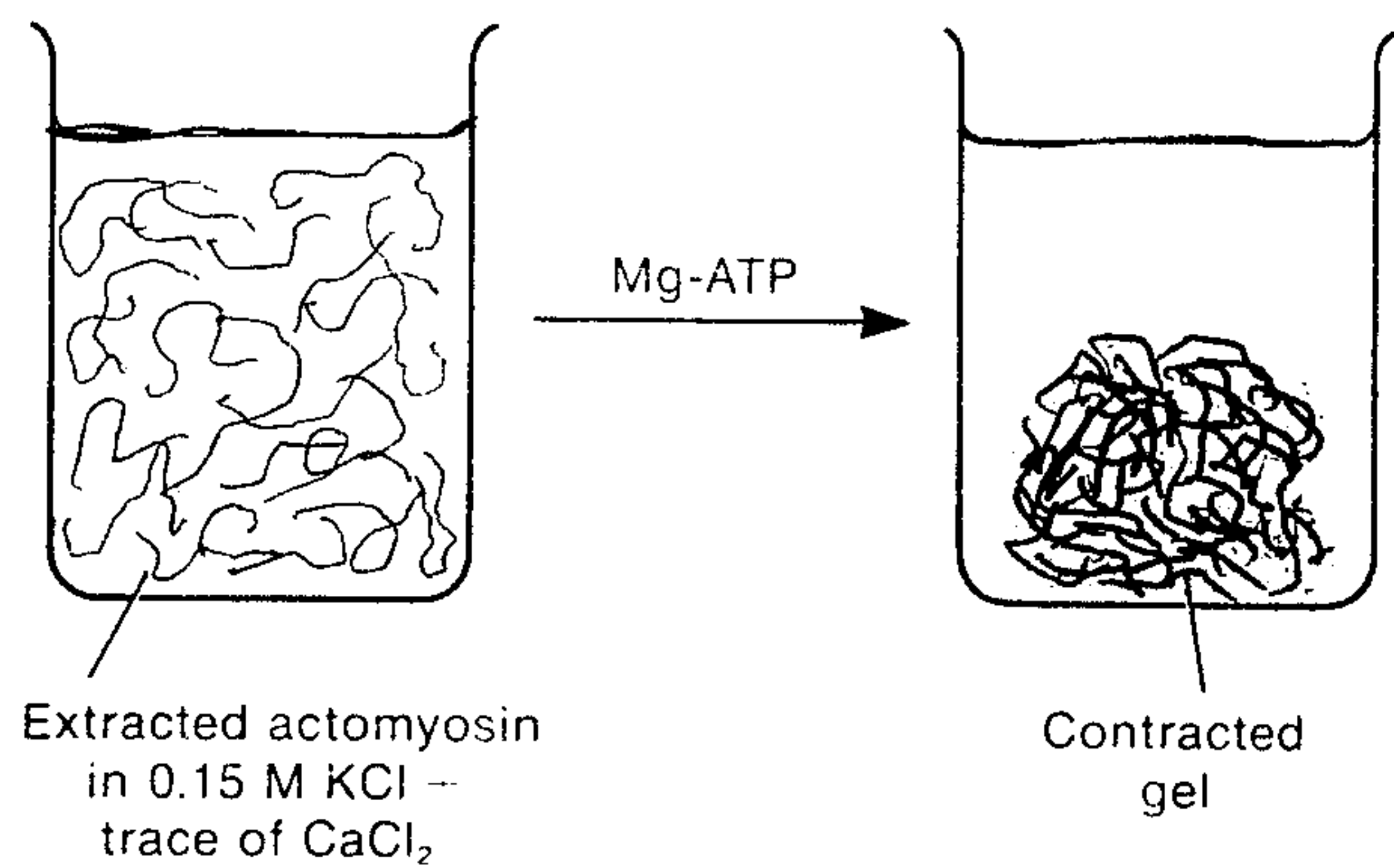
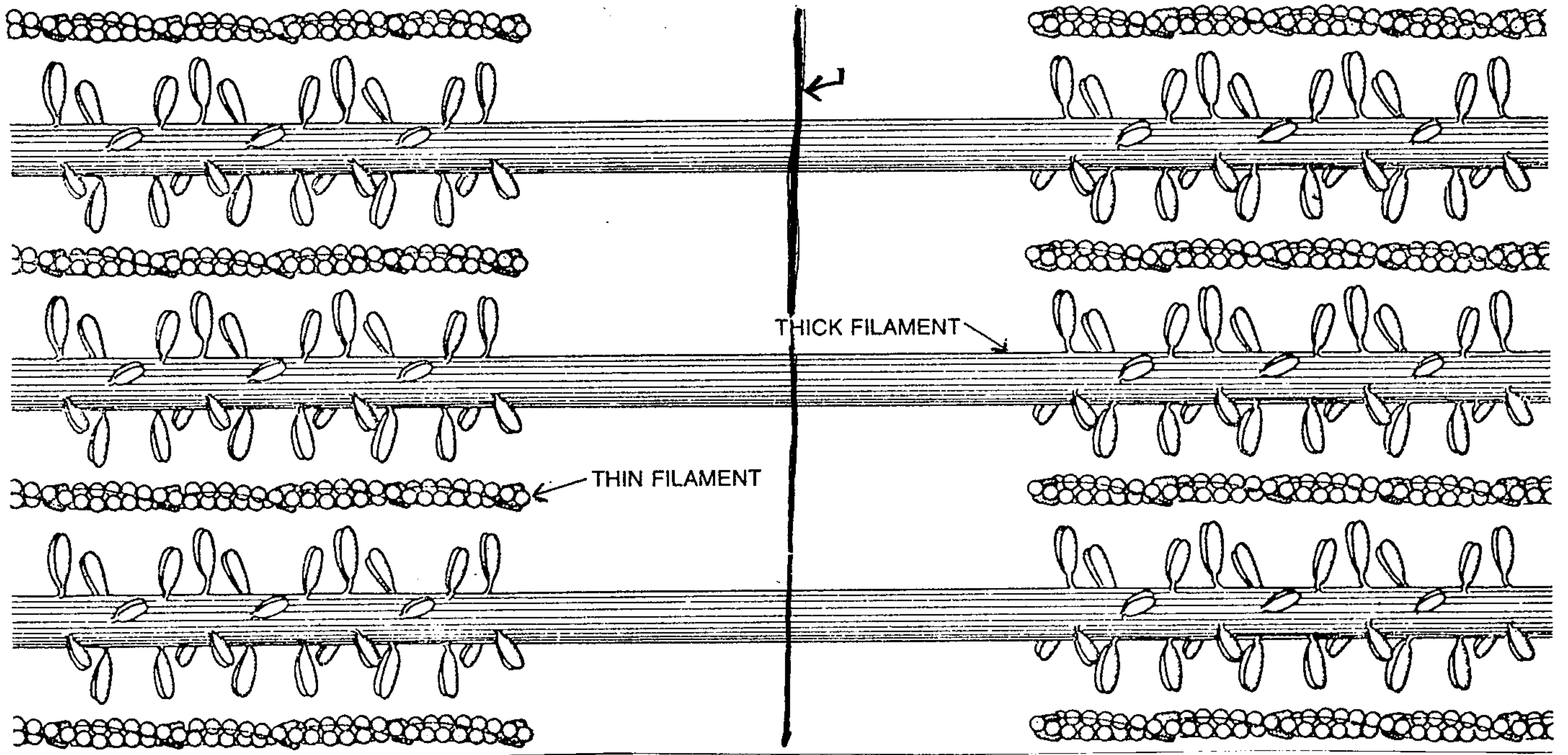
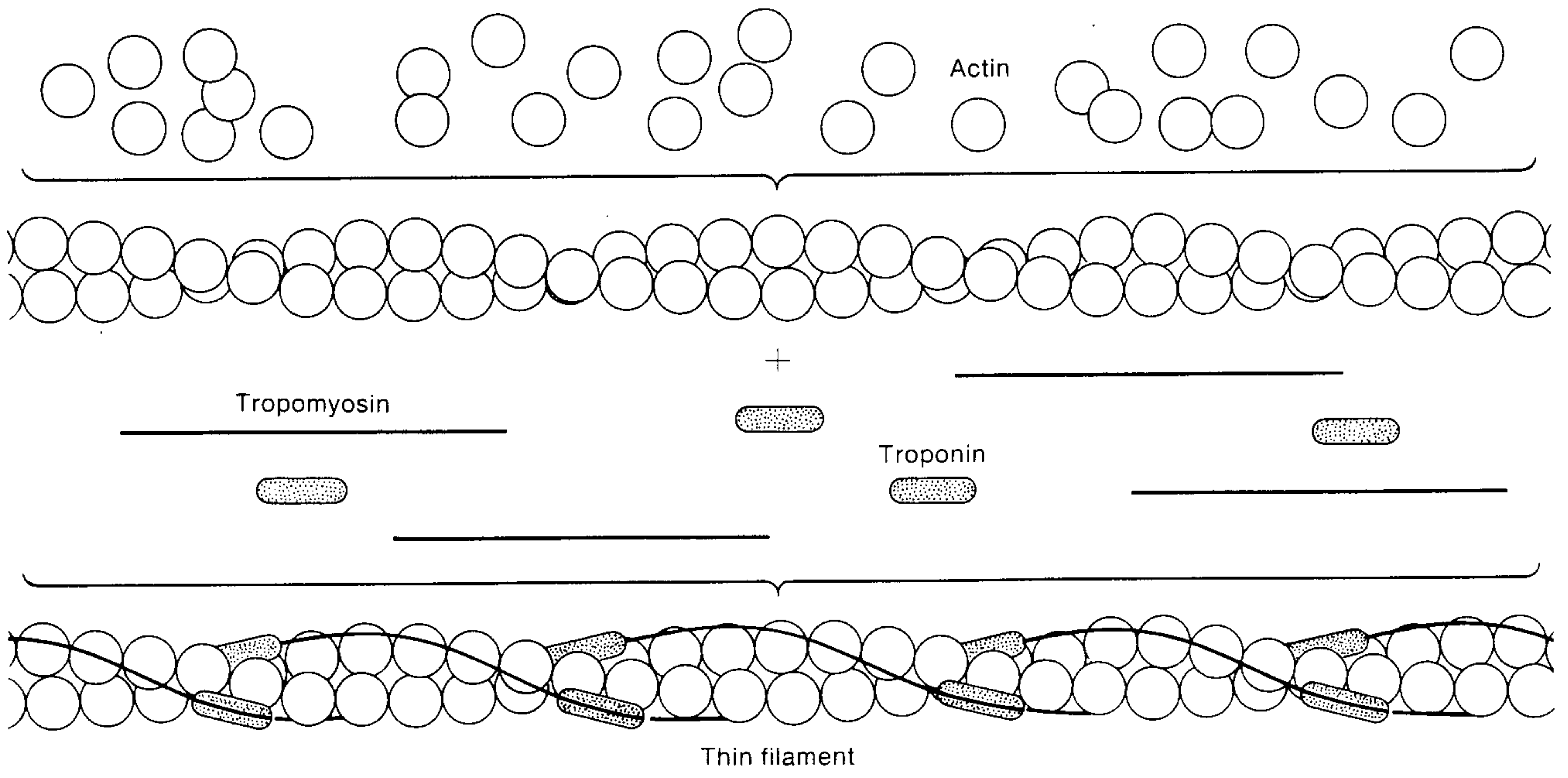
(b)

