

these cases should be given an opportunity to clear up under internal medication, this should not be persisted in unless the condition improves. It is not sufficient to have the condition remain apparently stationary; under these conditions it is probably progressing insidiously; such cases should be given the benefit of operation.

It is much more important, naturally, that the double processes be submitted to operation than the unilateral ones. In young persons we may be sure that a double process, if unchecked, will considerably lessen the probable length of life.

The possibilities are that it may prove fatal within a relatively few years. In a process that involves but one kidney the question of operation is more open to debate. Renal insufficiency, of course, does not occur with one healthy kidney, and as the pus is not under tension there is little toxemia from the mere suppuration itself.

On the other hand, the infected urine discharges into the same reservoir as the normal kidney. This constant presence of infected material in the bladder must be a certain danger to the other kidney, though we all know instances where it has continued for a long period without the second kidney becoming infected. Clinically, in a double process, the disease in one kidney is often more advanced than in the other; this would seem to point to the infection in one preceding that in the other, but it may perfectly well be that the progression in one has been faster than in the other.

A more intimate knowledge of the bacteriology of these nontuberculous infections may teach us which infections have the most favorable outlook and which ones we must fear most. My opinion, formed from relatively few cases, is that the colon group gives rise to a persistent and destructive infection.

The recognized surgical treatment of these cases consists in drainage. I believe it is yet to be proven that washing the kidney pelvis can exert any considerable curative action on the process. I feel we are also in doubt as to the results to be gotten by use of vaccines. There is a question whether drainage should be carried out by means of an incision through the cortex to the pelvis, or by means of a simple incision into the kidney pelvis. The first is undeniably the operation of greater magnitude, but on the other hand it seems probable that it drains the renal tissue better than the pyelotomy. In the few cases in which I have drained kidneys for the earlier stages of infections of this type. I have incised through the kidney substance into the pelvis. There has been no mortality and the results have been good, though the cases have been too few to allow one to draw definite conclusions.

The points I wish to bring forward are these:

We have certain cases of pyelonephritis that simulate bladder infection very closely. In these cases the signs we commonly depend upon for making a diagnosis of kidney infection are not present.

These cases are insidious in that signs that

point to the kidney occur only late in the disease, at a time when we are powerless to stay its course. The only way in which these cases of pyelonephritis can be recognized in season to render treatment of avail is by means of cystoscopy. In cases that are apparently chronic cystitis, but which persist without evident cause, we should consider that the burden of proving that the condition is not renal rests upon us.

Early treatment by means of drainage is probably our most efficient means of treating these cases.

ADENOIDS AND TONSILS. FROM THE STAND-POINT OF THE GENERAL PRACTITIONER, WITH SPECIAL REFERENCE TO AN EXAMINATION OF THE THROAT IN CHRONIC SYSTEMIC INFECTIONS AND A CONSIDERATION OF THE QUESTION OF STATUS LYMPHATICUS IN THESE CASES.*

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At the present time there is a growing tendency from both clinical and experimental evidence to regard the faucial tonsils as the portals of infection in a wide range of diseases. Likewise, and to a less extent, perhaps, the pharyngeal tonsil, or so-called adenoid, is responsible not only for the classical symptoms with which all of us are familiar, but for many other conditions in young children, such as unexplainable attacks of febrile conditions, cervical adenitis and numerous symptoms attributed to intestinal disturbance. The purpose of this paper is not to touch upon most of the already well-known data commonly found under the title of adenoid and tonsils, but to present more recent deductions, chiefly experimental dealings with these organs in their connection with certain general infections. A study of the relation of the lymphoid tissue of the throat to chronic systemic disturbances is a most interesting one and covers many fields of work. Some of our most valuable contributions have come from those engaged in the practice of general medicine and surgery. Since the more thorough recognition of the importance of an examination of the pharynx and the remote effects of throat infection, the practitioner has been quick to consult the specialist, not only for such symptoms as mouth breathing, snoring at night, frequent earaches, repeated colds in the head, mental dullness, night sweats, etc., concomitants of adenoids, but also to discover the cause of repeated attacks of tonsillitis, supratonsillar abscess, tubercular adenitis, endocarditis and many joint affections.

