

COCAINE AND ITS USE IN OPHTHALMIC AND GENERAL SURGERY

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Cocaine and Its Use in Ophthalmic and General Surgery by H. Knapp

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H. KNAPP

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IN OPHTHALMIC AND
GENERAL SURGERY**

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GENERAL SURGERY

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ON COCAINE AND ITS USE IN OPHTHALMIC
AND GENERAL SURGERY.

By H. KNAPP.

NO modern remedy has been received by the profession with such general enthusiasm, none has become so rapidly popular, and scarcely any one has shown so extensive a field of useful application as cocaine, the local anæsthetic recently introduced by Dr. C. Koller, of Vienna. Convinced that it will not only continue to prove as valuable as it has hitherto been found, but that its properties will be the subject of numerous scientific researches and clinical observations all over the globe for many years to come, I purpose, as far as I am able, to collect in the following pages what knowledge has thus far been acquired on this highly interesting and important drug. To help the reader in gathering information is, however, not the only object of this paper; I would like it also to act as a stimulus for new investigations. From this standpoint I consider a faithful, unabridged translation of the original paper which Dr. Koller read before the Medical Society of Vienna, and published in the *Wien. med. Wochenschr.*, Oct. 25, and Nov. 1, 1884, not only as an acknowledgment of a debt of gratitude we all owe to him, but also as an appropriate introduction to the present article. The paper is as follows:

ON THE USE OF COCAINE TO ANÆSTHETIZE THE EYE.

By Dr. KARL KOLLER, Assistant Physician to the General Hospital in Vienna.
(Translated by H. Knapp.)

I want to report on some experiments which I have made in regard to anæsthetizing the eye. This is not my

first communication on this subject—a previous one, to secure priority, having been directed to the meeting of German oculists held at Heidelberg Sept. 15th and 16th of this year. Dr. Brettauer, of Trieste, was kind enough to deliver my paper to the Publishing Committee, and to exhibit before the Society my experiments, which have since been repeated and confirmed in different places of Germany.

It is generally known that cocaine, the alkaloid separated from the leaves of erythroxyton coca, in 1859, by Niemann, a pupil of Wöhler, possesses the remarkable property of rendering, on local application, the tip of the tongue anæsthetic. This property was discovered by Prof. Schroff, who first, in 1862, mentioned it before this Society. It is further known that cocaine, through the circulation, contracts the peripheric arteries, and it is known also that it dilates the pupil both through the circulation and on local application. From the foregoing it is evident that cocaine has been instilled into the eye in former years, but those phenomena have been overlooked which will be the subject of my present communication.

The internal application of cocaine, tried repeatedly, has always been abandoned again. In 1880 Dr. von Anrep¹ published an elaborate experimental paper on cocaine, at the end of which he points out that its local anæsthetic action may become of importance. To us Viennese physicians cocaine has been prominently brought to our notice by the thorough compilation and the interesting therapeutic paper of my colleague at the General Hospital, Dr. Sigmund Freud.² Starting from the supposition that a substance paralyzing the sensitive terminations of the mucous membrane of the tongue could not greatly differ in its action on the cornea and conjunctiva, I have made, in the laboratory of Prof. Stricker, a number of experiments on animals, of which, in brief, the following were the results obtained :

A few drops of a watery solution of muriate of cocaine ;³

¹ *Pflüger's Archiv f. d. ges. Physiol.*, 21. Bd.

² *Centralbl. f. Therapie v. Heilkr.*, August number, 1884.

³ Muriate of cocaine dissolves up to 5 % in water without addition of an acid, but always opalescent. Addition of acids is to be avoided, as a very small quantity of acid causes intense burning. The opalescent solution becomes as clear as water by filtration.

dropped on the cornea of a guinea-pig, rabbit, or dog, or instilled into the conjunctival sac in the ordinary way, cause for a short time winking of the eyelids, evidently in consequence of a slight irritation. After one half to one minute the animal again opens its eyes, which gradually assume a staring look. If now the cornea is touched with a pin-head (in which experiment we have carefully to avoid touching the eyelashes), the lids are not closed by reflex, the eyeball does not move, the head is not drawn back as usual, the animal remains perfectly quiet, and on application of stronger irritation we can convince ourselves of the *complete anæsthesia of the cornea and conjunctiva*. In this way I have scratched and transfixed the corneæ of my animals used for experiment with needles, and have excited them with electric currents so strong as to cause pain in my fingers and become quite intolerable in the tongue; I have cauterized the cornea with the nitrate-of-silver stick until it became milky-white—during all this the animals did not move. The last experiment convinced me that the anæsthesia involved the whole thickness of the cornea, and did not affect the surface only. But if I incised the cornea, the animals manifested intense pain when the aqueous humor escaped and the iris prolapsed. I have been unable, hitherto, to decide by experiments on animals whether or not the iris could be anæsthetized by dropping the solution into the corneal wound, or by prolonged instillations into the conjunctival sac; for experiments to test the sensibility of non-narcotized animals are very complicated and difficult, and do not yield unambiguous results. The last question which I subjected to experimentation on animals, *viz.*, whether or not the inflamed cornea could be anæsthetized by cocaine, was answered in the affirmative. The cornea in which I had incited a foreign-body keratitis became as insensible as a healthy one.

Complete anæsthesia of the cornea from the use of a 2% solution lasts ten minutes on an average. After such successful experiments on animals I did not hesitate to apply cocaine also to the human eye, trying it first on myself and some of my friends, then on a great number of other