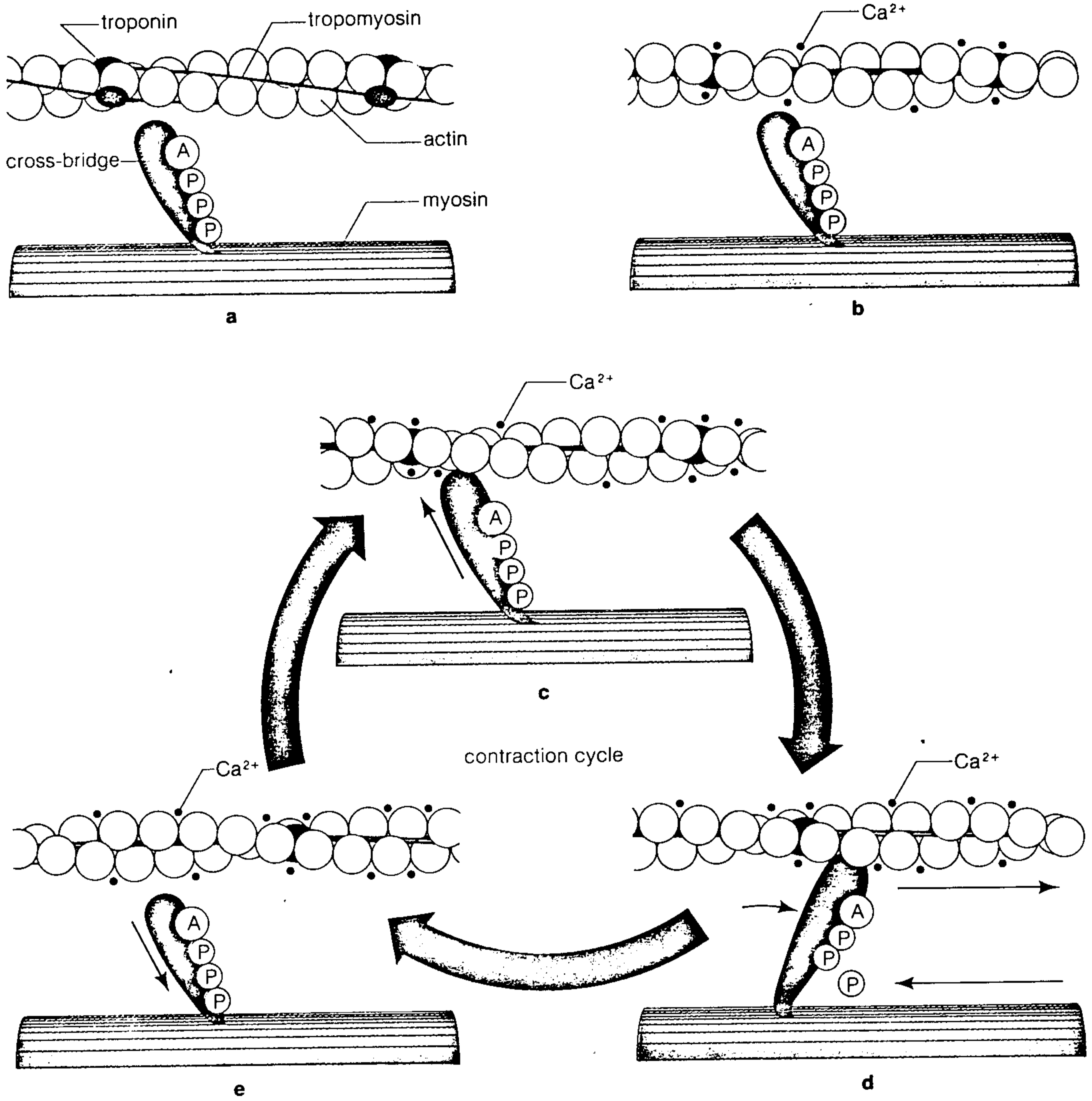


(c)