At the present time the relationship of acute articular rheumatism (acute serous synovitis) to the tonsil is claiming the attention of the profession. Clinical evidence would often appear to show that there might be a connection as the removal of septic foci has sometimes been followed by complete relief of the joint symptoms. Certainly, joint inflammations of a more or less severe

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type occur not only in combination with general sepsis (pyemia), but after the most trifling local infections. It is also seen in certain specific diseases like scarlet fever, gonorrhoea, pneumonia and typhoid. Lovett,¹ speaking as an orthopedist, remarks: "A long step towards explaining a possible source of pyogenic infection in articular rheumatism has been made in the recognition of the existence in the tonsils of organisms capable of producing the symptoms of rheumatism when injected into animals. The tonsils acting as a filter are, perhaps, more effective as such when they are normal than when inflamed. When their cells are injured or diseased it is obviously easier for the pyogenic organisms of the locality to enter the circulation, and the frequent association of sore throat with the early stages of rheumatism suggest a lesion of the tonsils, impaired efficiency of filtration and consequent easier entrance into the circulation for the pyogenic organisms. This to a certain extent explains the more frequent occurrence of rheumatism during the cold and damp weather most likely to attack the throat. Chronic tonsillitis is therefore to be regarded as a most likely source of rheumatic infection, either in the acute cases or in chronic joint affections."

Goldthwait² also, in referring to infectious arthritis, notes that "the condition is rarely primary, but usually appears as a sequela of some other disease, representing in all probability the extension of an infection. The primary disease may be mild and attract little attention, so that in a large number of cases, especially the so-called acute rheumatism, the few symptoms of the primary disease are often considered to be prodromata of the joint lesion." It is, then, in the class of cases where the source of infection cannot be established that an examination of the throat should be made.

Leaving the domain of general medicine for a moment, let us turn to other laborers, most of them throat specialists, and see what observations have been made. The relation of tonsillitis to rheumatism is no new subject, as the articles of Desmos, Hall and Tilley, Mackenzie, Cheatham, Ullman, Thomson, Adler, Rottenbiller, Gurich, Parmentier, Ingals, Freer and a host of others will testify. According to Ingals,³ "One of the first references found on the relation of these two diseases was by Desmos, about forty years ago, who states that the poison of rheumatism occasionally favored the production of inflammation of the tonsils."

In spite of such extended research, however, we are still in the dark about much that we should like to know. Statistical deductions have come to be thrown out as almost worthless. As it is not clear what particular bacteria cause the trouble, it is impossible to state whether the condition is caused by the bacteria themselves gaining entrance to the body or merely due to the absorption of their toxins.

This brings us face to face with the question: Is the throat in a particular patient the point of entrance for the infection of the joints? The

question is not an easy one and cannot as yet be truthfully answered. While the point of infection may occur in other regions than the throat, if these can possibly be eliminated, we can, if it seems wise, extirpate the tonsils thoroughly and replace a structure of at least lessened resistance by a sound wall of tissue. The responsibility in case of failure would rest as much with the family physician as with the specialist, if such advice were given. So much, then, for the vexatious problem of tonsillar lesion and joint infection.

The relationship between enlarged tonsils and tubercular cervical adenitis is another phase of the subject now being investigated. Is the tonsil frequently the seat of a tubercular process? That non-tubercular cervical adenitis is often produced by toxins absorbed from the tonsil, there can be no dispute. It occurs, as a rule, from lacunar retention, with usually some alterations in the appearance of the tonsil. In such cases the throat is undoubtedly the starting point of infection. In tubercular adenitis, however, while the connection is a very close one, it is not always clear just what route bacilli have followed. Tubercular cervical adenitis is essentially a disease of children. The disease may exist without much alteration, so far as one can see in or about the tonsil, although there may be considerable adenoid tissue in the vault. At first this was puzzling, until it began to be surmised that the micro-organism might enter through a tonsil of normal appearance, or possibly from the adenoid. In cattle Theobald Smith has attempted to show that the bacilli of tuberculosis may enter the body through the mucous membrane of the mouth and pharynx into adjacent lymph nodes without leaving any trace. While it is difficult to draw analogues from this, the evidence is at least suggestive. In adults, however, the tonsil should less frequently be the entrance point of a tubercular affection.

