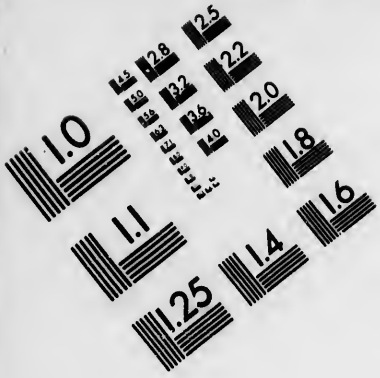
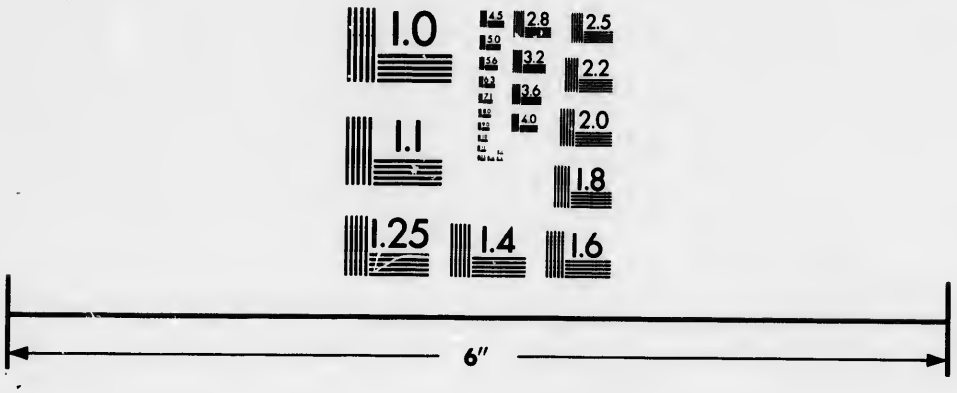
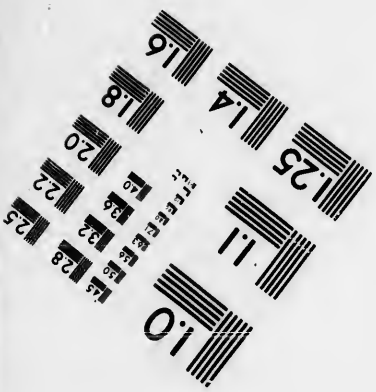
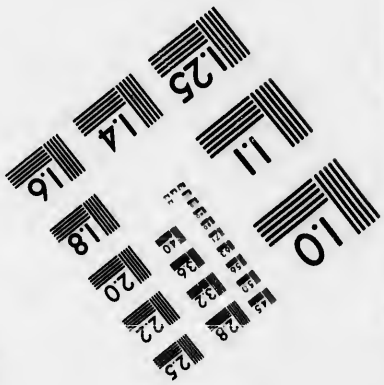


IMAGE EVALUATION TEST TARGET (MT-3)







Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☐ Tight binding may cause shadows or distortion along interior margin/ Le reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- ☐ Additional comments:/ Commentaires supplémentaires:

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality of print varies/ Qualité inégale de l'impression
- ☐ Includes supplementary material/ Comprend du matériel supplémentaire
- ☐ Only edition available/ Seule édition disponible
- ☐ Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/ Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
						✓					

The copy filmed here has been reproduced thanks to the generosity of:

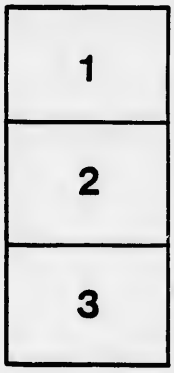
Medical Library
McGill University
Montreal

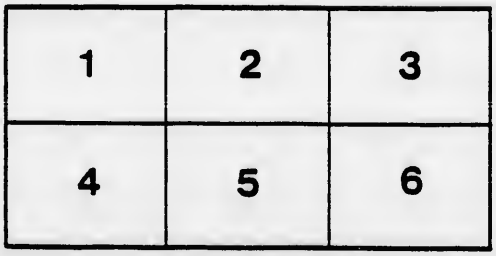
The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol → (meaning "CONTINUED"), or the symbol ▽ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:





L'exemplaire filmé fut reproduit grâce à la générosité de:

Medical Library
McGill University
Montreal

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole → signifie "A SUIVRE", le symbole ▽ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

RE-PRINTED FROM THE "CANADA MEDICAL & SURGICAL JOURNAL,"
JANUARY, 1887.

43

SECONDARY SUTURE OF THE ULNAR NERVE, WITH RAPID RESTORATION OF SENSATION.

By Francis J. Shepherd, M.D..
Surgeon to the Montreal General Hospital.