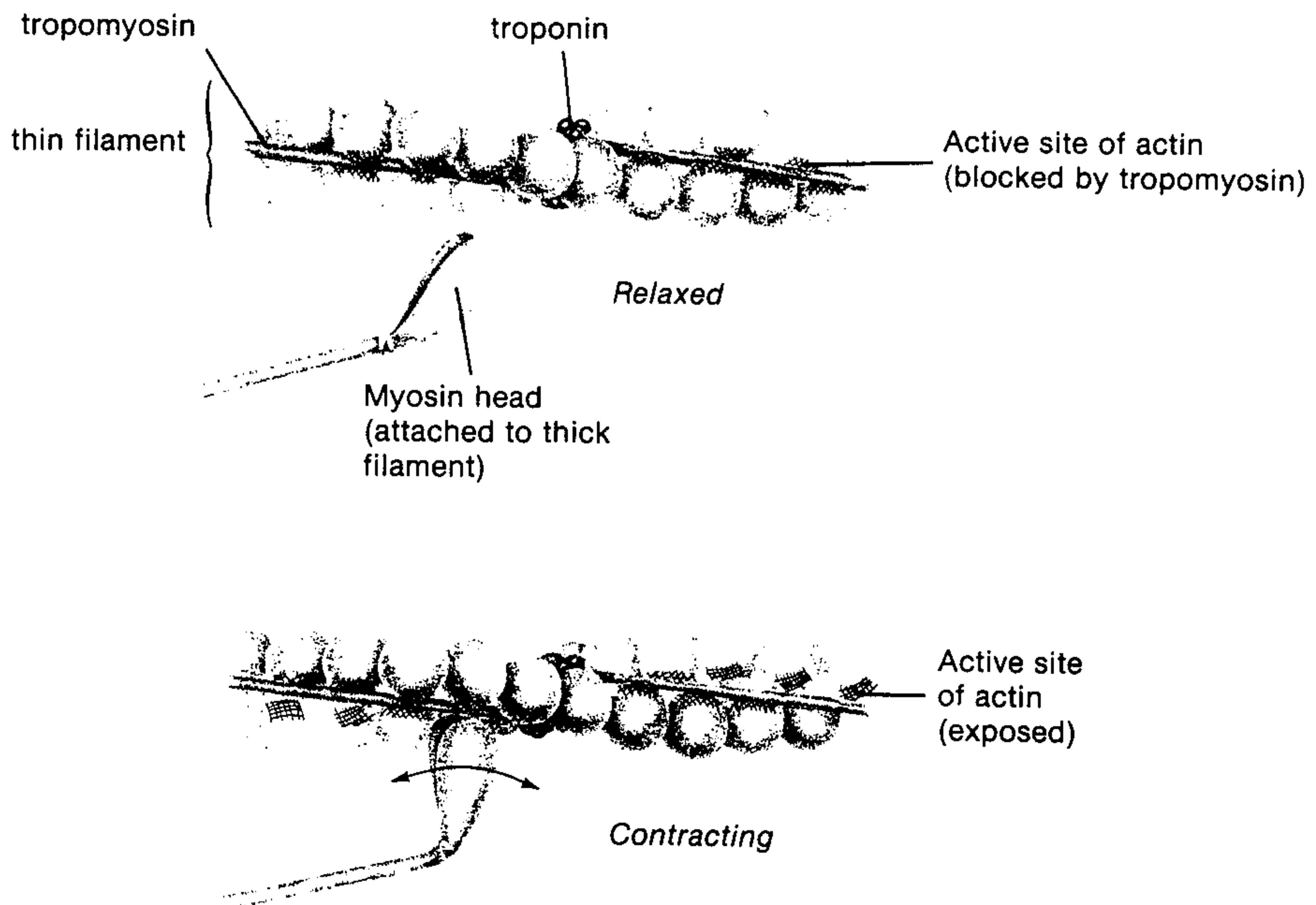




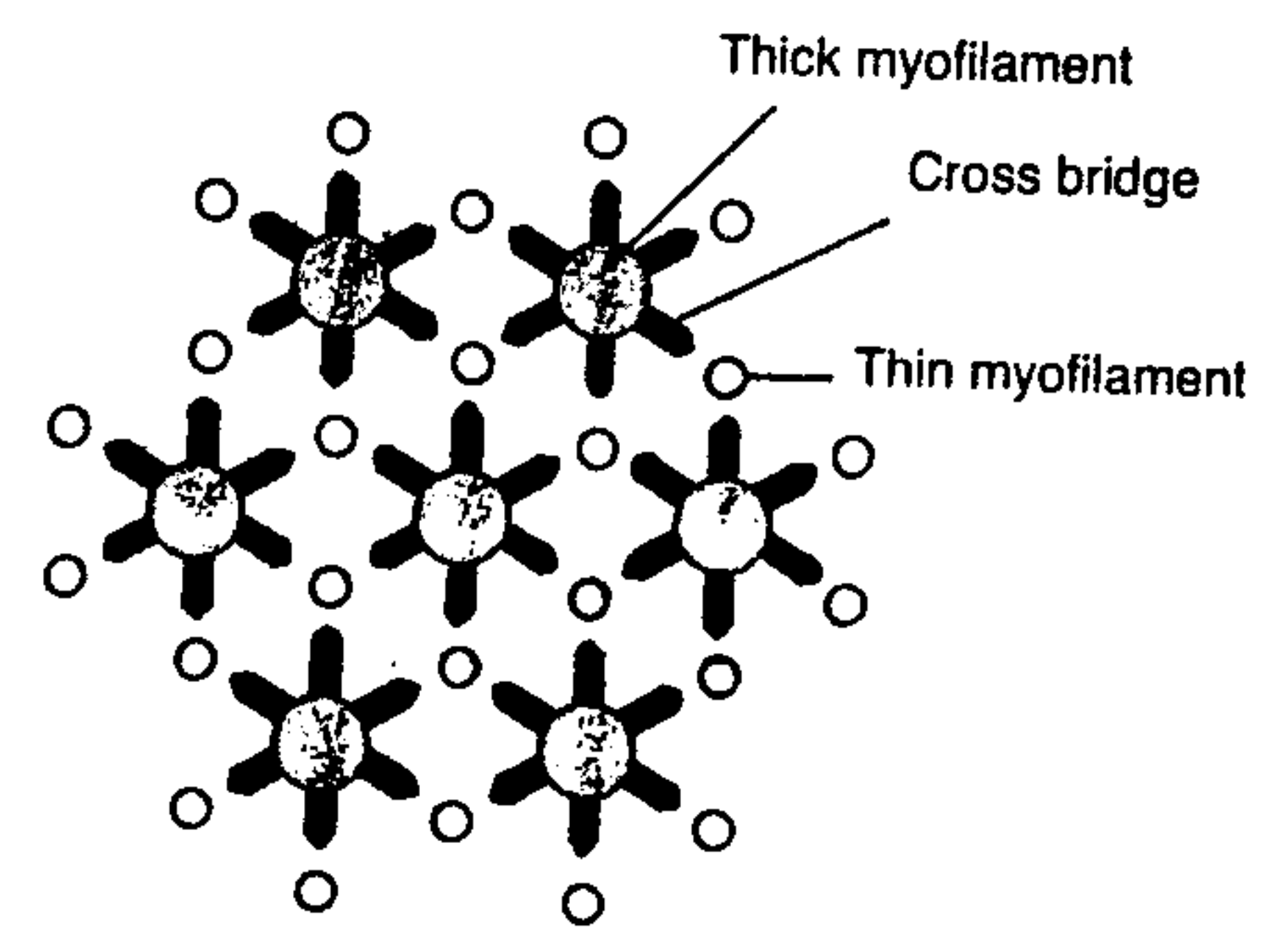
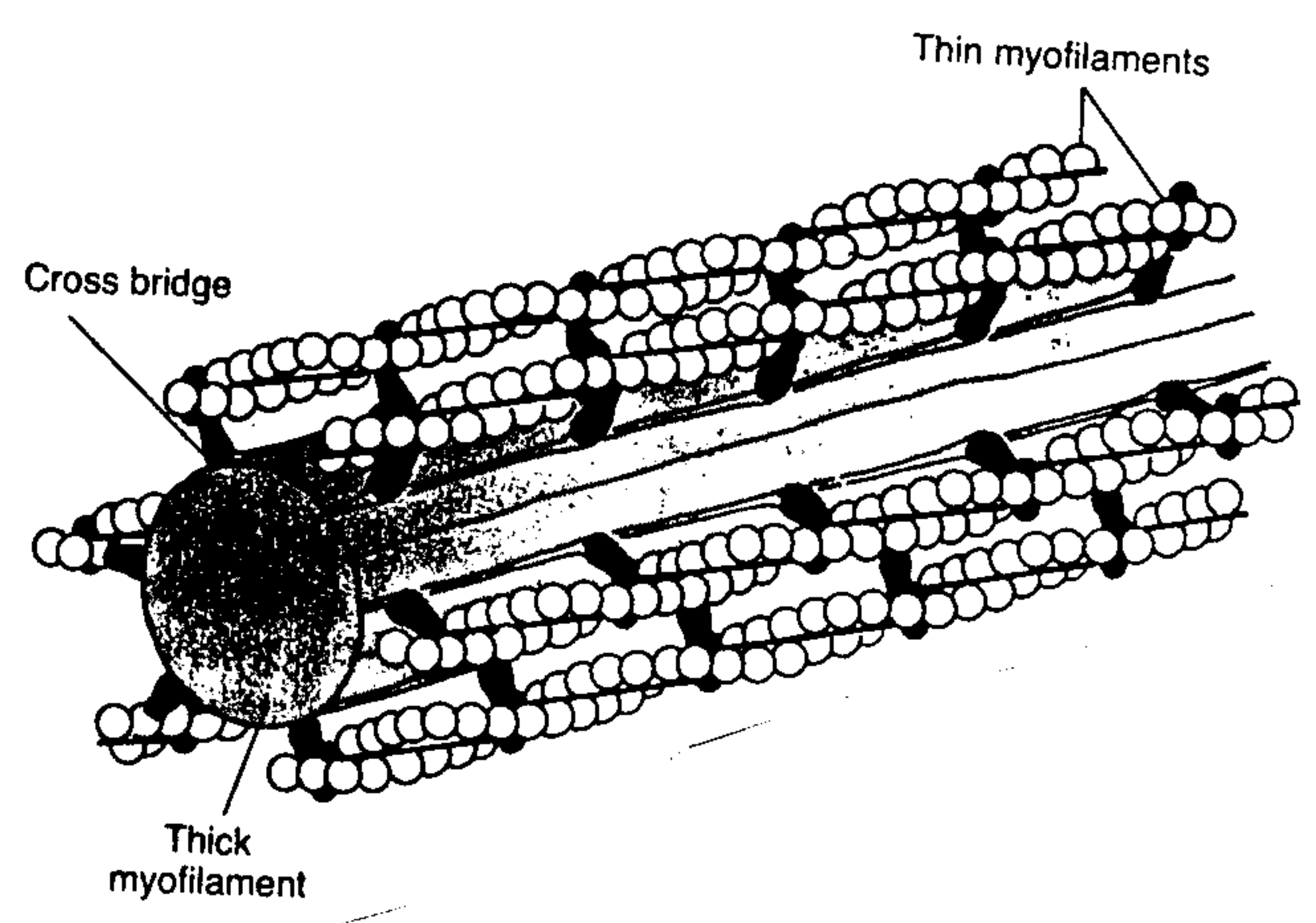
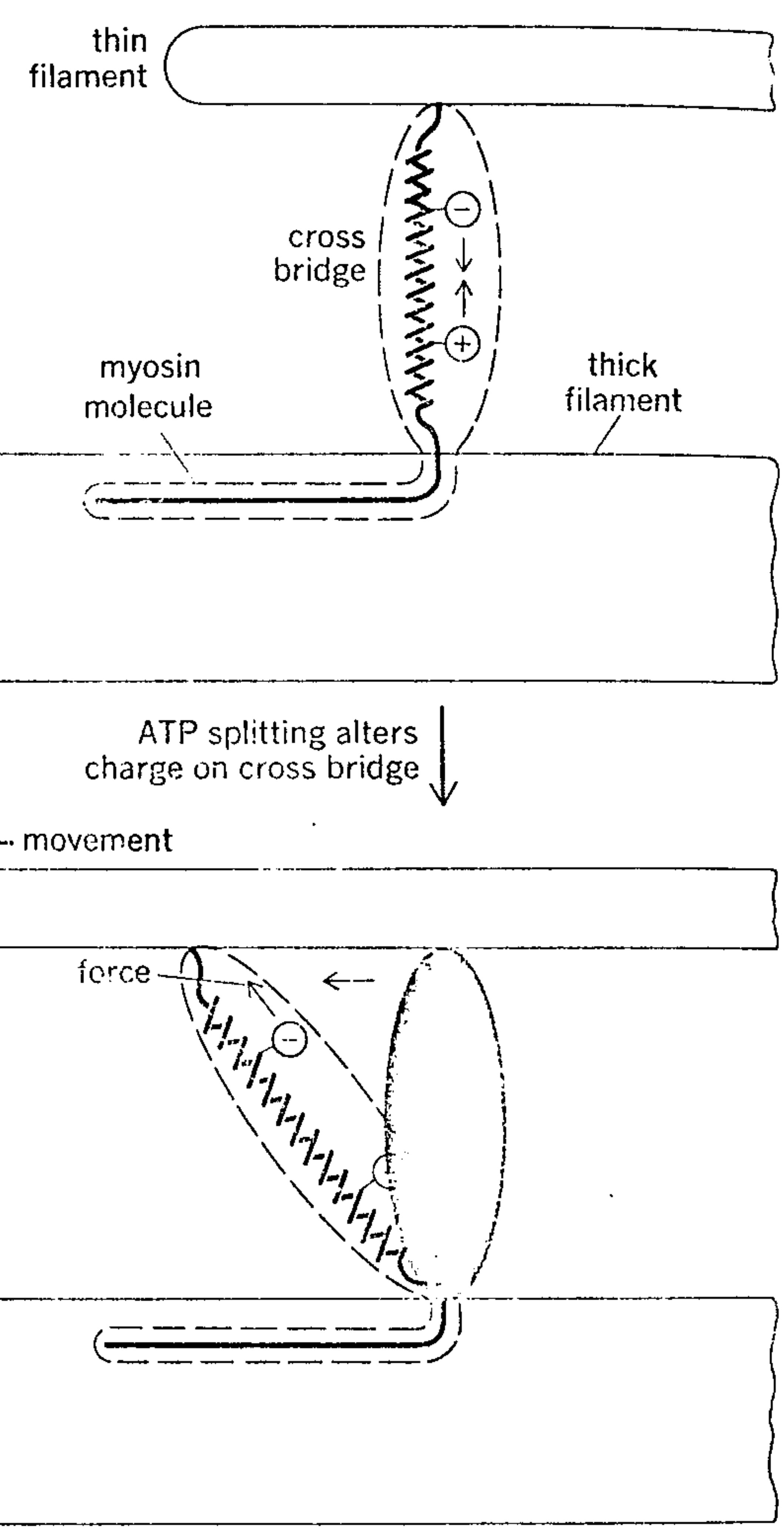
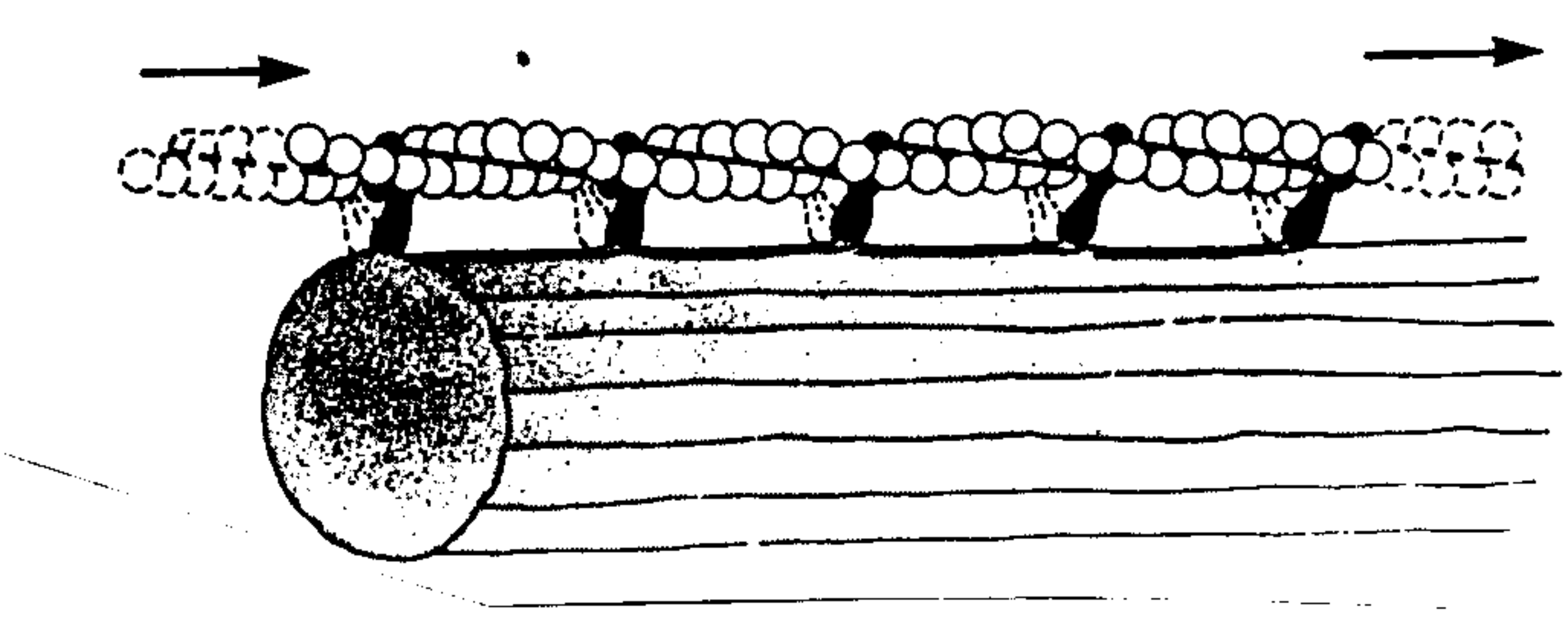
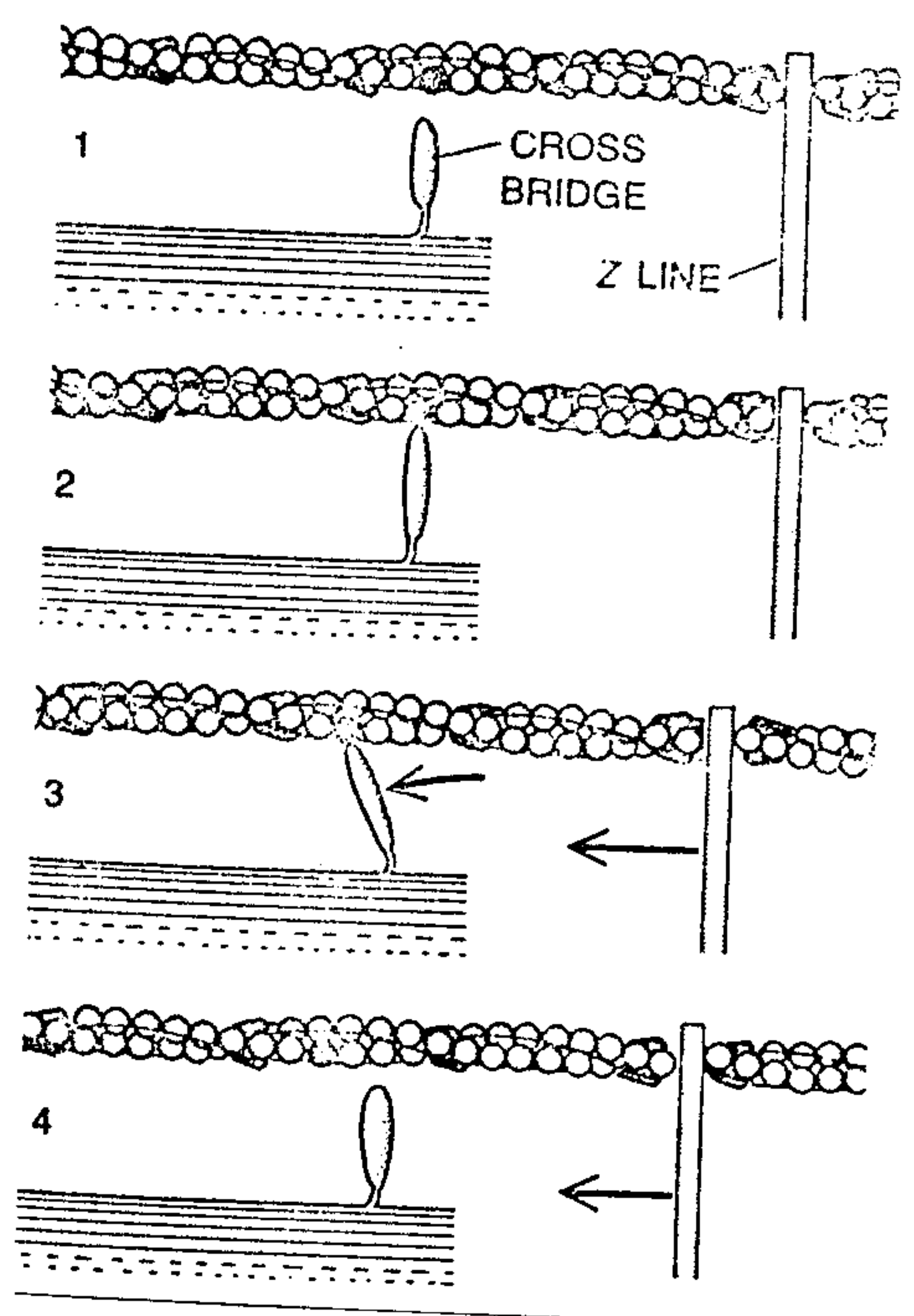
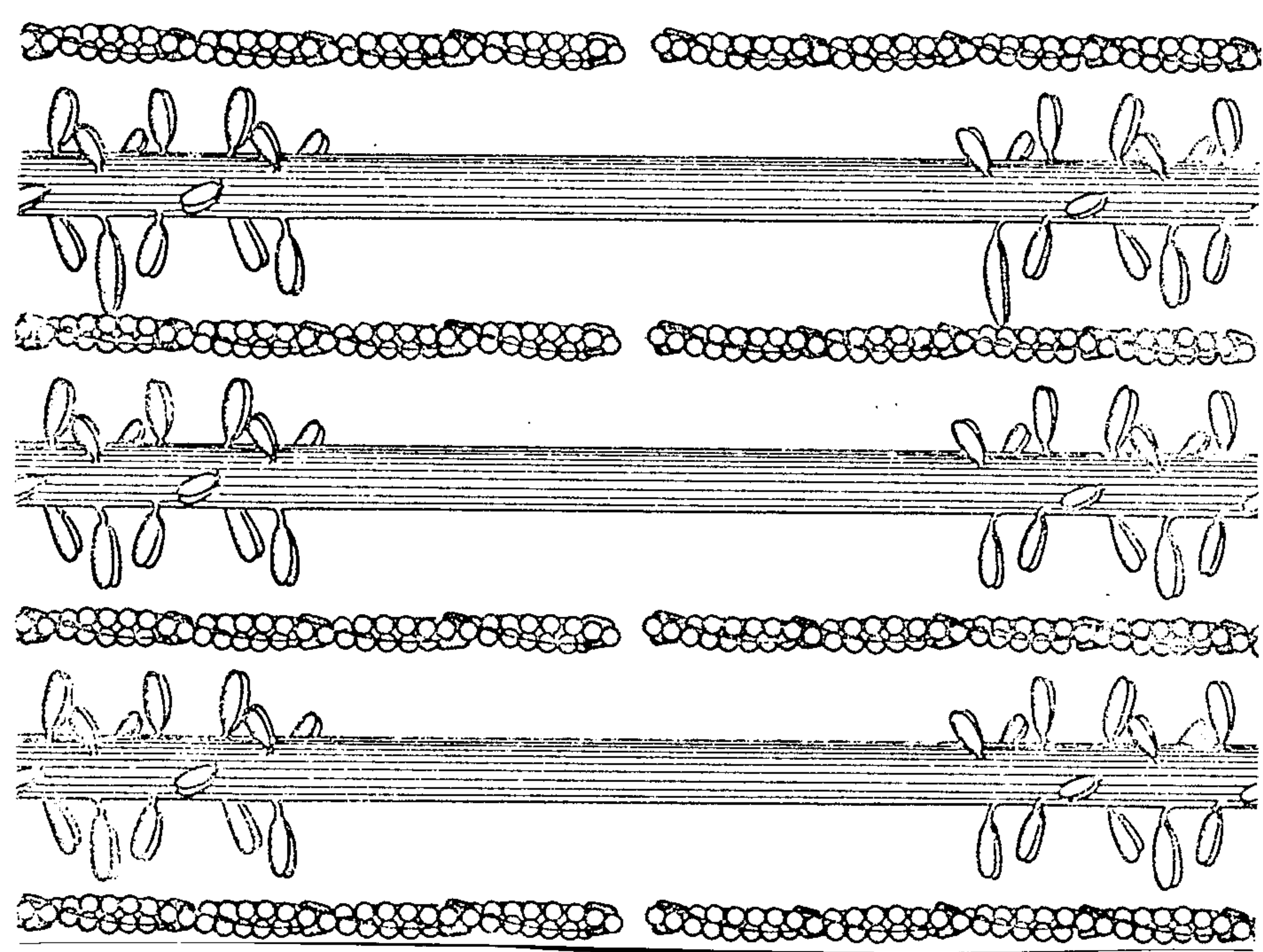


