

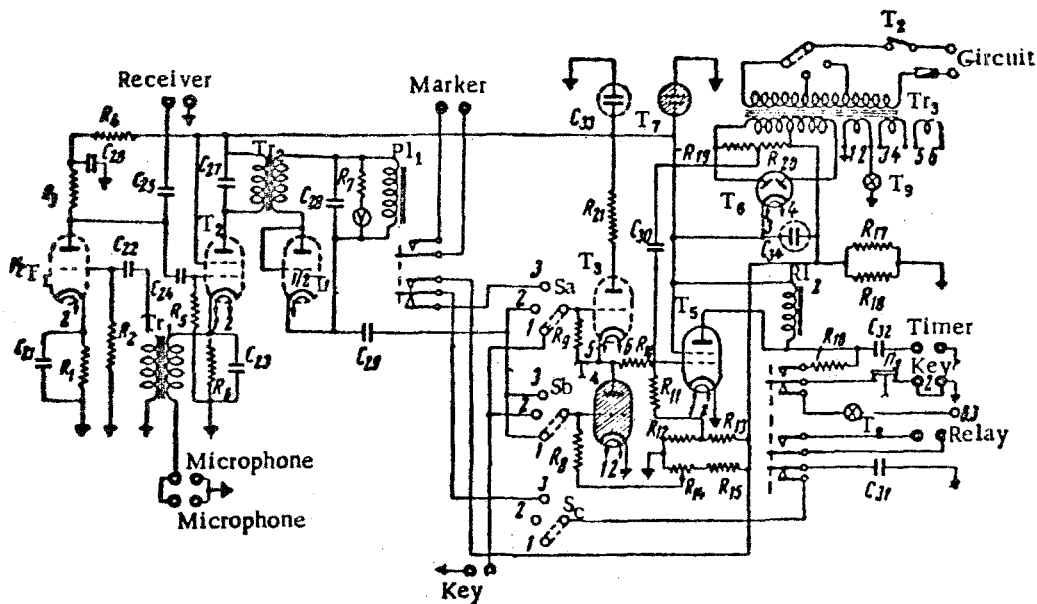
METHODS

AN ELECTRONIC REFLEX METER

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The latest achievements of radio electronics open up vistas for the development of more exact and varied methods for the measurement of reflexes. The present communication presents a short description of a perfected variation of the electronic reflex meter TKhP-56. The instrument had been constructed by us and P. N. Karpenko in 1951 [1,2] and has been perfected at present with the participation of P. I. Rumyantseva. In 1956-1957 experimental commercial models of this apparatus were subjected to prolonged testing in a number of the Institutes of the Acad. Sci. USSR and Acad. Med. Sci. USSR and received favorable comment. The technical committee of the Ministry of Health USSR has approved the apparatus and recommended that it go into regular production.



Schematic of the electronic reflex meter.

R_1 - R_{20}) Resistances; C_{21} - C_{32}) condensers; Tr_1) microphone transformer; Tr_2) output transformer; Tr_3) power transformer; RL_1 , RL_2) electromagnetic relays; S_c - S_c) wafer switch; S_2) cut off switch; S_3) push-button "start 3"; T_2 - T_9) tubes.

The electronic reflex meter is an "inertia-less" instrument for investigating various conditioned and unconditioned reflex responses to direct and verbal stimuli. In part the electronic reflex meter permits the study in man and animals of verbal (voice) and movement reactions in various combinations, as well as study of respiratory, tendon, defensive and some other reflexes.

The concrete experimental situations made possible by the electronic reflex meter are best analyzed in relation to a study of conditioned movement and voice reactions. Depending on the experimental problem, the investigator presents to the subject some signal: direct (light, sound, mechanical to skin, electric stimulus, and others) or verbal. Simultaneously with the appearance of the signal, the electric timer cuts in automatically. The subject, having absorbed the signal, reacts to it, depending on the experimental conditions, be it a response by movement or word. The very beginning of the movement or word (of any intensity beginning with a whisper) has to stop the timer. This in itself measures the latent period of the response to the stimulus. Depending on the experimental situation, the electric timer may be activated not only at the start but also at the completion of the movement or word. The presence of two electric timers makes possible the simultaneous measurement of both the movement and voice reactions to the same signal.

The apparatus receives alternating current from the line at 127/220 volts. The diagram of the apparatus is shown in the figure.

The basic elements of the apparatus are: the electronic relay, connected in circuit with the timer, the regulating tube and thyatron, this latter being used to direct the electronic relay.*

The receipt of the verbal or direct conditioned signal is associated with an action upon the circuit of the control tubes; this results in the opening of the electronic relay and the beginning of current passing through the timer. The subject, having assimilated the signal, reacts to it with a movement or word, thus activating the thyatron circuit; as a result, the electronic relay shuts off and the timer stops.

The intensity of the verbal signal or the verbal reaction is registered with the aid of a microphone (laryngo-phone) and amplifier by means of an electric indicator. The circuit of the timer becomes activated at the end of the verbal signal by the use of a condenser which becomes charged at the beginning of the word and becomes connected with the circuit of the control tube after the word has been pronounced. The electronic reflex meter is built to take the electric timer PB-52 which is obtainable commercially but other timers may be modified from other systems.

The possibility of employing this instrument under variable situations is attained by the switching of the special commutator. The sensitivity can be regulated. The electric timer may be switched in or out not only with a word but also by the start or end of a sigh, swallowing and other activities. When necessary, objective registration by the apparatus can include addition to the forward panel of an oscillograph or an electromagnetic marker. In the presence of a portable transmitter, the electronic reflex meter can operate as a wireless receiver and the distance between the experimenter and subject can be varied (wireless radio variant).

The electronic reflex meter makes possible a whole series of experimental psycho-neurological experimental procedures as well as such methods of studying conditioned reflexes as speech-motor (in animals; voice), electrodepressive, blinking, swallowing and others.

The apparatus is easy to transport (dimensions 32 x 17 x 12 cm). It is easy to use, reliable and not complicated in construction.

SUMMARY

The author describes an electronic reflex meter which extends the present methods used for the study of various conditioned and unconditioned reflexes.

The diagram shows the electronic relays, connected in circuit with an electric second meter, the control tube and the thyatron circuits.

LITERATURE CITED

- [1] O. Ya. Bokser and P. N. Karpenko, Zhur. Nevropatol. i Psikhiat., 1954, Vol. 54, No. 12, pp. 1024-1028.
- [2] O. Ya. Bokser and P. N. Karpenko, Description by the authors of Invention No. 101428, Standards Press, Moscow, 1956.

* There exists a variant of this apparatus in which, instead of a thyatron, a trigger device is employed.