Suture of nerves after division, though done by Arnemann in 1826 and Flourens in 1828, has never been performed extensively till within the last few years. Primary suture of the divided ends of nerves is a proceeding which commends itself to every surgeon, but secondary suture has not been so popular, and up to the end of 1885 only some half-dozen cases had been reported in America. In these cases where the wound has long closed, the divided ends of the nerve undergo degeneration, and are generally imbedded in cicatricial tissue. The proximal end is generally bulbous and the distal much atrophied; both ends are often so degenerated that no nerve structure can be found in them. The divided ends are sometimes separated by a long interval, the upper portion of the nerve retracting, and it is often very difficult to bring them together. It was formerly thought that to get union it was necessary to cut the terminal portions of the nerve till healthy nerve tissue was reached; this proceeding, of course, increased the distance between the divided ends and the difficulty of bringing them together. It is, however, now conclusively proved that a mere joining of the freshened ends is all that is needed for purposes of union. Where the divided ends of the nerve cannot be brought into contact, strands of catgut, or fresh nerve tissue from amputated limbs, have been introduced into the interval between the ends of the nerves, and perfect restoration of function has followed. The sooner the operation of secondary suture is performed after the perfect healing of the original wound the better, but good results have been obtained months and years after the division of the

nerve. Mr. Jessop sutured the ulnar nerve with partial success nine years after its division.

Many cases of apparent failure turn out well. Mr. Holmes (*Lancet*, June, 1883) reports a case where the function of the nerve was not completely restored for more than a year after operation. Sensation generally returns before motion, but occasionally the opposite is the rule. In some cases, where sensation was good in the course of a week, motion was not restored for six months. It has been asserted by those who oppose the suture of nerves months after the closure of the wound that the nerves will recover their functions if left to themselves. That they do so in some cases, says Mr. Holmes, is certain, and he gives cases to prove it, but he remarks that such a favorable issue is highly dubious, especially when the distance between the divided ends is great and the proximal end terminates in a bulbous enlargement.

With regard to the method of suturing the nerves, experiments have been made on animals by Rawa, Falkenheim and others. Rawa, in his cases, made the nerve ends overlap, and held them together by an encircling ligature; physiological union took place at end of six to twenty months. Falkenheim united nerves by the direct and indirect method; in the former the suture is passed through the trunk of the nerve, and in the latter the sheaths only of the divided nerves are united. The indirect was found by him to be preferable. It is now the opinion of surgeons that it matters little how the divided ends are held so long as the raw surfaces are firmly secured in close apposition. Horse-hair, fine catgut and silk have been used as sutures, and the ends of the nerves have been cut in various ways—oblique, transverse, etc. It is important that after operation the newly united nerve should be subject to as little tension as possible, and that the union of the wound should be by first intention, for if suppuration takes place the nerve may again become imbedded in cicatricial tissue. The following case of suture of the ulnar nerve is interesting because of the rapidity with which sensation returned :—

John D., aged 50, in the beginning of April, 1885, whilst working at Lake Nepissing, was cut with an axe over the left

elbow, between the olecranon process and the internal condyle. The wound healed rapidly, but he found that afterwards he could not use his arm, and that there was considerable pain in the elbow. He entered the Montreal General Hospital for treatment June 23rd, 1885, some ten weeks after the injury, and then presented the following conditions: Left arm was semiflexed and fixed; on attempting to straighten it the man complained of great pain in the elbow and resisted the movement; the muscles on the ulnar side of arm and hand were wasted, and the little finger and ring finger bent and useless; no sensation in the little and ring fingers and other parts supplied by ulnar, and, in fact, arm was useless and painful; could not separate his fingers. On examining the elbow, a scar two inches long was seen stretching across the space between the olecranon and internal condyle. This cicatrix was excessively tender on pressure. The diagnosis of division of the ulnar nerve was easily made, and next day (June 24th) an operation was performed for the purpose of uniting the divided ends. An incision was made in the line of the ulnar nerve and across the scar, and the nerve reached. The upper end, which was bulbous, was easily discovered and dissected out from the cicatricial tissue in which it was imbedded; half an inch lower down was found the other end, much atrophied, and also imbedded in scar tissue. After dissecting out the divided ends, they were freshened and brought together with a continuous suture of fine catgut, the wound sewed up and dressed with iodoform and dry dressing, a small drain inserted at the lower end, and the arm was put up in the extended position in an anterior splint. Next day when patient was seen he had a tingling feeling in the little and ring fingers, and general and tactile sensibility was good. The wound was first dressed on the sixth day and the tube was removed; union by first intention, except where drainage tube had been. It was firmly healed on July 8th, and gentle movement was commenced in the arm. The sensation was good, but motion was deficient. As his wound was healed he was allowed to go home, with a promise that he would write and let me know how he progressed. He was told that it would probably be some months before he recovered the use of his arm.

Not hearing from him, my house surgeon, Dr. Eberts, wrote in January, 1886, and received a reply from Nepissing saying he was fast recovering the use of his arm, and that he had gone back to his work; and the only complaint he had was a slight burning pain in his little finger. Since then I have endeavored to hear from him, but cannot find out his whereabouts, he having left Nepissing some months ago.

The rapid restoration of sensibility in this case is the interesting feature. Surmay (*Archives Gén. de Médecine*, Oct. '85,) reports a case where general and tactile sensibility were restored in twenty-four hours after resection of three-quarters of an inch of the median nerve, and the complete restoration of the other functions occurred after six months.

NOTE.—In May, 1884, Dr. Roddick of Montreal sutured the sciatic nerve in a young man seventeen months after its division. The immediate result of the operation was the healing of two troublesome ulcers on the foot. Sensation did not return for some time, and motion is not yet completely restored, but he is still improving, and can now walk about without a stick. The interest in this case lies in the rapid restoration of the nerves of nutrition, whilst those of sensation and motion more slowly resumed their functions.