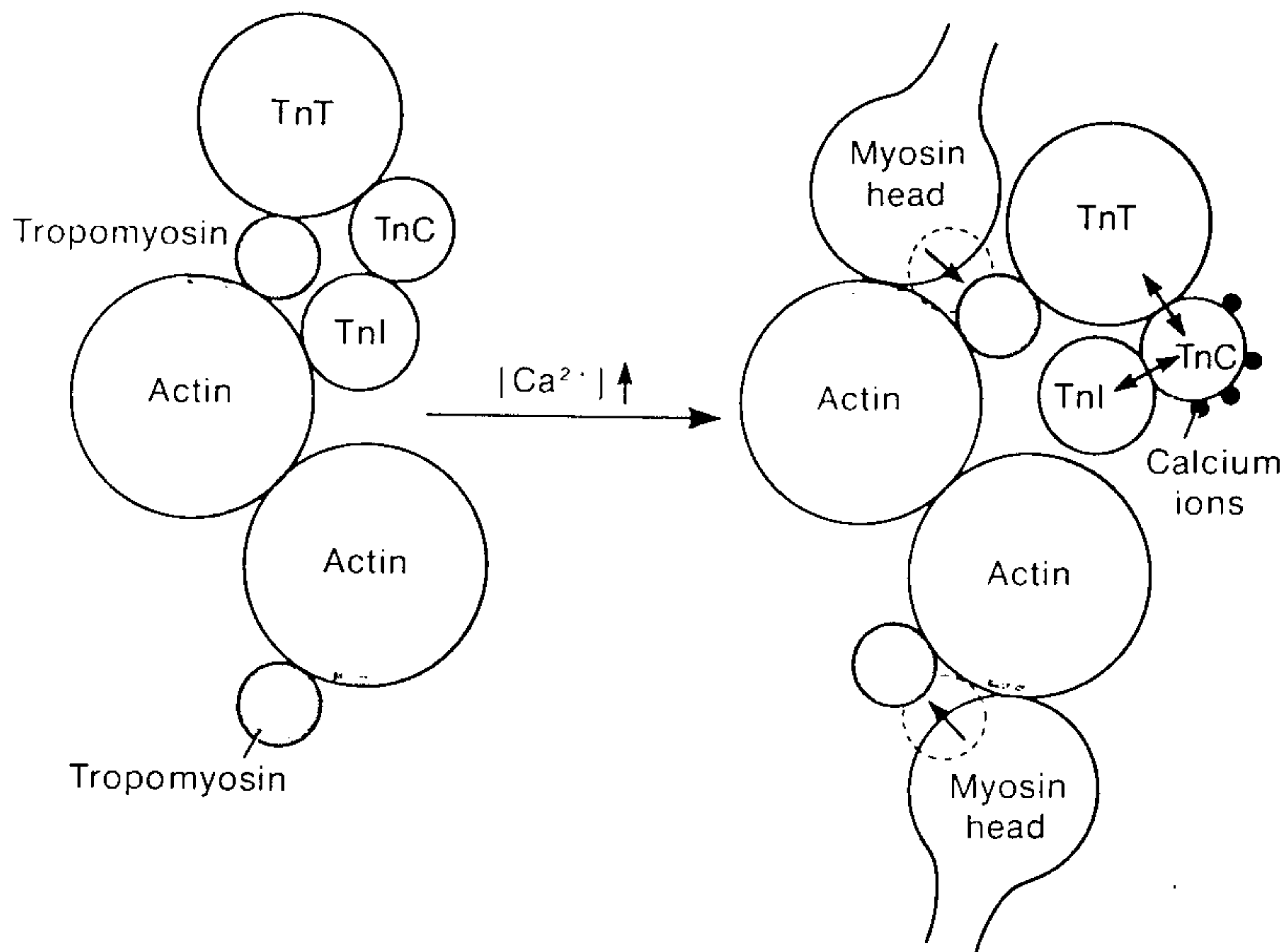


Steps in the contraction process: (a) ATP attaches to myosin. (b) Calcium ions cause the troponin-tropomyosin complex to move away from the reactive sites on actin. (c) Energized cross-bridge binds to actin. (d) The energized myosin head swivels, causing the filaments to slide past one another. (e) New ATP attaches to myosin, and the head returns to its earlier shape, ready to form another cross-bridge. Steps c, d, and e constitute the contraction cycle. These steps occur over and over again at the rate of 50 to 100 times per second as long as calcium ions are available in adequate concentration.

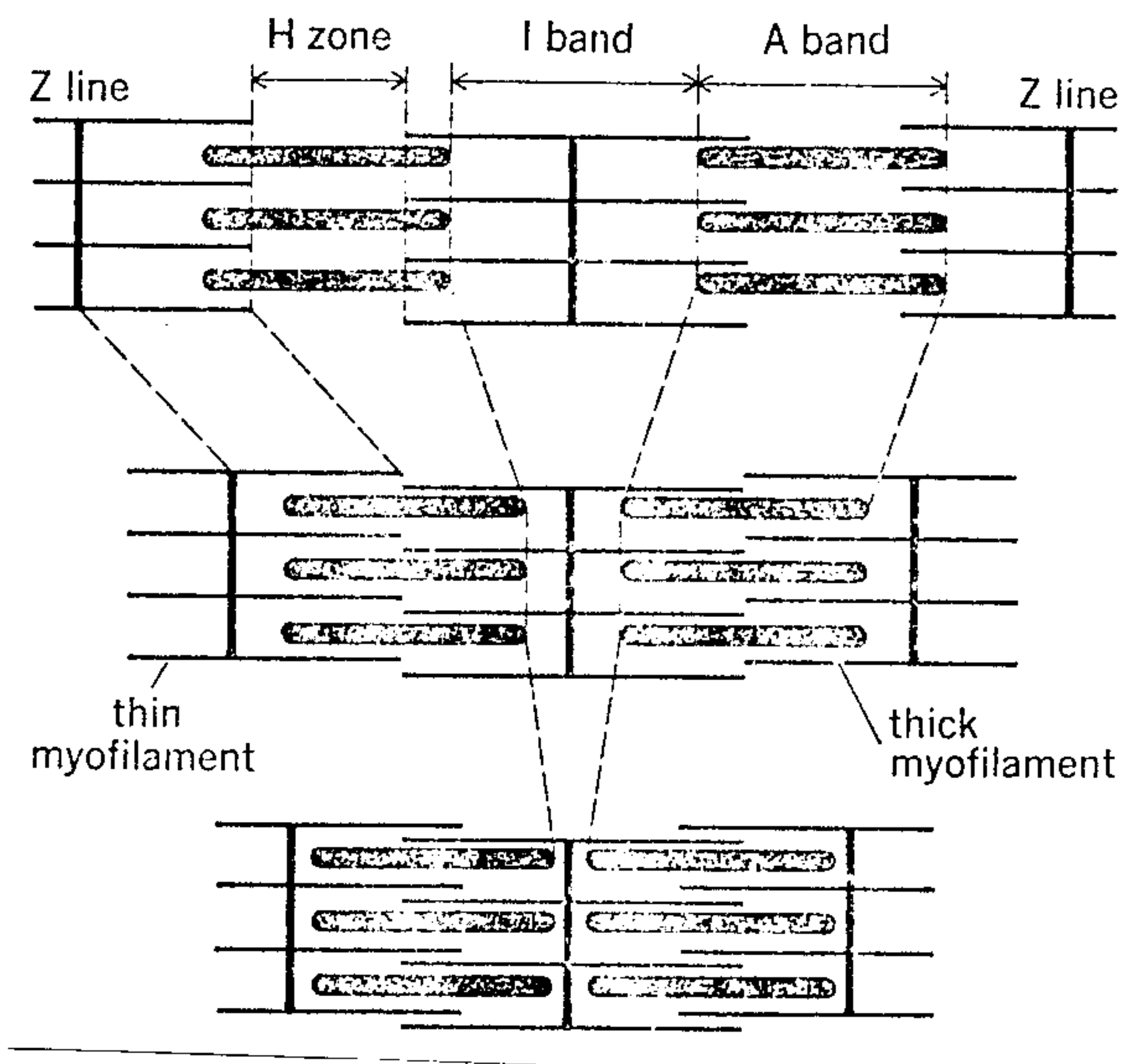
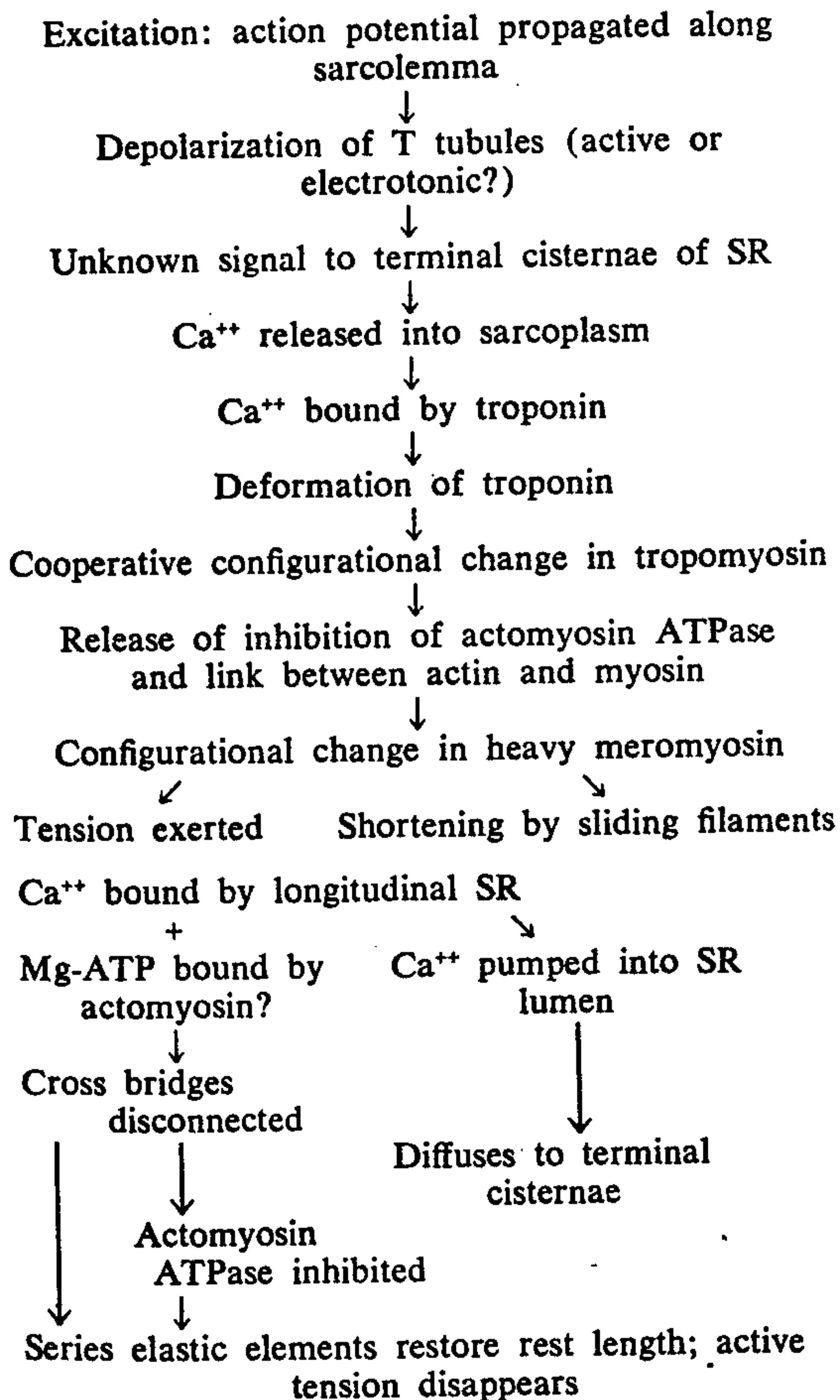