Goodale,⁴ of Boston, presents an interesting series of 9 cases of cervical adenitis, which rapidly cleared up after the removal of the tonsils and whatever adenoid tissue was present. In every case the tonsils and adenoids were examined histologically and inoculations made into guinea pigs. In all but one case either one of the tonsils or both or the adenoid showed giant cells and tubercles microscopically, and inoculations into guinea pigs was followed by extensive tuberculosis. In one case, in which the examination of the throat showed tonsils of normal contour and color, not enlarged or adherent to the pillars, a microscopical study demonstrated giant cells and tubercles. Occasionally the bacilli of tuberculosis were noted. He concludes that "these cases demonstrate first that tubercular cervical adenitis may exist in association with the presence of tubercle bacilli in the tonsils, with or without visible changes in these structures, and is not necessarily affected by the removal of the tonsils. Second, that a form of cervical adenitis occurs, accompanied by distinct enlargement and subacute or chronic inflammation of the tonsils, and disappears after their excision. In the first

instance it appears reasonable to assume that a penetration of tubercle bacilli through the tonsils into the lymph glands has occurred; in the second, that an absorption of irritating material generated in the tonsils is taking place from them into the adjacent lymph nodes. In the latter instance the removal of the focus of toxin production is followed by immediate relief."

In this connection it is of interest to further follow the experiments of Jonathan Wright, Grober, Harbitz, Lartigan, Goodale and others bearing on the possibilities of bacilli passing through the lymphoid tissue without local inflammation changes and on the absorptive power of the tonsil. Undoubtedly, this route of infection would assume greater importance if the tonsils were examined not only microscopically but by inoculation methods. Occasionally inoculations prove the presence of tuberculosis when the microscope will not. Grober, out of a total of 28 experiments along these lines, injected 1 cc. of a sterilized emulsion of black Chinese paint into the tonsils of a rabbit and two dogs. Autopsy was performed a week or more later. In the rabbit autopsy showed coloring matter behind the tonsil and in the lymph glands on the left side of the neck as far as the upper border of the thyroid cartilage. The lymph vessels were filled with the free coloring matter as well as the leucocytes. Autopsy on the dogs showed pigmented areas, not only around the tonsil but along the muscles of the neck. The coloring matter was even traced to the bony opening of the thorax and to the parietal pleura, which when stripped off and examined by transmitted light, showed the black pigmentations. The mediastinum was also affected in the same way.

Wright and Goodale have demonstrated that coloring matter need only be dusted into the crypts to be readily absorbed into the interior of the tonsil. Wright showed that while powder was absorbed there was a marked difference in the absorptive power of the tonsil for powder and bacteria. Bacteria, he thought, seemed to more or less resist absorption, but clung more tenaciously to the outside of the tonsil. Wright's⁵ experiments on the fat contents of the tonsils are also worth noting. After becoming familiar with the appearance of fat in the tonsils under ordinary circumstances he smeared tonsils with butter ten or fifteen minutes before tonsillotomy. In these cases the distribution of fat was relatively exactly the same as in other cases, but the increase in amount was everywhere very decided. Evidently the rapidity of the absorption of fat by the tonsillar epithelium was greater even than that of dust.

From the work of men cited, and including the work of others whose names have not been mentioned, the following conclusions seem rational. I prefer in this to repeat the summary of P. K. Brown,⁶ of San Francisco, which covers the following points convincingly:

1. Minute particles of foreign matter, dust, carmine and other pigment, when locally applied,

are rapidly absorbed by the tonsils from the crypts and are found easily in sections of tonsils removed as early as fifteen minutes afterwards.

2. Bacteria do not pass so rapidly and are rarely recoverable in the tissue under ordinary circumstances.

3. Ordinary organisms are probably absorbed less rapidly on account of their mucous protection. They are promptly destroyed as soon as they enter the tonsillar parenchyma, unless able to resist this power of the tonsil. It is probable even in this case that their virulence is somewhat altered.

4. Virulent organisms follow the same course that dust particles and nonpathogenic or mildly pathogenic bacteria do and may cause local lesions, lymphatic involvement and lesions in any part of the body.

5. Tubercle bacilli may lodge and remain indefinitely in the crypts, ready to be absorbed at any time. They are a constant source of danger, even though not involving the tonsil in actual disease.

While one is hardly inclined to be such an ardent believer in the far-reaching evils of the so-called tonsil, as for instance Solenberger,⁷ one cannot help agreeing with Campbell,⁸ that very often diseased tonsils are a great menace to glands and contiguous parts which seem especially susceptible to infection. That the tonsil has an internal secretion or function I very much doubt. Like a troublesome appendix, there is so much evidence to show that they are better out than left behind to be a source of infection, that the force of such an argument is lost. The final word, however, cannot be added until their function is definitely established.

