

Periscope.

PATHOLOGY (INCLUDING PATH. ANATOMY).

On the Changes in Nerves and Spinal Cord after Amputations. By C. FRIEDLAENDER and F. KRAUSE. (*Fortschritte der Medicin*, 1886, No. 23.)

Various changes in the spinal cord have been observed after amputations, consisting of atrophy of the gray substance both in the anterior and posterior horns, and of the white columns. No single lesion appears to be uniformly present. Authors hitherto have denied the existence of changes in the nerves or nerve roots from the stump to the spinal cord. Friedländer and Krause have recently examined the condition of both nerves and spinal cord in eight cases which died several years after amputations had been performed. Their results are as follows:

1. There are changes in the peripheral nerves traceable from the stump to the nerve roots, and these can be followed to the posterior spinal ganglion, but not into the posterior or anterior nerve root. The change is not a Wallerian degeneration, but is a simple atrophy. It involves as much as one-half of such a nerve trunk as the sciatic, many fibres in each bundle being affected. The individual fibres appear to have lost their medullary sheaths, and although a faintly tinged substance is left representing the axis cylinder, it is by no means certain that this is a normal axis cylinder. The nuclei of the sheath of Schwann are increased in number. The atrophied fibres have no double contour, do not stain with osmic acid, or with Weigert's hematoxylin, and stain only faintly with carmine or aniline-blue. This atrophy is to be found three months after amputation, but is more evident two or three years after. Since this atrophy is only to be found in the portion of the nerve which turns backward to the spinal ganglion, it must be admitted that the atrophic fibres are sensory in their function. The atrophy ceases at the posterior spinal ganglion, and no trace of it is to be found in the posterior nerve-root between the ganglion and the cord. The anterior-nerve root is free from any trace of atrophy. All the sensory nerve-fibres in a nerve from the stump are not involved. It is only a portion of these which are atrophied. The number seems to be about the same, whether the amputation is near the trunk or far from it. The authors put forward the hypothesis that the atrophied fibres are those which

come from the terminal bulbs and tactile corpuscles which are situated chiefly in the skin of the feet and hands. They think that the sensory fibres which are preserved are those which come from the sensory plexus in the skin. This implies that the tactile corpuscles and terminal bulbs are trophic organs for the fibres originating from them.

2. There are also changes in the spinal cord. (a) There was observed a diminution in the size of the posterior columns on the amputated side. When the leg was amputated, this was visible in the lowest part of the lumbar enlargement, and reached its maximum at the eighth dorsal segment, where the columns were only one-half the size of the opposite side. No atrophy of individual fibres was observed; there was simply a less number of normal fibres. No other columns of the cord were affected.

(b) There was observed a diminution in the number of cells in the gray matter, and a diminution in the size of the posterior horn. All the groups of cells in the anterior horn are not equally affected. The anterior median, antero-lateral, and central groups appear to be unaffected. The postero-lateral group is very markedly involved, being reduced to one-third or one-half the number of cells on the opposite side. Numerous careful observations bear out this statement, the numbers being given in the text. It is only the lower portion of the lumbar spinal cord in which this atrophy is seen, viz., that part from which the sacral nerves arise. The Clarke column of cells in the posterior median area of the gray substance was also found affected on the side of the amputation. The reduction in the size of this group was found to extend from the twelfth to the sixth dorsal segment. The number of cells in any single section was at least one-third less on the side of the amputation. When the amputation had been made in the upper extremity, the same changes were observed, excepting only those in the Clarke column which, as is well known, does not extend above the eighth cervical segment. The authors claim that this establishes the fact of an intimate connection between the Clarke column of cells and the sensory roots; also between the postero-lateral group of cells and the sensory roots.

3. A reduction in the number of fibres, but no appearance of atrophy in individual fibres, was observed in the posterior nerve-roots corresponding in degree with the atrophy in the posterior columns. A bibliography of the subject with critical comments is appended to the article.

M. A. S.

Primary Degenerative Neuritis. PROF. A. KAST.
(*Deutsch. Arch. f. Kl. Med.*, Vol. 40, 1., p. 41.)

Prof. Kast relates four interesting cases of various forms of neuritis, and in connection with each one of these has some valuable suggestions to offer.

CASE I.—Girl, aged 13, very mild angina follicularis; about two