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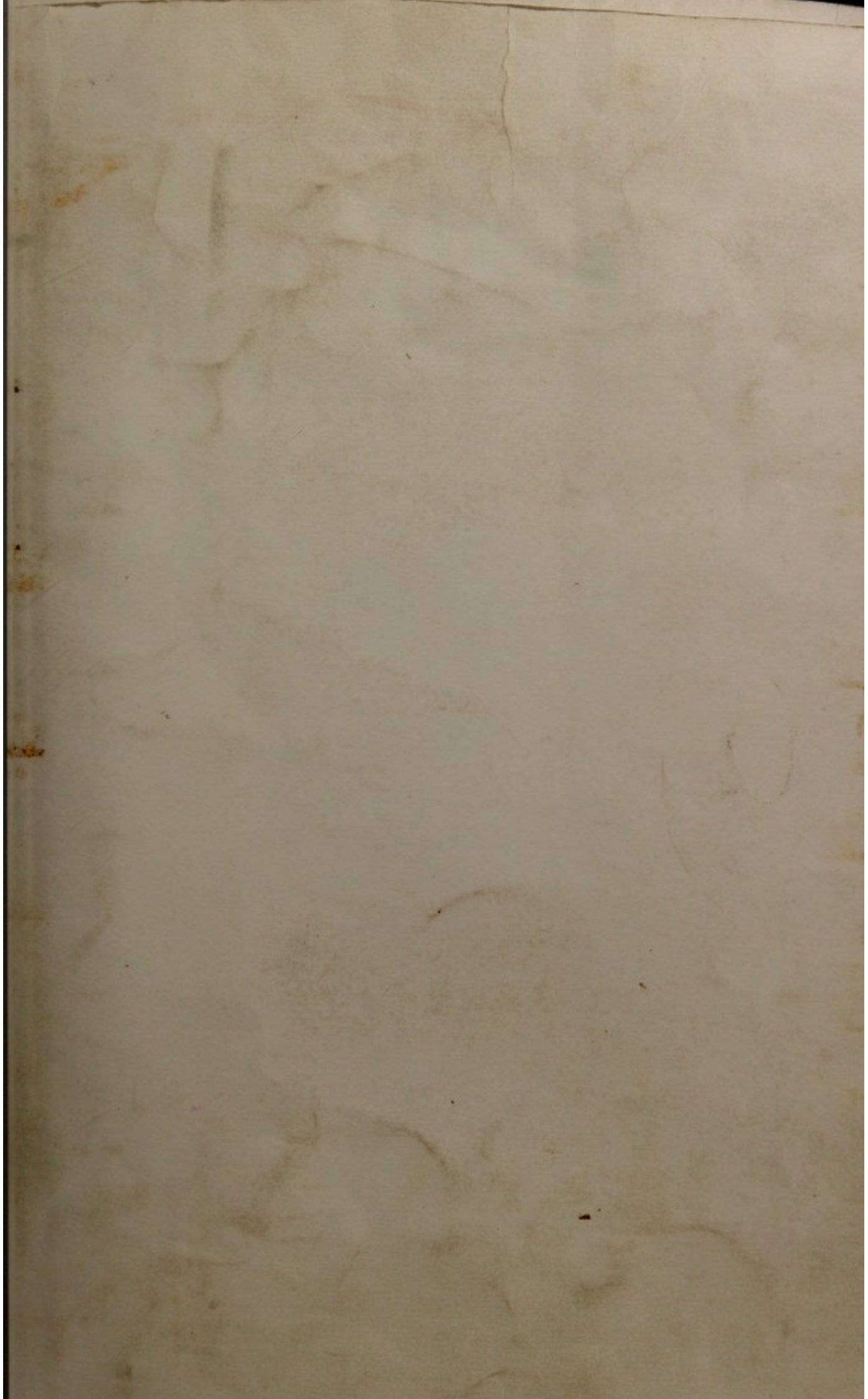
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Patellar Knee-jerk

by

Victor Horsley



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NOTE ON THE PATELLAR KNEE-JERK.¹

BY VICTOR HORSLEY, F.R.C.S., B.S. M.B. LOND.