Cases of nephritis as a complication of tonsillitis are being reported, and even a few cases of leukemia and general septicemia. Holmes,⁹ of Cincinnati, reports a fatal case of cryptogenic staphylococcus bacteremia of undoubted infection through the tonsil and reviews the literature. The fact that the contagious diseases are preceded by an angina and swollen tender tonsil is, to say the least, suggestive.†

†A recent editorial in the Jour. Am. Med. Asso., May 11, 1907, "Appendicitis and Angina," discusses the hypothesis supported by Kretz and already advanced by others that acute appendicitis in certain cases may be the result of a general infection which originated in a streptococcal tonsillitis and angina. The observations made are as follows: "According to Kretz (Verhandl. der Path. Ges., 1906, x, p. 229), acute phlegmonous appendicitis may be associated with acute tonsillitis, and in these cases streptococci occur as the predominating organism in the appendix, in the peritoneal exudate and in the tonsils. These conclusions are based on observations made after death, in cases in which the conditions were favorable for satisfactory study and all which occurred in young persons without previous attacks. The changes in the tonsils were marked. As regards the route of infection, assuming that the appendix is secondary to the tonsillitis, then the following possibilities must be considered: pyogenic cocci may be pressed out of the tonsils in the act of swallowing and carried to the intestine, or the cocci may be transferred to the appendix by way of the blood. In favor of the latter as the more likely route are the conditions described in the tonsils and cervical lymph nodes, whence bacteria may pass directly into the blood (tonsillo-genous bacteriemia); and the condition in the appendix itself and the adjacent parts of the intestinal tract, especially when death ensues early, indicates clearly that inflammation begins about minute foci of necrosis and milary abscesses, which correspond accurately in size and location to the lymphatic follicles and which undoubtedly result from mycotic embolism, minute masses of cocci being found within the vessels in the center of the follicles. These observations again emphasize the importance of the tonsils in the etiology of various pyogenic infections. Kretz also points out that Semmelweis really was the first to announce clearly that many apparently heterogeneous inflammations — acute endocarditis, osteomyelitis and arthritis, acute peri-

In concluding these remarks on the tonsil, the whole subject may be boiled down to the question of removal under certain conditions to be determined in each individual case, not alone by an examination of the tonsil, but bearing in mind as so well expressed by Ballanger,¹⁰ that "when the tonsil becomes a well-established atrium of infection the physical economy of the patient is constantly menaced by conditions ranging all the way from a follicular tonsillitis to endocarditis and pulmonary tuberculosis."

Leaving the faucial tonsillar structure as a cause of so many ills, the adenoid next claims our attention. According to its situation these collections of lymphoid tissue have received various names, such as the faucial tonsils, one on each side of the pharynx, the pharyngeal third tonsil or so-called adenoid in the vault above, and the lingual or fourth tonsil below at the root of the tongue. It is observed that there is in reality a complete ring of tonsillar tissue (Ring of Waldeyer) about the entrance of the throat. The lingual tonsil is apparently the only one not predisposed to inflammation in so far as we now know. In considering the adenoid a word in regard to its pathology may not be out of order. These growths are composed of lymphoid tissue, formerly termed adenoid from the mistaken idea that it was glandular in structure. The term "adenoid" as originally employed by Meyer, however, still clings to it.

Our knowledge in regard to the absorption of dust on this lymphoid tissue of the naso-pharynx is much less definite than with the tonsils. There would seem to be no definite reason why the same thing might not occur in spite of certain anatomical differences in the position of the adenoid, relatively fewer number of bacteria and differences in the composition of the fluid bathing them. The fact that the adenoid tends to shrink at puberty also limits to a certain extent the production of added disturbances. In young children the presence of adenoid tissue is a greater factor in the production of harmful effects than are the tonsils. This is due mostly to the fact that the naso-pharynx is very small in infancy. In regard to frequency it may be said that adenoids are far more common in young infants than even the laryngologist has supposed.