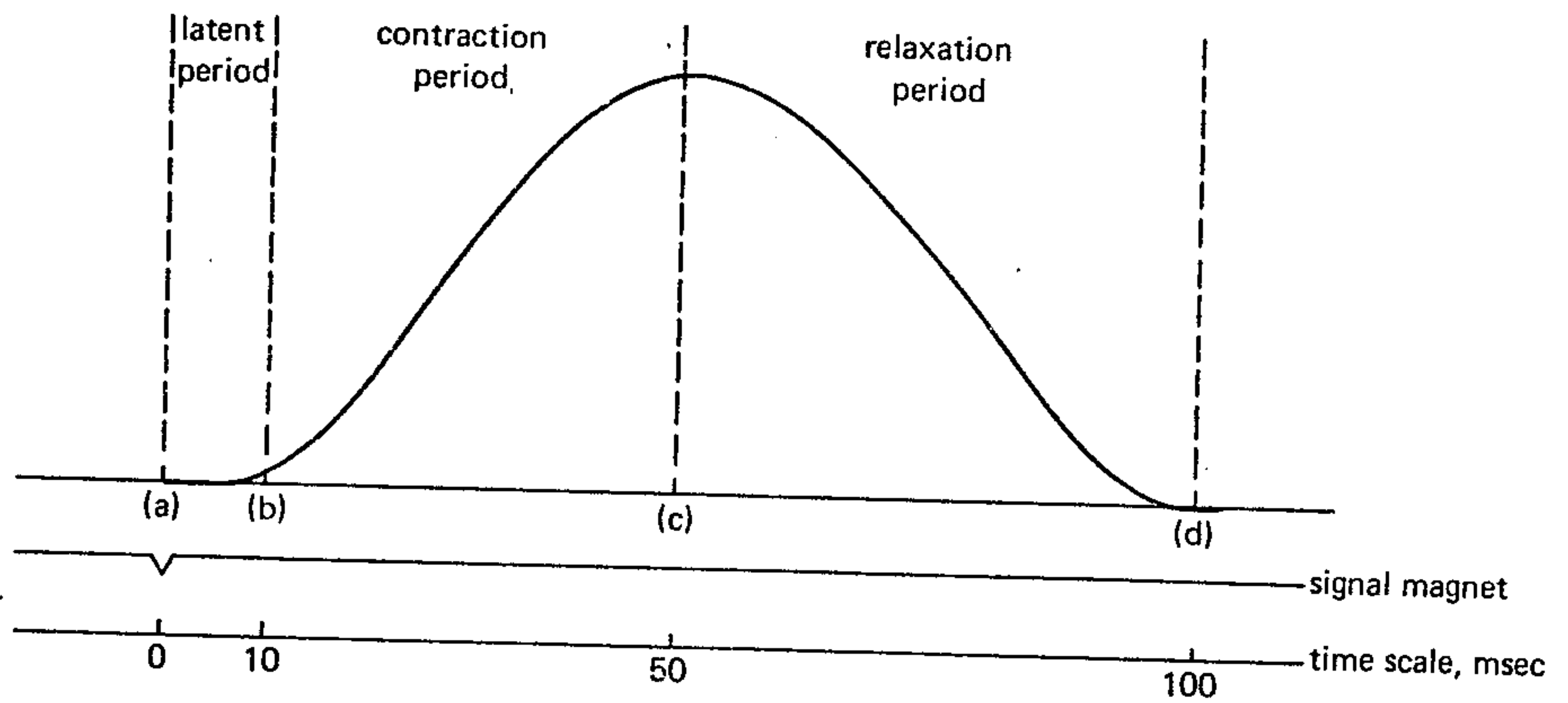
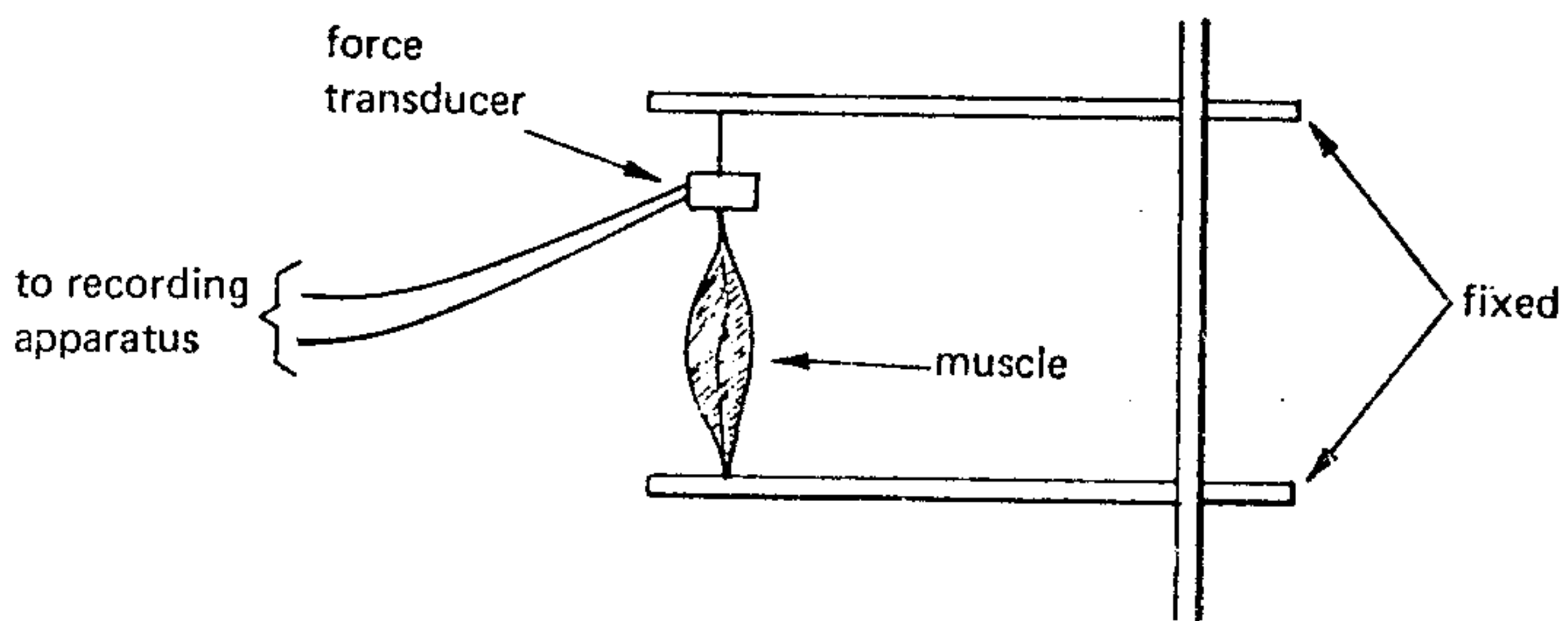
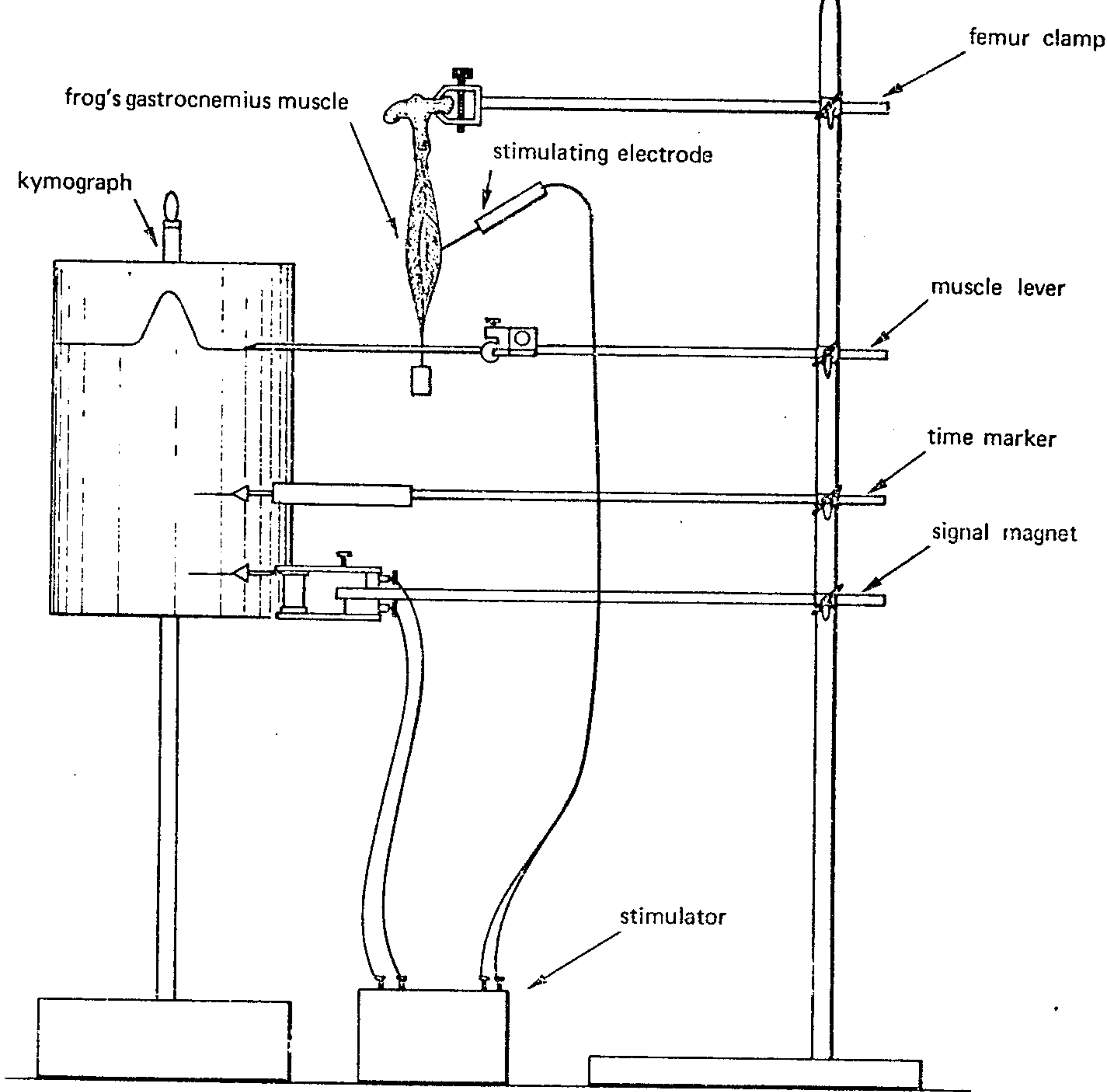
12

