Fig. 2. Transverse section through spinal cord in lower dorsal region, showing distribution of sclerosis in posterior area.

rounding the fibres of the nerve, of which the endoneurium and perineurium are both increased. This sheath is apparently composed entirely of fibrous tissue, of tolerably recent though not of fresh origin, as is shown by the degree to which the fibrous tissue has been formed with the very small quantity of round-cells present. This condition may be taken as fairly clear evidence that the thickening had existed longer than twelve days (the period which had intervened between the date of the operation and the death of the patient). The nerve-fibres contained within this mass of tissue show signs of inflammation also in having lost their medullary sheaths. The axis cylinders are still for the most part, if not entirely, intact.

It is impossible, from the histological characters, to determine whether the mass is or is not gummatous in nature.

In the neighbourhood of the operation wound is a little recent granulation tissue tracking up the cord for a short distance along the pia mater.

The spinal cord.—Sections have been cut and prepared from the following regions:—Upper and middle cervical; upper, middle, and lower dorsal; upper, middle, and lower part of lumbar enlargement.

The sections have been stained by Pal’s method (a modification of Weigert’s); with aniline, blue-black; lithium carmine; and sections from all the regions have been stained by each of these methods.

Throughout the whole of the lower half of the dorsal portion of the cord there are small irregularly distributed areas of sclerosis in the posterior median (Goll’s) columns and in the posterior root-zones.

The section shown in the drawing (Fig. 2) is from the lower half of the dorsal portion of the cord, and it shows fairly typically the condition of the whole of the lower half of the dorsal portion of the cord, although in the other parts the sclerosis is slightly different in position, and is apparently more irregular.

The sclerosed areas tend to gradually diminish towards the upper dorsal region, and finally disappear altogether, leaving the cord above the middle cervical portion quite normal in appearance.

The sclerosis throughout is distinctly more extensive in the left than in the right half of the cord, and tends to affect the posterior median columns proportionately more in the higher parts of the cord, although, as has been mentioned, the general area of the sclerosis is less in these regions.

In the posterior root-zones there is no one part in which the lesion can be said to be relatively more extensive than in another.

There are no changes in the vessels of the cord suggestive of syphilis.

The sections of the brain which have been examined show nothing abnormal.

(For report of the discussion on this paper, see ‘Proceedings of the Royal Medical and Chirurgical Society,’ Third Series, vol. I, p. 115.)

A CONTRIBUTION TO THE SURGERY OF THE SPINE.*

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The surgery of the spine is one of the new chapters soon to be written, from which much may be expected. As yet, however, so little work has been done or published that statistical tables upon the subject are untimely and of little profit.

It should be a surgical axiom that every case of operative interference should be published, and I shall therefore present concisely, for our study, two cases that have recently come under my care, deducting such practical lessons as may be deemed important. I have the pleasure of showing you the patients themselves.

The second patient is one whose malady is more complicated, whose recovery is not yet so brilliant, but whose operation stands, as yet, quite unique. Intractable brachial neuralgia, nerve stretching, amputation, and finally, division of posterior roots of the sixth, seventh, and eighth cervical. Improvement.

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Mr. I. R. T.—is forty-four years of age, an iceman. He was referred to me three months ago by Dr. C. L. Dana, of New York, to see if I were willing to undertake an operation, conceived by him, to relieve the patient of one of the most intractable of neuralgias of the right brachial plexus, appearing in the arm and forearm. The essential features of the operation were carried out as planned from the first by Dr. Dana. The pa-
tient's history is as follows:

Prior to this trouble, he had no disease—rheuma-
tism, malaria, or specific. During the war a shell explosion left a small piece of it in his left shoulder, which was extracted on the field, and left only a small flesh scar; never otherwise injured. One year ago last May, he spent a day putting a zinc lining in a large butcher's refrigerator, and on the night following he first had a throbbing pain, localized in a single spot on the posterior surface of the right forearm, above the middle. The pain kept him from sleep. It was continuous at that site, but about one week later, there was added a paroxysmal pain giving a peculiar twitching sen-
sation in the thumb, index, and middle finger of the same hand. He was treated by electricity, blisters, counter-irritants, and internal medica-
tion, by excellent doctors, but his arm grew steadily worse. The pain still localized over the forearm, and supplemented by the paroxysms of painful twisting sensation. There seems to have been distinct muscular spasm with the sensation of pain.

During the spring of last year there had ensued a disablement of the hand. The fingers were not readily closed nor extended. The hand was kept in a stiff position, the fingers semi-flexed. The fore-
arm and hand were slightly emaciated. There was atrophy of muscle in the interosseous spaces. Dr. Dana and others thus saw him, and a diagnosis of ascending neuritis was arrived at. At this time he came under the care of Dr. W. T. Bull, at the New York Hospital. After a week the patient begged an operation, and the doctor stretched the poste-
rior interosseous and ulnar nerves. The pain was not improved. If anything, it was worse.

On July 16th, at the patient's earnest request, the arm was amputated by Dr. Bull above the humeral insertion of the deltoid, and above any site of local pain heretofore complained of. The wound healed by first intention. As far as the eye could judge, all nerves in the arm were in a normal condition. When the wound had healed it was found there was no abatement of pain. It still had a "drawing" character, and he could feel the fingers twist just as if they were on. He left the hospital August 1st, if anything, complaining of more pain than before. He then came under the care of Dr. William Kemp, of New York, who again sought Dr. Dana's counsel. The patient had now got in the habit of taking morphine, one half grain every hour, to destroy the pain.

Of this interview Dr. Dana writes me thus:

"On September 25th I examined him again. The arm had been removed. The patient said he felt no better. There were twitchings and tonic contractions in the muscles of the stump. The pa-
tient had the Brauch-Romberg symptom, swayed in standing, and had a tendency to fall to the right when walking with eyes closed. Knee-jerks exaggerated and ankle clonus in right leg, all of which might be due to the morphine he was taking. There was much stiffness in the neck muscles. The patient could not rotate his head completely to the right, nor draw the head down to the right shoulder. The diagnosis, so far, had been neuritis—and of this there could be no doubt. The question was whether it might be due to a tumor or inflammatory process, either extra-spinal or extra-ural. An exploratory operation was ad-
vised with the idea, if no tumor was found, of cutting the posterior roots of the nerves transmit-
ting pain. If it were a tumor, that could be re-
moved. If it were ascending neuritis, cutting or resecting the nerve might stop it; while cutting the posterior roots would cause an ascending de-
generation and destroy the sensory tract, even into the spinal cord."

At this juncture he went to Dr. Seguin for a month, and returning to Dr. Dana, was sent to me at St. Luke's Hospital. His condition then was as follows:

November 3d.—Had grown thin, was careworn and hollow under the eyes. Appetite fair, tongue coated. No fever. He gives evidence of sharp pain, every few minutes, in the stump of his right arm, and usually doubles over and grasps the stump with the other hand. When asked about it, says it jumps and the stump draws to his side when the pain shoots into the hands and fingers, as if they were still on, and he can feel them all drawn up. The pain seems to be genuine, and the recurrence every five or ten minutes. He says also that they keep up all night. Muscular atrophy is beginning to be marked about the shoulder, either from the disuse or degeneration. The deltoid, supra and infra spinati, and biceps are atrophied; while the lateral dorsi and pectoral major are short and thin, but still act strongly when called upon. A small, tender neuroma of the musculo-spiral nerve in the stump, can be felt, and on pressure gives the same pain as is generally complained of.

November 7th.—Dissected out the neuroma under cocaine.

November 24th.—Not relieved by the removal of the neuroma. Urine L024, no albumen or sugar. Some oxalates.