Sprague¹¹ is correct in stating that "there is probably no condition of childhood which plays so important a part in the causation of febrile conditions, aside from the exanthemata. Many of the obscure and otherwise unexplainable attacks of febrile conditions in children up to eight years of age are due to acute inflammation of the adenoid tissue." He thinks it is safe to say that all earaches occurring in children under ten years of age and the periodical earache which occurs in the night, keeping the child awake for several hours, are due to temporary closure of

the Eustachian tube, which results from adenoid congestion following some slight exposure.

Morse,¹² in a valuable review of the diseases of the naso-pharynx from the view point of the pediatricist, states that "rickets is especially prone to develop in these cases, and considerable deformities of the chest are sometimes produced. They are one of the commonest, if not the most common, cause of chronic 'snuffles' in infancy. They are always present in those babies that are subject to frequent colds in the head. The fact that the baby does not keep its mouth open and snore at night or have the typical facies of adenoids should not allow one to overlook the adenoid symptoms, but be on the lookout for them when they are present, since the frequent colds and chronic snuffles are almost as suggestive and characteristic of adenoids in infancy as these more marked symptoms are in childhood. Adenoids should always be thought of when babies sleep poorly."

It is hardly necessary to add that the practice of immediate removal should be instituted when offending lymphoid tissue seems in any way to be connected in the causation of symptoms. Adenoids are associated with enlarged tonsils in at least 85% of the cases. Sprague gives this percentage as 90% in 1,000 cases.

The preparation of the patient, although in a general way the same as for any surgical operation, demands a word of explanation. The patient had better be free from acute inflammation of the throat. It makes but little difference whether the child is in an upright position held in a chair or lying down on one side. Out of a total of 521 adenoid and tonsil operations performed in the last three and one-half years the upright position was utilized in 475 without a mishap. The blood does not tend to flow into the larynx. The patient must be fairly deeply under the anesthetic, deep enough to secure throat relaxation, but not so profound as to lose the laryngeal reflex. If this be kept trouble will be prevented.

The choice of an anesthetic has occasioned considerable discussion, ether being used almost to the exclusion of chloroform in some parts of the country. I have never happened to have any trouble with chloroform, perhaps because I have restricted its use. Chloroform is supposed to be especially dangerous in adenoid and tonsil cases, as it is thought that they may belong to the class known as "habitus lymphaticus." The whole subject of status lymphaticus is such an interesting one that it deserves a brief comment. The literature is mostly summed up in the papers of Breckele, Blumer, Connor, Cushny, Crile, Ewing, Furrer, Halsted, Norton, Osler and Vintras. As so clearly stated by Furrer:¹³ "Sudden unexpected death under an anesthetic, without adequate cause, in a patient in good condition before the administration of the anesthetic and continuing so throughout the operation until the moment before the fatal determination is the untoward result that the surgeon may be called upon to face at any moment." We know that sudden death in infants and children and even

carditis and acute inflammation of other serous membranes—really belong together by virtue of a common mode of origin, namely, acute angina. There is need of careful systematic clinical studies of the relation of tonsillar infections to acute appendicitis in order that the special characteristics of appendicitis as a manifestation of tonsillogenic bacteriemia may become better known."

young adults without obvious cause is not exceptionally rare. Post-mortem examination in these cases fails to show anything more than an enlarged thymus. Connor¹⁴ remarks: "This tendency to overgrowth of lymphoid tissue may show itself in any structure where normally lymphoid tissue is to be found; both superficial and deep are frequently affected, as are also the tonsils,—faucial, pharyngeal and lingual. The lymphoid tissue of the stomach and intestines is especially prone to such hyperplasia, and the Malpighian bodies of the spleen are also usually enlarged and numerous, although the gross enlargement of the organ is often slight or lacking. The enlargement and persistence of the thymus, which is made up almost wholly of lymphoid tissue, is only another evidence of the tendency in such cases to universal lymphoid proliferation. The careful anatomical study of these cases has shown that certain other bodily abnormalities and diseases are present in very many instances, such as: hypoplasia of the heart and arteries, incomplete development of the sexual organs, evidences of old or recent rickets, abnormalities of the thyroid gland and idiopathic epilepsy."

The points of practical interest to us are: (1) The question of whether a diagnosis of status lymphaticus can be made during life. (2) Whether cases of greatly enlarged adenoids and tonsils are more likely to fall in this class than individuals who are not so affected.

In regard to the first point, it may be stated that a positive diagnosis is, to say the least, extremely difficult, if not impossible. The diagnosis is certain only when verified by a most careful autopsy. Nevertheless, such a disorder should be born in mind, especially if attention is drawn to it by any suspicious circumstances.