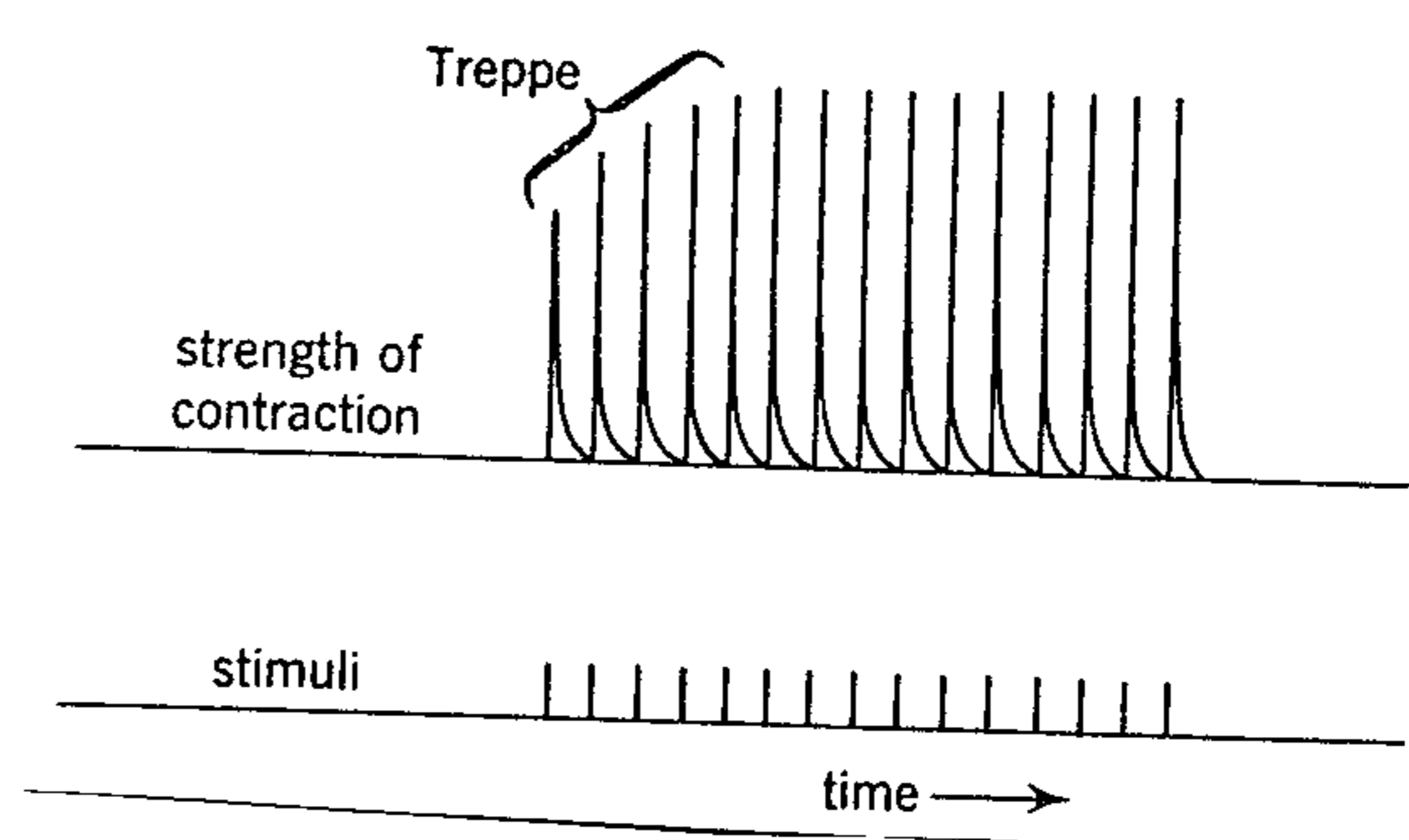
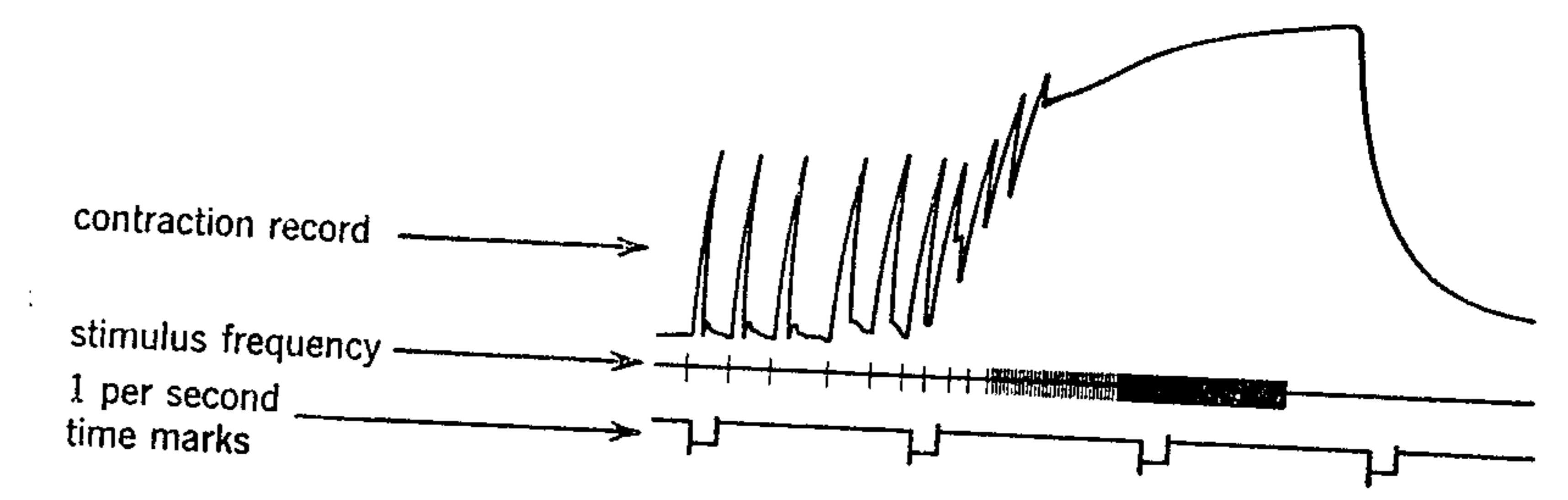
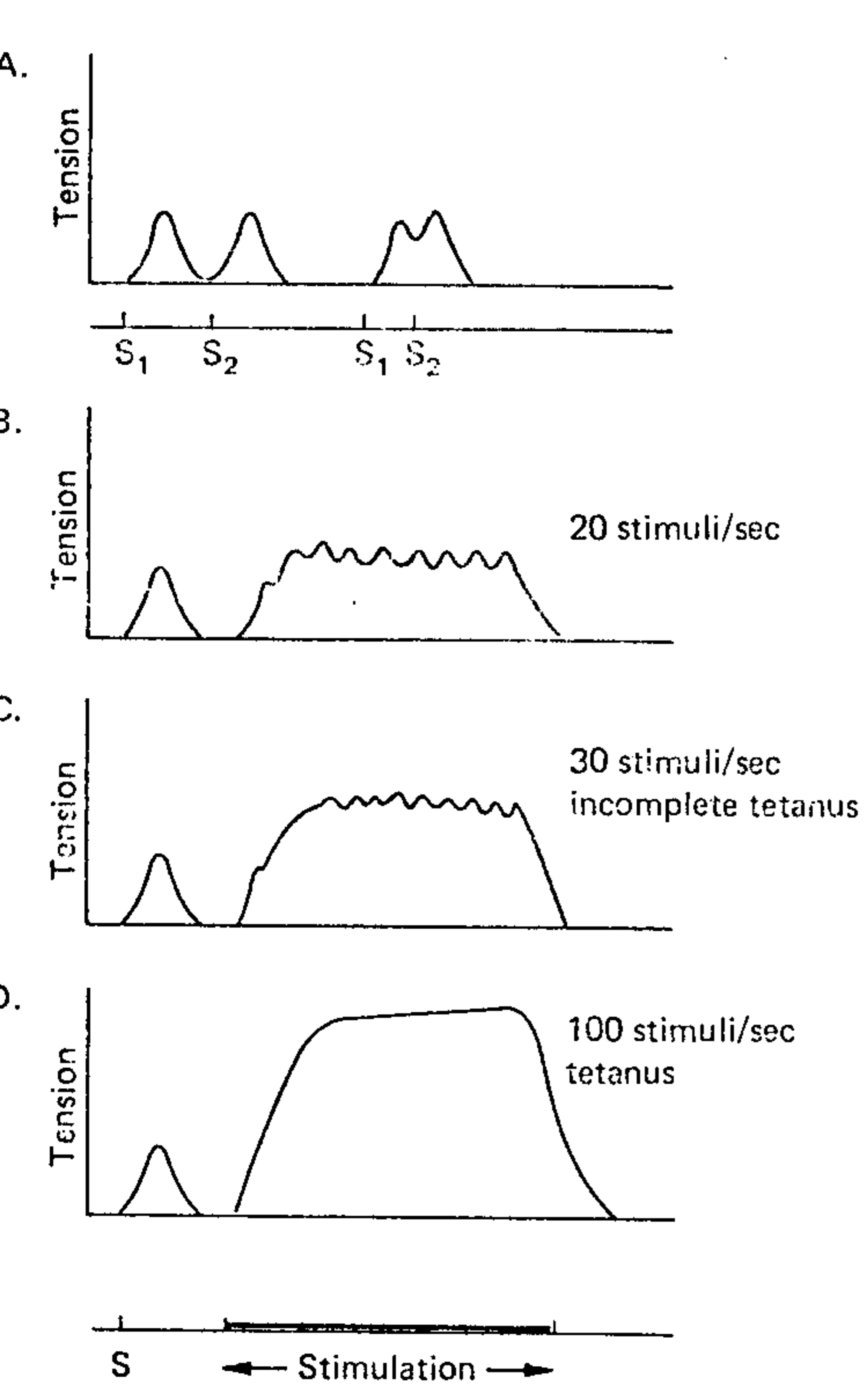
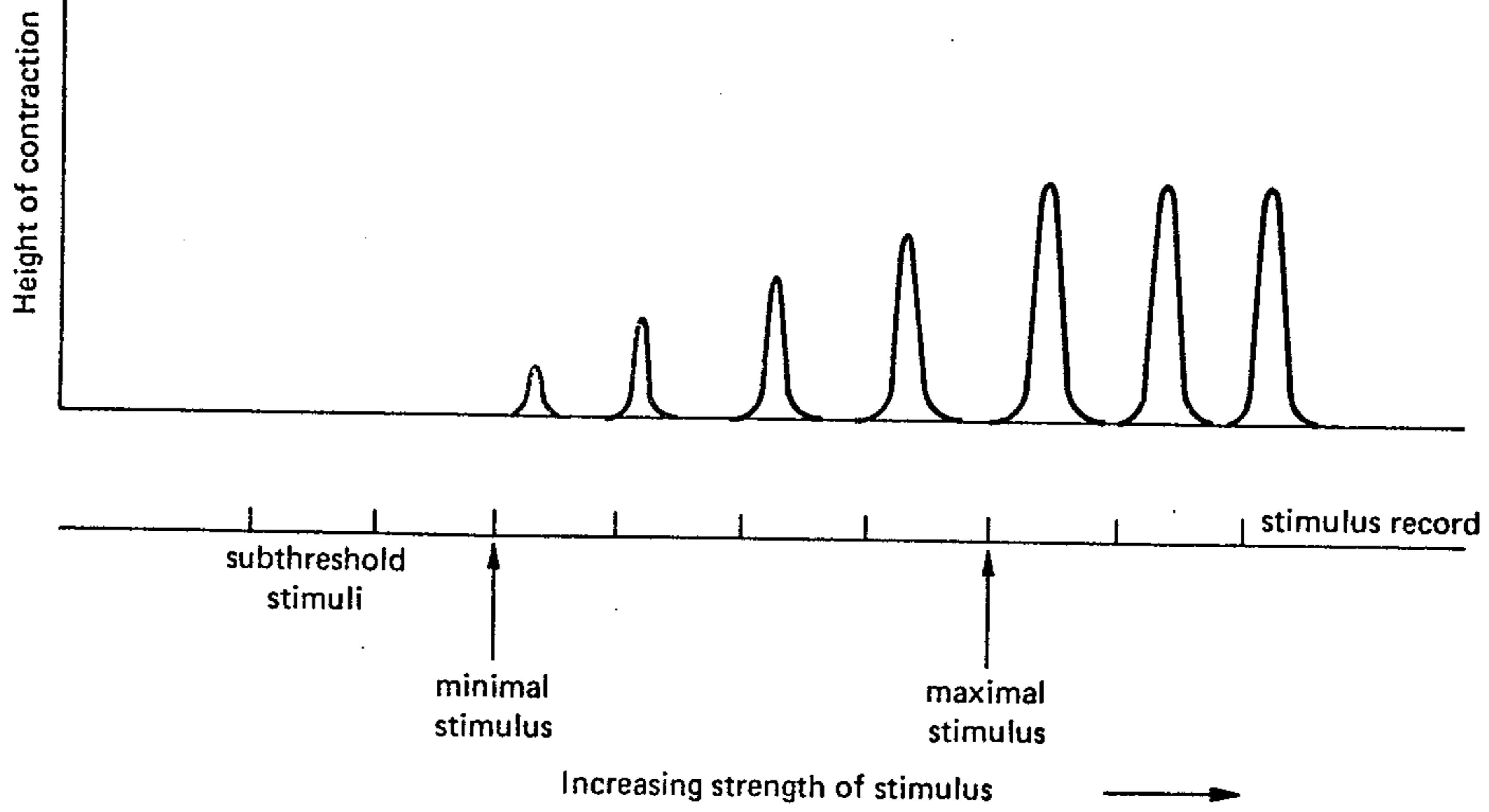


