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# Techniques for Recording Time Intervals upon Paper Ribbon

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of the past events, "They tell me that such and such a thing happened, etc."

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## TECHNIQUE FOR RECORDING TIME INTERVALS UPON PAPER RIBBON

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The recording of time intervals of one-hundredth second duration upon paper ribbon is possible by the use of a comparatively inexpensive set-up.

The set-up consists of a semi-flexible needle attached to the vibrating prong of an electrically driven 100 d.v. tuning fork. The needle is adjusted to vibrate against a stationary cork anvil and a paper ribbon is drawn over the anvil between two revolving drums. The needle perforates the paper ribbon 100 times per second. The tuning fork is operated by three dry cells and the power for revolving the drums which move the paper ribbon is supplied by a one-eighth H. P. electric motor.

This set-up has been perfected and used in making a study of the time element in athletics at the State University of Iowa. A second needle is operated by special contact switches and is operated to make a second series of perforations which are measured in terms of the perforations made by the tuning fork.

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## A SYNTHETIC TONE-MIXER

JOSEPH TIFFIN

A device designed to demonstrate the phenomenon of "tone-mixing" will be exhibited and described. By means of this apparatus a vibrato may be synthetically produced with the number of pulses per second, extent of frequency fluctuation, and intensity relationship under control. The manner in which each of these variables influences the perceived tone can thus be determined. It is also possible to reproduce a vibrato whose rate, extent, and intensity relationship are identical with those of artistic singing.