In considering the second point, it would seem reasonable to suppose that cases of simple adenoid and tonsils should not in themselves present reasons for doubt or anxiety in this respect. It is only when they are associated with some of the previously mentioned stigmata, as, for instance, absence of pubic hair in an adult, frequent attacks of syncope, dyspnea and laryngismus stridulus, etc., that the possibility of a *constitutio lymphatica* should be considered. As the list of fatalities increases we find death from all manner of slight causes, such as antitoxin injections, bathing, convalescence from acute infectious diseases, labor, etc., and from both ether and chloroform.

In closing I wish to call attention to the method of removal of tonsils (and adenoid) in these cases when they are but moderately enlarged and yet undoubtedly the cause of some disturbance. It is very important that the tonsils be removed thoroughly down to and including the capsule. It is the only method of procedure which can guarantee immunity from further infection. The tonsillotome so frequently used will not answer the purpose. It is about as surgical to leave large pieces of the tonsil in some part of the sinus tonsillar as it is to excise but a portion of the appendix in an appendectomy. Incision, cauterization or partial decapitation does not meet the

condition. The offending organs should be eradicated by scissors, snare or punch, and even the base curetted if necessary to secure a sound wall of tissue behind. The same applies to the adenoid, and after the removal of the adenoid with whatever instruments are used the naso-pharynx should be carefully cleaned out with the finger until smooth and free from all offending shreds. Adenoids and tonsils rarely recur after this systematic attention. A so-called regrowth in such instances is usually pretty fair evidence that the entire organ was never removed.

REFERENCES.

- ¹ Remarks on the Infections of Joints. BOSTON MED. AND SURG. JOUR., May 24, 1906.
- ² Infectious Arthritis. *Ibid.*, April 7, 1904.
- ³ Relation of Tonsillitis to Rheumatism. *Laryngoscope*, October, 1907.
- ⁴ *Ann. of Otol., Rhinol. and Laryngol.*, March, 1907, p. 85.
- ⁵ J. Wright: Fat Content of the Tonsils and Its Relation to the Processes of Metabolism and Infection. *New York Med. Jour.* Dec. 15, 1906.
- ⁶ Remote Effects of Tonsillar Infection. *Jour. Am. Med. Assn.*, vol. 48, p. 2025, June 15, 1907.
- ⁷ *N. Y. Med. Jour.*, Sept., 1906.
- ⁸ *Ibid.*, May, 1907.
- ⁹ Fatal Case of Cryptogenic Staphylococcus Bacteriemia. *Lancet*, Clinic, Sept., 1907.
- ¹⁰ *Ann. of Otol., Rhinol. and Laryngol.*, Dec., 1906.
- ¹¹ *Ibid.*, March, 1907, p. 180.
- ¹² BOSTON MED. AND SURG. JOUR., April 13, 1907.
- ¹³ Status Lymphaticus, with Death under Ether Anesthesia. *Cleveland Med. Jour.*, March, 1906.
- ¹⁴ Clinical Diagnosis of Status Lymphaticus. *N. Y. State Jour. of Med.*, July, 1906.

DIVISION OF THE POSTERIOR SPINAL ROOTS FOR AMPUTATION NEURALGIA.

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The reason for the development of severe neuralgia in the stump after an amputation is still obscure, nor can we apportion precisely the share which is to be ascribed to each of the various pathological processes—involve ment of the nerves in scar tissue, neuroma formation, or ascending degeneration of the nerve, although the latter is probably the most important. Although operative measures are sometimes of service, treatment is often unsatisfactory, and the trouble, as we all know, may prove to be the source of life-long suffering.

In severe cases simple rest in bed, with a strengthening regimen, may offer temporary relief; but the attempt to return to the ordinary occupations, especially with painful stumps of the leg where the pressure of an artificial leg becomes a factor, promptly brings back the pain. The various surgical procedures—excision of the scar, re-amputation, removal of neuromata, or resection of the nerves higher up—sometimes afford temporary relief and sometimes prove unavailing.

In obstinate cases, as in the other inveterate neuralgias, division of the posterior spinal roots has been thought to afford the greatest promise of permanent relief, and it may well be considered if other operative measures fail. It is not, however, to be undertaken without grave considera-