Surgical Registrar, University College Hospital, and Assistant to the Professor of Pathology in University College, London.

IN view of the uncertainty at present existing with regard to the physiology of the so-called patellar reflex, I venture to record a few observations on the condition of this phenomenon when the subject of experiment is under the influence of nitrous oxide gas.

In 1881, while experimenting (on myself) with this gas for a different purpose, it occurred to me to contrast the conditions of the superficial and deep "reflexes," taking the plantar reflex as an example of the former, and the patellar phenomenon to illustrate the latter. Being aware of the fact that deep chloroform-narcosis abolishes all the "reflexes," superficial and deep, and yet that with ether-narcosis, however deep, ankle-clonus frequently appears, I was scarcely surprised to find that the knee-jerk persisted in the deepest anæsthesia from nitrous oxide, while the superficial reflexes all disappeared. This distinctive difference between the two groups of "reflexes" was so striking, as to merit further observation, of which the following is a brief summary.

The necessity of estimating exactly the degree of consciousness in dealing with an anæsthetic reagent, such as nitrous oxide, is obvious when the statements of patients (who have been operated upon while under its influence) are taken into account. To avoid the possibility of error in stating the depth of narcosis, only the result of experiments (fifteen in number)

¹ I desire here to express my obligations to my friends, especially to Mr. Henry Maudsley and Mr. Halliburton, for kind help in making the above observations.

made on myself is here stated, but the facts were verified by observations made on other subjects.

In all cases the anæsthesia produced was complete; after the usual symptoms attending the commencement of the administration of the pure gas were fully marked, absolute unconsciousness followed in from 90 to 120 seconds.

The anæsthesia was pushed until rigidity and sometimes cyanosis resulted. The recovery of consciousness was very frequently attended with considerable muscular spasm and semi-co-ordinated convulsive struggles and excitement. The "reflexes" were examined at regular intervals of five seconds from the commencement of the experiment to the return of consciousness; the sole of the foot being pricked with a pin, for the plantar reflex,¹ while the opposite patellar tendon was struck by a stethoscope or the hand. (The knee-jerk being normally very well marked, there was no opportunity for error of observation in eliciting the phenomenon, and the plantar twitch was also very active.)

Result.—In the deepest narcosis the condition of the reflexes was as follows:

Superficial.—Plantar and conjunctival abolished.

Deep.—Knee-jerk persistent.

Thus it is seen that although the whole central nervous system, viz. the encephalon and spinal-cord, was poisoned by the gas, the knee-jerk still continued active.

Taking this fact in connection with the short time expended in the knee-jerk contraction, the conclusion is unavoidable that the shortening of the rectus is due to local irritation of the muscle from sudden elongation, the integrity of the normal tonus being maintained. It seems scarcely necessary to refer to this latter point, but in an admirable paper on this subject,¹ Dr. Prevost has shown, that in rabbits, anæmia of the lumbar enlargement of the spinal-cord (produced by compression of the abdominal aorta) is followed by the simultaneous (?) disappearance of the deep and superficial "reflexes." It would appear, however, that in nitrous oxide we have a reagent with which it is possible to perform the crucial experiment of

¹ Published in the 'Revue Médicale de la Suisse Romande,' Jan., Feb., March 1881.

suppressing the superficial reflexes without abolishing muscle tonus. With regard to the different results obtained by using different anæsthetic agents, the following conclusions may be drawn from the researches of Eulenburg,¹ also confirmed by Prevost's experiments with ether, &c., viz. (1) that the deep "reflexes" are only abolished by the denser anæsthetic reagents, such as chloroform, &c., and are exaggerated by the more volatile reagents, such as ether, &c., but that both superficial and deep "reflex" action is completely abrogated in the asphyxial state; and (2) that in the latter condition, whether induced mechanically, or by drugs such as nitrous oxide gas, the superficial disappear before the deep "reflexes."

¹ Centralblatt für Med. Wissensch.' No. 6, 1881.

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