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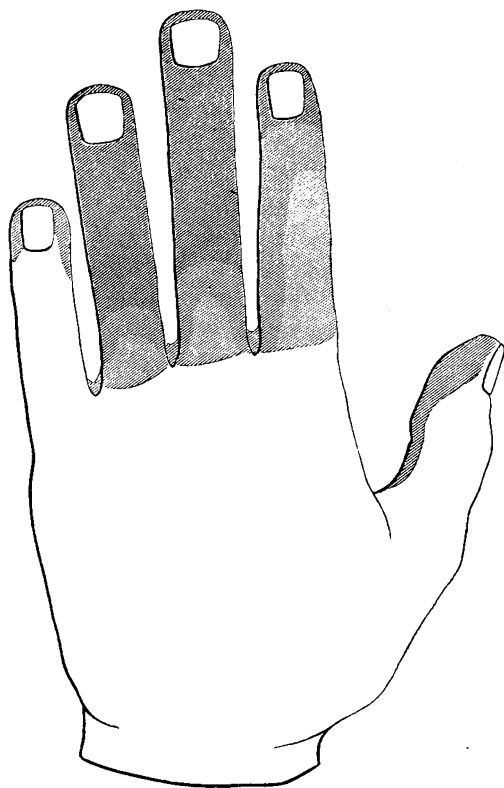
## A CASE OF SECTION OF THE MEDIAN AND ULNAR NERVES.

BY JAMES J. PUTNAM, M. D.

THE publication of this case is justified by the fact that, from its peculiar nature, it illustrates very well certain points concerning the distribution of the cutaneous nerves of the hands and fingers.

The patient, a young man in good health, in manipulating the sash of a window accidentally drove his hand through the pane, inflicting a deep flesh wound on the front of the wrist, from about the median line almost to the ulnar border of the arm, leaving behind it, in healing, a scar of about one inch and a quarter in length. The early history of the case may be passed over as unimportant in this connection. The patient was first seen by me, in the out-patient department of the Massachusetts General Hospital, five weeks after the accident, and at that time the characteristic features of his condition, as regards the anæsthesia, the atrophy of the muscles of the hand, etc., seemed essentially as at a later period, but owing to the presence of symptoms of irritation of the nerves, as well as of inflammation of the tissues about the wound, no careful examination was made until a few weeks afterwards. At this time all the muscles of the hand were found completely incapable of responding to voluntary impulses or to the induced current, while all responded with especial readiness, and with the familiar "wave-like" motion, to the stimulus of weak galvanic currents, particularly when the positive pole was applied over them (at least this latter point was noted at a later time); some of them, however, — the adductor pollicis, the first interosseous, and some of the muscles of the thenar eminence, — more readily than the rest. In the course of the two months following, several careful examinations were made with a view to determining the limits of the anæsthetic district, with results which varied somewhat, though for the most part unessentially. The examination which formed the basis for the statements made in this paper, illustrated also by the diagrams which accompany it, was especially protracted and minute, and the results may, I think, be relied upon as accurate. The manner of expressing the various degrees of anæsthesia is essentially that adopted by Dr. S. Weir Mitchell: the three zones representing respect-

ively the regions where (1) sensation was absolutely lost; (2) the sense of touch was lost while strong impressions were still felt; (3) the sensibility of the skin was only slightly modified. For the production of powerful excitations the skin was pricked deeply with a needle, or was touched with a *single wire* connected with one pole of an induction battery, the other pole being represented by a pad placed on the moistened skin at a distance. It has been claimed that the use of the wire brush is objectionable in these cases, as giving rise to indistinct sensations which are really due to excitation of nerve filaments at a greater or



(FIGURE 1.)

less distance from the point touched. It is true that when the whole brush is placed upon the skin a sort of thrill may be felt, which may be referred, for example, to the whole of a finger, and may be supposed to obscure other sensations due to the local irritation; comparative experiments, however, failed to convince me that, in this case at least, such objection could fairly be raised against the use of a single wire. The slight sense of vibration which was occasionally, though rarely, spoken of by the patient was always distinguished with readiness from the acute local pain, and the limits of the anæsthesia as thus obtained did

not differ materially from those obtained by the use of the needle, where the effects of the two irritations were compared. On the other hand, the two methods are not to be compared from the point of view of convenience.

For estimating the sense of touch a feather was used, or, what seems equally good and is often more convenient, a bit of twine two or three inches in length. For estimating the lesser degrees of anæsthesia Dr. Mitchell uses the æsthesiometer. Experiments were made with it in this case, but the results did not seem to me sufficiently satisfactory to deserve notation; less so than the statements of the patient as to whether the sensations excited by a light touch were "natural" or "unnatural."

The information given by the diagrams may be supplemented by the following remarks.

