

**A simple apparatus for the mechanical stimulation of nerve / by E.A. Schäfer.**

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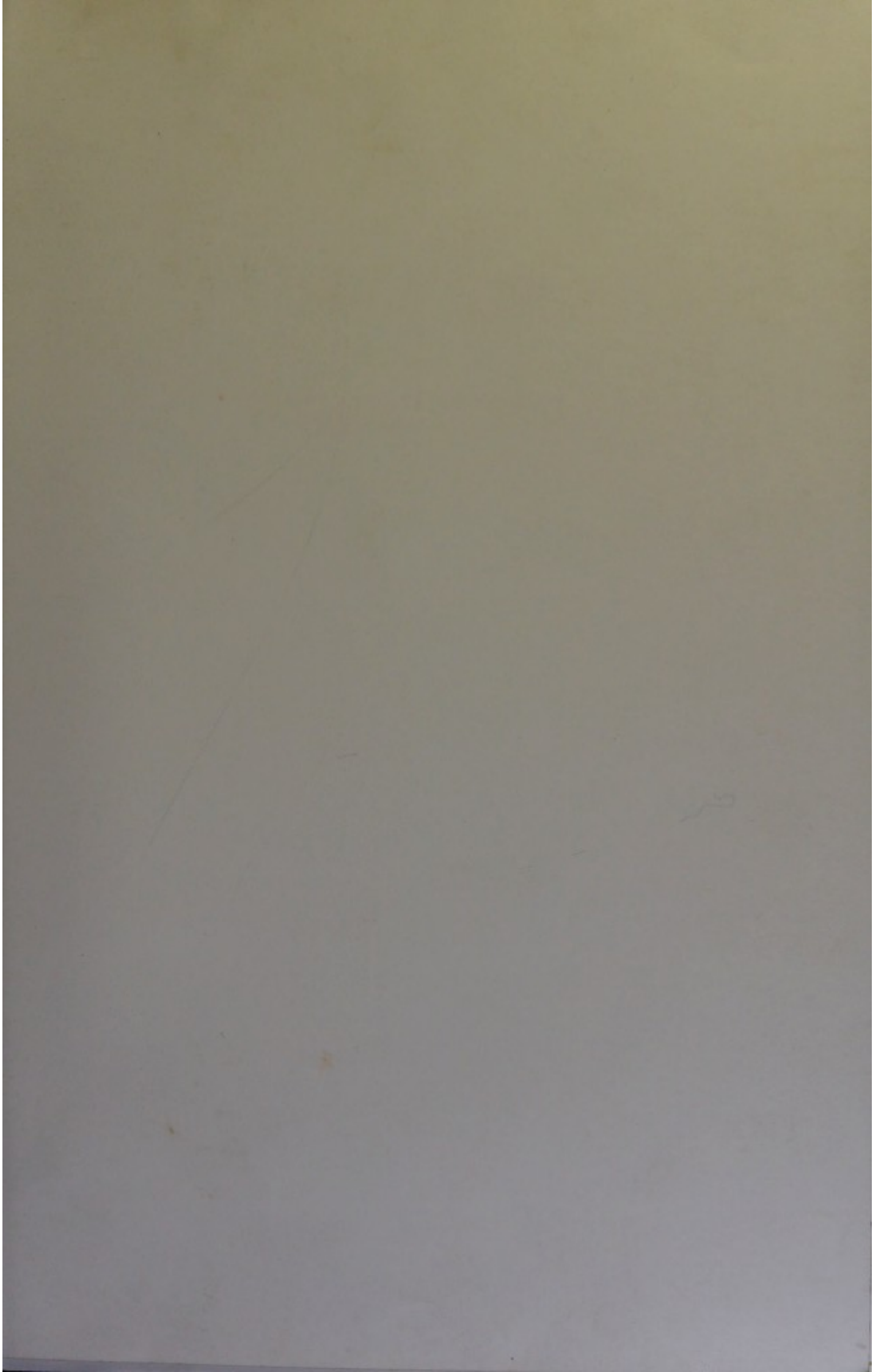
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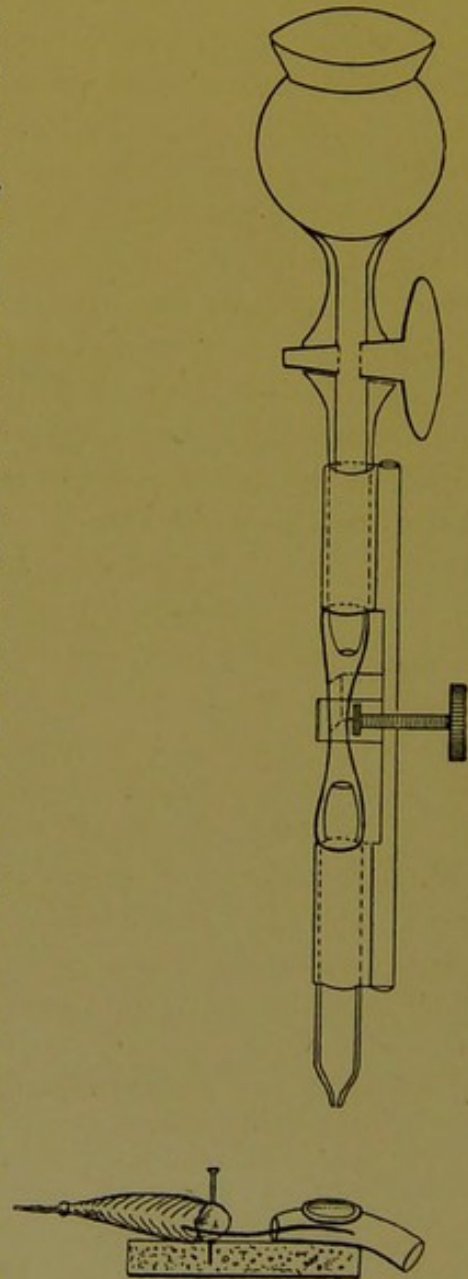


