wounds discharging *Strep. pyogenes* comprised those which became infected in the ward (see table) and those which were already infected with this organism on admission. Of the latter there were in all in the first period 3 (2 in the

Table showing Incidence of Hospital Infection of Head Wounds with *Strep. pyogenes* in Two Four-month Periods, before and after Introduction of Improved Dressing Technique

	1st Period	2nd Period
Air-raid casualty wounds:		
Number uninfected on admission	32	46
Number of hospital infections	10	1
Percentage incidence of hospital infection	31.3	2.2
"Clean" operation wounds:		
Number operated upon	46	49
Number of hospital infections	2	0
Percentage incidence of hospital infection	4.4	0.0

male ward and 1 in the female ward), and in the second period 11 (5 in the male ward, 6 in the female ward); therefore, including the patients infected on admission, there were altogether 15 streptococcal wounds in the first period and 15 in the second period.

Results and Discussion

The table records the incidence of hospital infection by *Strep. pyogenes* in the two periods. Hospital infection by haemolytic streptococci other than Lancefield A occurred during the first period, but has not been included in the analysis. It appears that a total infection rate of 15.4% has been reduced to 1.1% by the enforcement of the improved dressing technique and ward organization described above. A number of air-raid casualties admitted in the second period had in addition to their head injuries wounds of the trunk and limbs. Thirteen of these wounds were dressed by the improved technique, and in this group there was no streptococcal hospital infection. Six limb wounds, however, because of their minor character, were dressed without these improved precautions—a relaxation of procedure which proved to be indefensible, since three of them became infected with *Strep. pyogenes*. The result indicates clearly that a large risk of hospital infection was present in the unit during the second period.

The improved technique was devised for neurosurgical work mainly on head wounds. In surgical wards where wounds are larger in area or are exposed for longer periods, and where dressing involves more disturbance of bed-clothes (Thomas and van den Ende, 1941), air-borne bacteria may constitute a greater risk; and in wards where, for example, bathing and irrigation form part of the wound treatment here may be additional channels of infection important enough to warrant revision of the existing therapeutic methods. Nevertheless, it is possible that a greater relative reduction in incidence of hospital infection than that which we have recorded might be achieved in other surgical wards by the adoption of the improved dressing technique only. The technique originally used in the unit was considered to be bacteriologically safer than methods normally employed in general surgical wards, an opinion supported by the fact that the incidence of hospital infection in the preliminary observation period was lower than that obtained under war conditions elsewhere in the same hospital and in other hospitals.

It proved possible to maintain the improved dressing technique under the difficult conditions following the admission of a large number of air-raid casualties in a short period of time. At all times, and especially in times of stress, the intelligent co-operation of the nursing staff is essential if satisfactory results are to be obtained. We cannot praise too highly the work of Miss Mackinder, the sister in charge of the unit, and her nursing staff, without

whose help the improved technique could not have been put into effective use.

We have presented no data upon the ill effects of hospital infection, since they will form the subject of another paper; it may be said here, however, that the hospital infection produced serious complications in a small number of patients and a marked and significant lengthening of the average time of stay in hospital in the group of patients so infected.

Summary

During a preliminary observation period of four months the incidence of hospital infection with *Strep. pyogenes* among head wounds in a neurosurgical unit was 10, or 31.3% of 32 air-raid casualties, and 2, or 4.4% of 46 "clean" operation cases.

An improved dressing technique and a partially revised general ward procedure were designed to lower this rate of hospital infection.

During a test period of four months following the introduction of this technique as the routine method of dressing head wounds, the incidence of hospital infection with *Strep. pyogenes* was 1, or 2.2% of 46 air-raid casualties, and 0 of 49 "clean" operation cases.

Among the patients with head injuries treated in the test period were 19 with limb or trunk wounds. Thirteen were dressed by the improved technique, and there was no instance of hospital infection with *Strep. pyogenes* in this group. The remaining 6 were dressed without the improved precautions, and 3 of these, or 50%, became infected with this organism.

The conditions in the wards were essentially similar in the two four-months periods of investigation, and we attribute the striking reduction of hospital wound infection from 15.4% to 1.1% to the introduction of the improved dressing and nursing technique.

We are indebted to Dr. Herta Schwabacher, Dr. Joan Stokes, and Mr. E. P. Murrell for assistance with the bacteriological investigation; to Dr. Brian Brownscombe for collaboration in the clinical work; and to the Medical Research Council for a personal grant to one of us (J. W.).

REFERENCES

- Brown, W. A., and Allison, V. D. (1937). *J. Hyg., Camb.*, **37**, 1.
Miles, A. A., et al. (1940). *British Medical Journal*, **2**, 855, 895.
Thomas, J. C., and van den Ende, M. (1941). *Ibid.*, **1**, 953.

Medical Memoranda

Tenosynovitis of the Tendo Achillis

This condition has become extremely prevalent in infantry units. Forty cases have been investigated and the following observations made.