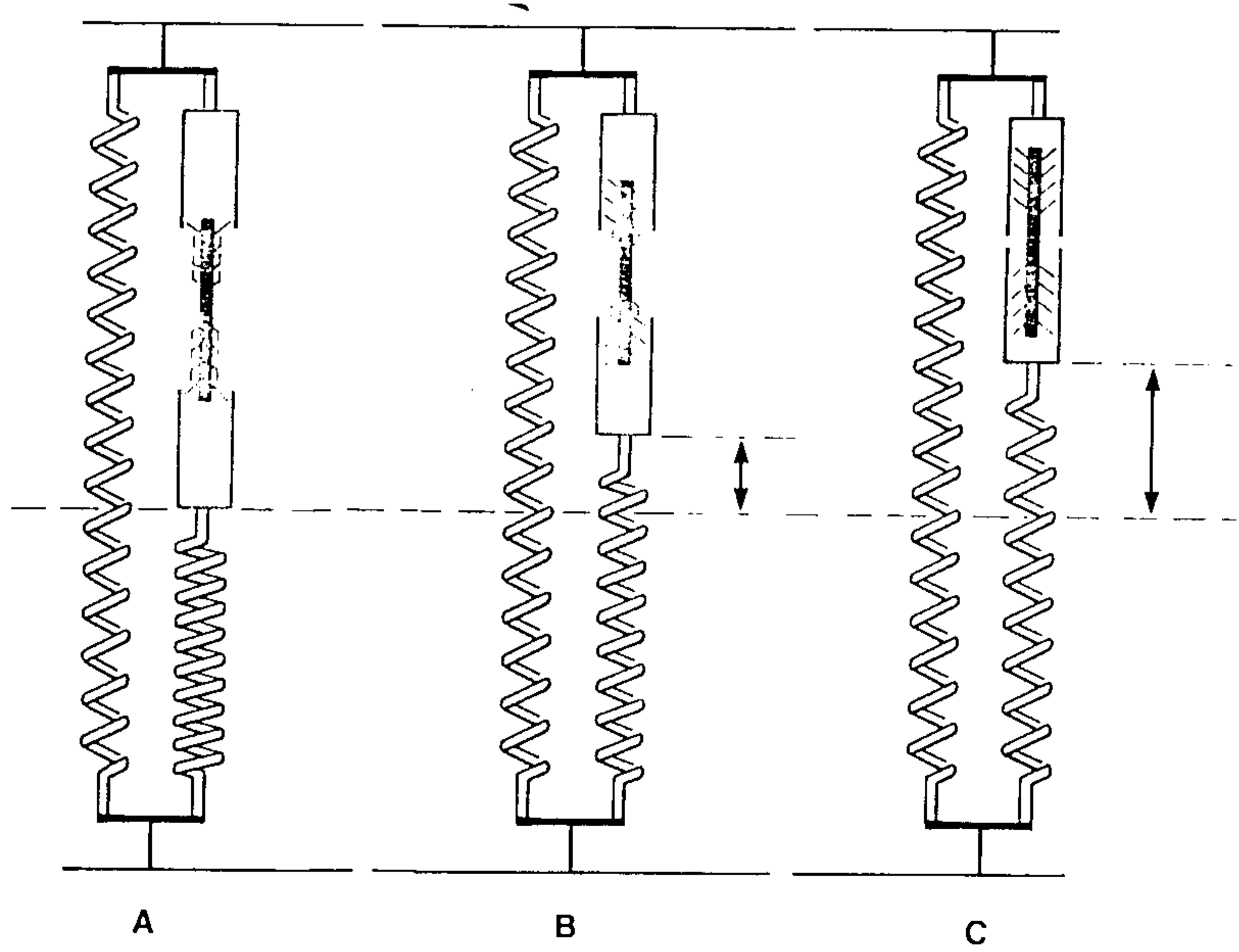
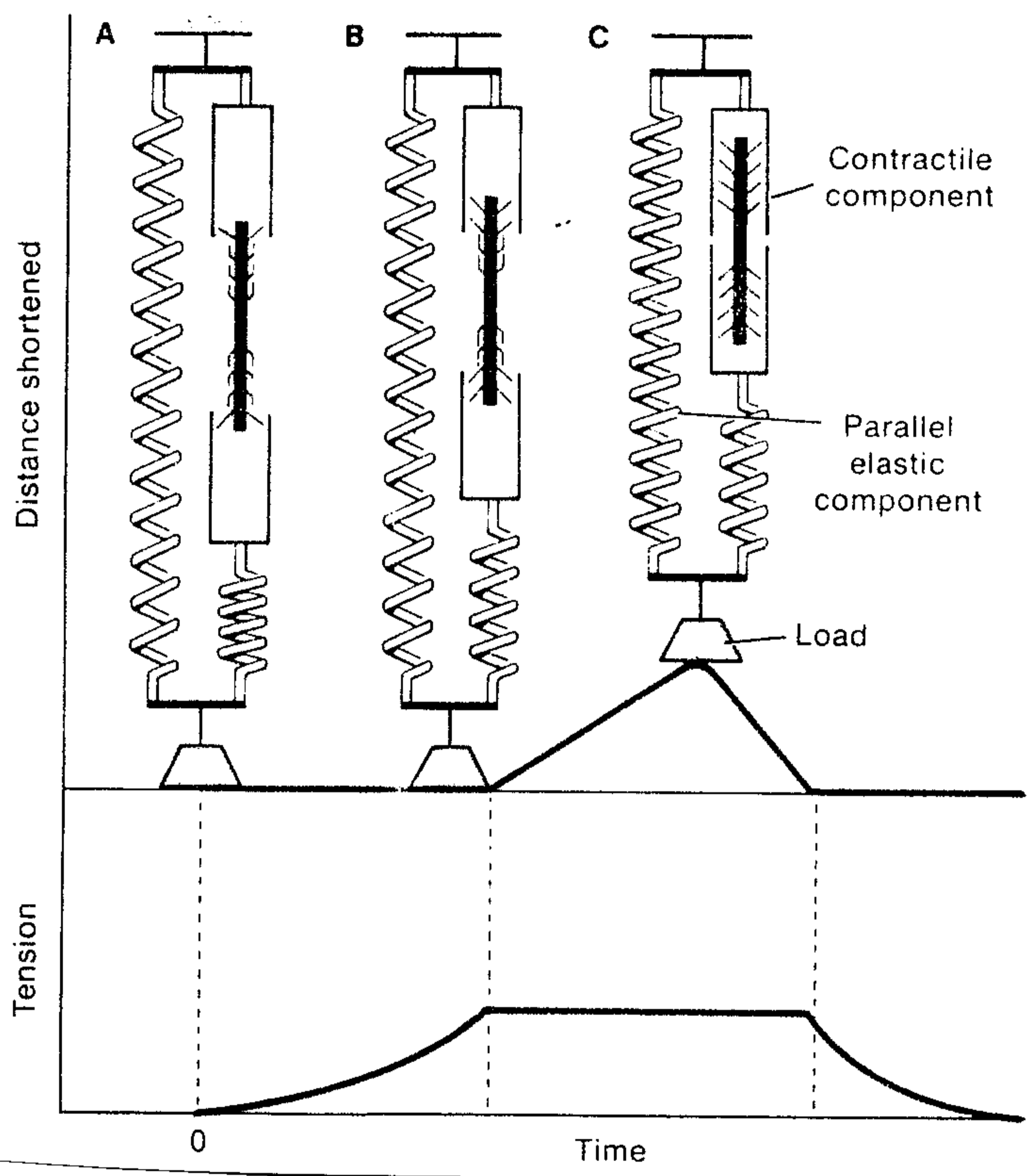
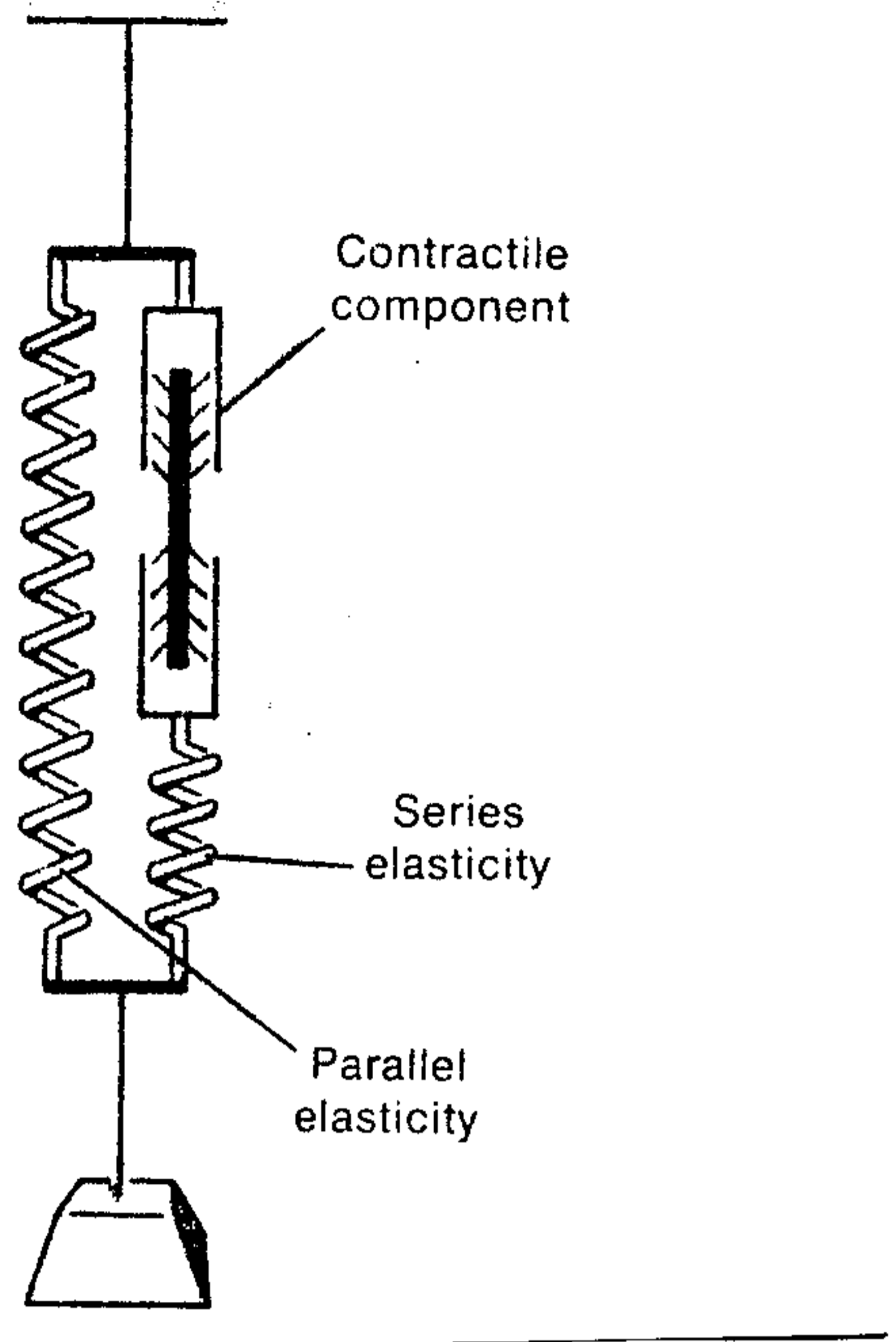