[From the Proceedings of the Physiological Society, Jan. 26, 1901.]

**A simple apparatus for the mechanical stimulation of nerve.**

By E. A. SCHÄFER.

An apparatus which I have found of great value for the mechanical stimulation of nerve is one which allows mercury to fall drop by drop upon the part of the nerve which it is desired to stimulate. The latter may if desired be protected from actual contact with the metal by placing over it a thin film of gutta-percha tissue. In order to avoid any splash of the mercury and also to furnish a grooved position from which the nerve is not readily displaced, it is passed into a short glass tube with a hole blown into it through which the mercury is allowed to drop either directly on to the nerve or against its side. The glass tube containing the nerve is inclined in such a way that the drops of mercury are conducted away from the preparation and are received into a bottle below. The jar of the drop is an efficient mechanical stimulus for the nerve. The mercury is contained in a reservoir which may take the form of a short thistle funnel; this is connected by an indiarubber tube to a short piece of glass tubing drawn out to a point the size of which is so adjusted as to deliver drops of mercury weighing each about 0.1 gramme. The rate of dropping is adjusted by means of a clamp, which is rigidly attached to a brass frame in which the tube of the thistle funnel and the delivery tube are also held, and the clamp, actuated by a finely





cut screw, compresses the indiarubber tube and allows the rate of dropping to be regulated from one drop in 5 minutes to 20 or more drops a second<sup>1</sup>. With an excitable preparation a fall of from 20 to 30 mm. will give a maximal response, but a fall of 10 mm. or even less than this is sufficient to provoke a contraction. Stimulating in this way it is possible to obtain either a series of single contractions of precisely the same extent, or, with rapid dropping of the fluid, either incomplete or complete tetanus. Moreover, the part of the nerve employed appears to be in no way injured by the drops so that it is possible to stimulate the same place at intervals for an indefinite time without any cessation of response other than that produced by fatigue of the muscle (cf. v. Uexhull, *op. cit.* infra).

The dropper is fixed upon an upright stand in such a way that it can not only be moved in a vertical direction by means of a rack and pinion or other rigid adjustment but also horizontally either directly over or away from the hole in the nerve-tube. The rate and height of the drop being arranged beforehand, a stopcock which is just below the funnel serves the purpose of enabling the stimulations of the nerve to be commenced or ended at any given moment. The moment of impact of the mercury can be recorded by allowing the drop just before it reaches the nerve to form a junction between two points of fine platinum wire which are introduced into the tube and form part of the circuit of a Desprez signal.

A tetanomotor arranged for stimulating a nerve by the dropping of mercury has been constructed by J. v. Uexhull<sup>2</sup>. The apparatus he describes is however of a somewhat complicated character, taking the form of a turbine which is not only actuated by the flowing mercury but at the same time breaks the regularity of the flow; it is moreover only adapted for the production of tetanus. I am also informed by Miss F. A. Welby that Professor J. C. Ewald has used the dropping of mercury upon a nerve as a means of stimulation, but the apparatus which he employed for the purpose has not as yet been described.

<sup>1</sup> The apparatus is made by J. Ednie, Mechanician in the Physiological Laboratory of the University of Edinburgh.

<sup>2</sup> *Zeitsch. f. Biol.* xxxi. p. 159. 1895.

