(5)
1941

Reprinted from AMERICAN JOURNAL OF PHYSIOLOGY
Vol. 133, page 455. 1941

J. M. SNODGRASS and R. W. SPERRY.
Oscillograph Laboratory, Department of Psychology, Oberlin College, Oberlin, O.

Mammalian muscle action potentials of less than a millisecond.

Muscle action-potential pulses having time relations approximating the discharges in mammalian motor nerve fibers have been obtained from human subjects. The potentials may be picked up from the extensor communis digitorum by either concentric needle electrodes or cutaneous pad electrodes. The potentials are characterized by a "spike" potential of approximately 0.4 msec. duration, followed by a relatively slow "negative after-potential" lasting from 1.5 to 3 msec. For detailed analysis the action potentials are recorded optically as a sound track on 35 mm. sound film. The recording is transcribed using sound-film speeds from the recording speed to 1/100 of the recording speed. A photo-electric pickup is used in transcribing. A direct-coupled amplifier connected to the photo-electric pickup operates a Westinghouse oscillograph. At a foot and a half per second, a sound film resolves 20 impulses per millisecond. This "slow transcription system" extends a millisecond to 5 cm. or more with high precision. Both the time-axis and the amplitude may be independently expanded. This same technic can be used with an instantaneous disc recording. By this flexible technic the summation of the action-potential pattern has been closely followed.