It is evident, from the fact that the sensibility of the skin over the back of the little finger was unimpaired, that the dorsal branch of the ulnar nerve, which is given off before the nerve enters the hand, escaped section in this case, and a good opportunity is therefore furnished for studying its distribution. One branch of it seems, whether normally or not, to supply, in part, the whole palmar surface of the first phalanx of the little finger.

The mode of distribution of the median and ulnar nerves to the backs of the fingers corresponds almost exactly with that established by the careful dissections of Richelot.<sup>1</sup>

The statement of Létievant, that a vibratory irritation, such as may be produced by drawing the point of a pin or a stiff piece of paper across the skin, may be transmitted through anæsthetic parts to the still healthy nerve filaments of adjacent regions, and give rise to an indefinite feeling which may be mistaken for a sign of preserved local sensibility, could be distinctly confirmed in this case with regard to the end of the forefinger.

On the other hand, the impression left by Létievant's statement, namely, that if sufficiently strong excitations are chosen the space within which the anæsthesia is complete will generally be found to be quite small, was not strengthened by the examination of this case. The limits of the complete anæsthesia were sharply defined, and only exceptionally a point could be found a little distance within the line where a strong excitation could still be felt. A deep burn was received on the dorsal surface of the second phalanx of the middle finger without the knowledge of the patient. It healed well, but even strong irritation of its exposed base was unfelt. It is well known that Arloing and Tripier have affirmed, with regard to dogs, that the whole skin over each paw is

<sup>1</sup> Archives de Physiologie, No. 2, 1875. The JOURNAL for September, 1875, vol. xciii., No. 2. Report on Anatomy, Dr. T. Dwight.

supplied with some degree of sensation by each of the main nerves of the limb, but the rule evidently does not hold for man. Among the cases collected by Létiévant, to be sure, there are some which seem to warrant the possible validity of such a view, but many others are reported (by Mitchell, Richelot, and others) where, as here, the anæsthesia was complete over the greater part of the space which we have anatomical reasons for believing to be supplied by the injured nerve (of course the existence of well-known anastomoses being taken into consideration).



(FIGURE 2.)

The condition of the sensibility of the palm of the hand is worthy of notice. The line limiting the anæsthesia will be seen to correspond quite nearly with the arterial palmar arch, and anteriorly it corresponds quite well also with the line at which, according to Rüdinger's atlas, a number of terminal fibres of the median and ulnar nerves, coming up from below, pierce the palmar fascia, passing, apparently, to supply the skin of the palm further forward. The central part of the palm, therefore, is evidently supplied mainly, in this case at least, either by a branch of the median, given off above the point of section, the *nervus cutaneus palmaris*, or by the *nervus cutaneus brachialis medius*.

For the sake of completion, two facts still deserve mention. At the second of the earlier examinations of the patient, the skin over the dorsal surface of the second phalanx of the ring-finger was found somewhat sensitive to powerful irritations, and, supposing the observation not to have been faulty, this shows that this region must have been supplied by a few fibres from either the radial or the dorsal branch of the ulnar, which at a later period became degenerated.

Between the thumb and forefinger was a spot where light rubbing caused a thrill to run down the radial side of the forefinger, indicating the presence there of an inflamed nerve twig, probably belonging to the radial nerve.

At the time of writing, which is six months after the accident, the voluntary power of the patient over the muscles of the hand has not shown any signs of gain, but according to a recent incomplete examination the anæsthesia seems to have withdrawn itself within somewhat narrower limits, at least as regards the palm of the hand.

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#### A REPORT ON THE PERCENTAGE OF NEAR-SIGHT FOUND TO EXIST IN THE CLASS OF 1880 AT HARVARD COLLEGE, WITH SOME ACCOUNT OF SIMILAR INVESTIGATIONS.

BY HASKET DERBY, M. D.

CHARLES W. ELIOT, LL. D., *President of Harvard College* :

SIR, — I present herewith the results of an examination of the eyes of the present freshman class, made in the month of January, 1877, and undertaken with the view of determining the percentage of near-sightedness in the class on entering college as compared with the percentage of near-sight that would be found to exist at the termination of the under-graduate course.

Near-sight, or myopia, is by no means the innocent affection that ordinary text-books on physiology have so long represented it. Perhaps no idea concerning the organ of vision is more firmly grounded in the popular mind than that a near-sighted eye is a *strong* eye, the difficulty depending on an undue convexity of the crystalline lens or of the cornea, and likely to be corrected in after-life by the flattening of one or the other. This is wholly false. Near-sightedness depends on a change in shape, an elongation of the eyeball; its progress, on an increase of that elongation; its dangers, on that elongation being pressed beyond the power of endurance of the tissues of which the organ of sight is composed.

Near-sight is either stationary or progressive. The former variety is, unfortunately, comparatively rare. Having remained at the same point up to about the fortieth year, it may afterwards even slightly