### Summary of events in contraction and relaxation

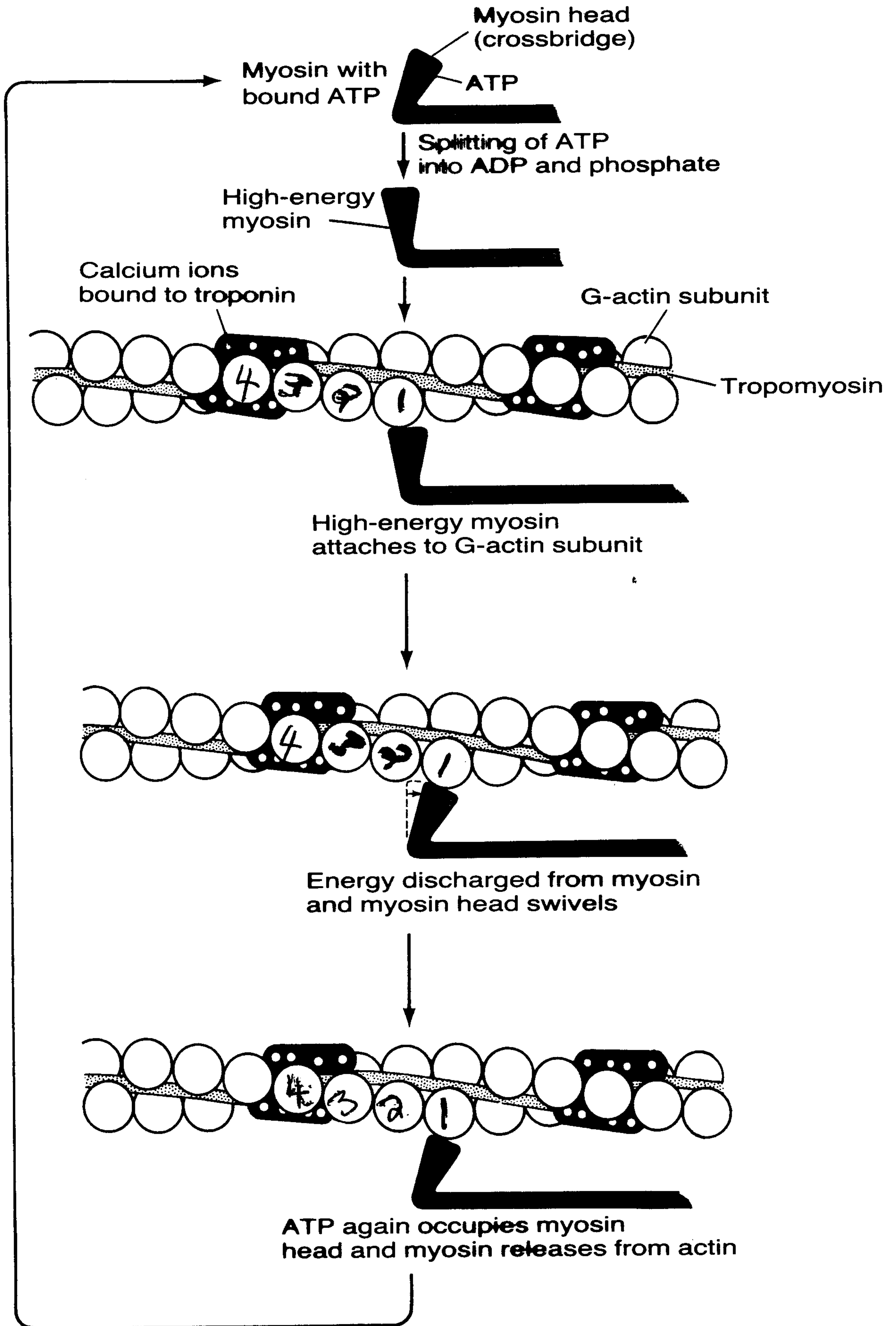


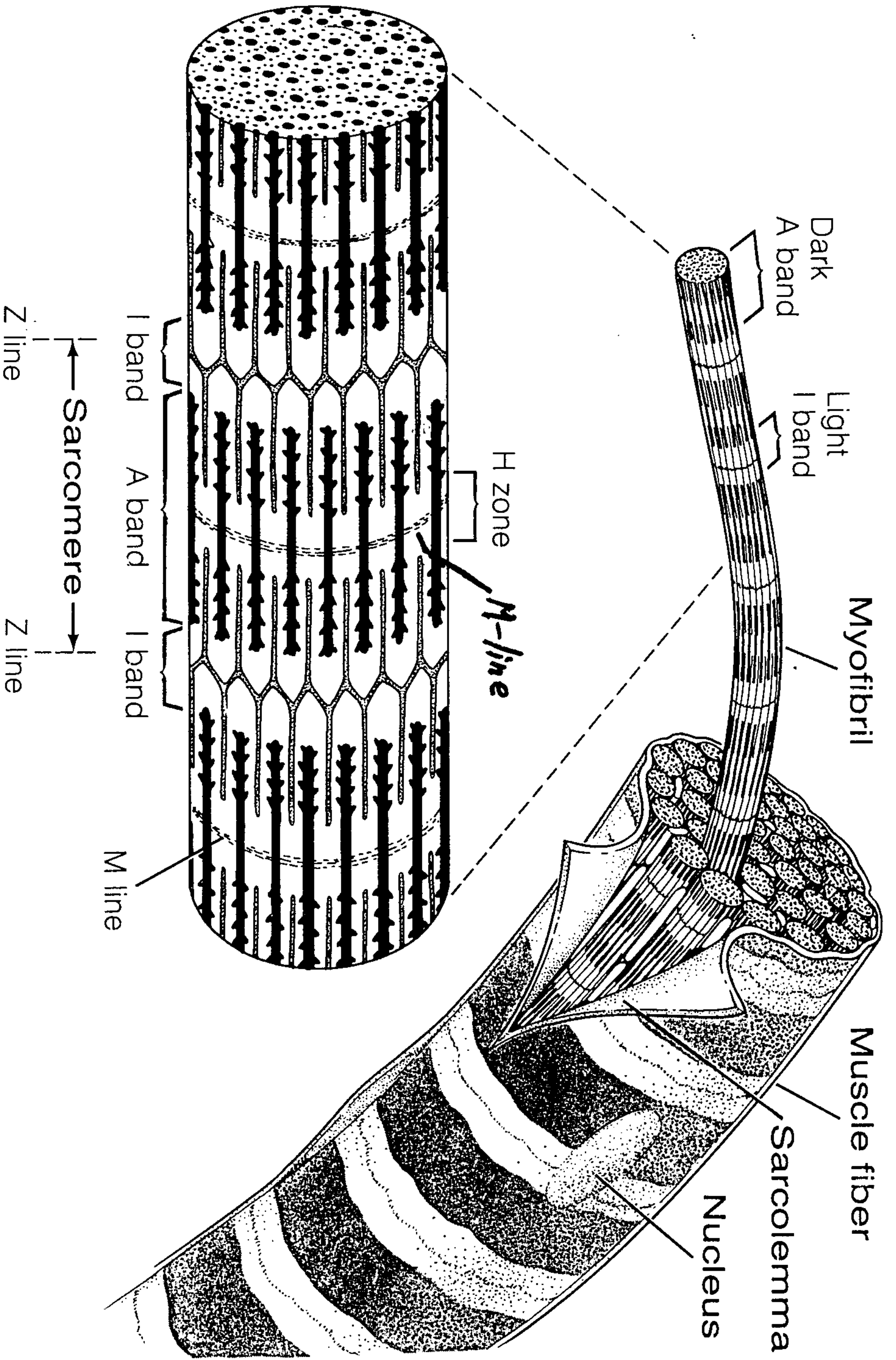


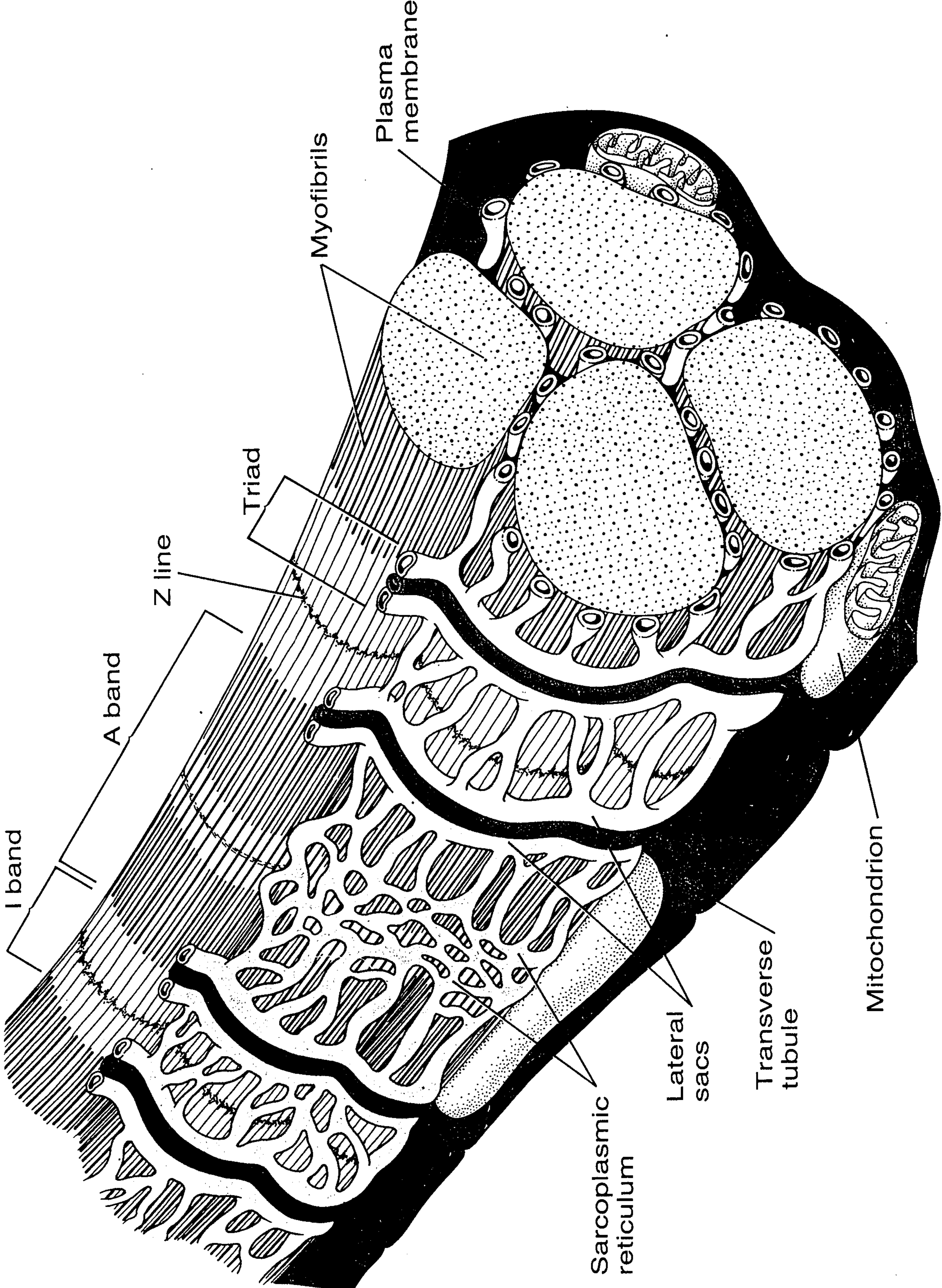












I band

A band

Z line

Myofibrils

Plasma membrane

Triad

Sarcoplasmic reticulum

Lateral sacs

Transverse tubule

Mitochondrion

Mitochondrion