CLINICAL SIGNS AND SYMPTOMS

The patient complains of pain in the heel along the Achilles tendon. This is relieved by wearing light shoes, but reappears on wearing boots, particularly after marching. On examination slight swelling of the lower inch of the tendon sheath is apparent. There is usually one point extremely tender to pressure about an inch from the insertion of the tendon into the os calcis. On movement of the foot, flexion, and dorsiflexion, tendon crepitus is easily palpable in most cases. The crepitus is often felt along the whole course of the tendon from its origin in the muscle belly of soleus and gastrocnemius to its insertion. Clinically the condition is identical with simple tenosynovitis as seen in the extensor sheaths of the forearm.

This condition occurring in the Achilles tendon has been described as a bursitis. Tendo Achillis bursitis is a completely different clinical entity which generally follows some violent exertion—e.g., a cross-country run: the painful spot is usually nearer the point of insertion of the tendon, and there is complete absence of tendon crepitus.

AETIOLOGY AND TREATMENT

Tenosynovitis of the Achilles tendon is undoubtedly due to repeated minor traumata which, in my opinion, are caused by an abnormal focus of pressure in the boot. The forty cases were investigated with special attention to the following points:

1. Height of the man, and whether the pace is abnormally short. The height varied from 6 ft. 1 in. to 5 ft. 4 in.

2. History of Forced Marching.—A history of forced marching was obtained in 50%. In 10% the condition arose following prolonged marching—i.e., marching at normal rate but for a longer period during manœuvres; 10% were in mechanized sections.

3. Abnormalities of Feet (e.g., first-degree flat-foot, hallux valgus, pes cavus, etc.).—With one exception, none of these men suffered from any foot deformity.

4. Boots.—It was thought that a new issue of Army boots which might be unduly stiff at the back (the leg or quarter) might be the cause. The boots had been in use for a period of three to eighteen months.

5. Effect of Gaiters on Shape of Boot.—All the men wore the webbing gaiters. In every case a constricting ring was formed on the boot by the lower strap of the gaiters being pulled tight. In this way a small ridge is formed at the back of the boot which causes slight pressure on the tendo Achillis. Slight jarring, as would occur in ordinary marching, between the tendon and this ridge seems to be the chief cause of the tenosynovitis.

The theory that gaiters are the causative factor is supported by the fact that (a) the wearing of light shoes relieves the condition, but that it recurs on resuming boots and gaiters; (b) gaiters wear out at the points of the friction at the heel and over the lace-holes of the boot. Tenosynovitis of the tibialis anterior is often associated with the condition in the Achilles tendon.

A looser-fitting gaiter is required that will not cause a constricting ring on the boot, so avoiding abnormal pressure on the Achilles tendon. Most men wear a gaiter which is so tight-fitting that there is no overlap, and the gaiters bulge at the side, leaving a wide gap. Leather gaiters appear to be much looser, and ride easier on the foot. Larger gaiters or leather gaiters will prevent this condition arising, except occasionally.

The following lines of treatment have been adopted: (1) Rest and the use of a counter-irritant—e.g., Scott's dressing. Most cases clear in five to seven days, but about 20% are more resistant to treatment. (2) Infiltration of the tendon sheath and surrounding subcutaneous tissue with 2% novocain. Three injections each of 5 c.cm. are given on alternate days. If there is no improvement the foot has to be immobilized in plaster-of-Paris for four to six weeks.

A. A. WILLIAMS.
Captain, R.A.M.C.

Local Arrangements under the Cancer Act

Rather more than a year ago the Minister of Health informed local authorities of his decision to extend to March 31, 1942, the period during which they may submit their arrangements under the Cancer Act, 1939. The Minister recognizes that in general it is not possible for local authorities to make complete arrangements under the Act at the present time, and in Circular 2469, dated August 30, 1941, he extends the period for a further twelve months, while urging those who have not already done so to submit, as soon as possible, interim instalments pending formulation of more complete schemes. Local authorities should exclude from such interim arrangements the erection of new buildings, elaborate extensions to existing buildings, or the provision of costly new equipment. Much could, however, be done even under present wartime conditions by extending the facilities for diagnosis and treatment that now exist. Conditions in some of the specially vulnerable towns may be reducing or impeding the hospital treatment facilities available to sufferers from cancer, who may thus be precluded from obtaining hospital treatment which might be likely to benefit them. To counteract this the Minister is endeavouring to arrange, where practicable, for cancer treatment centres to be set up at certain of the hospitals in the Emergency Hospital Scheme outside the towns which they would serve. These centres would be a temporary and emergency provision to meet the exceptional conditions in these towns.

Reviews

THE AVITAMINOSES

The Avitaminoses: The Chemical, Clinical and Pathological Aspects of the Vitamin Deficiency Diseases. Second edition. By Walter H. Eddy, Ph.D., and Gilbert Dalldorf, M.D. (Pp. 519; illustrated. 25s.) London: Baillière, Tindall and Cox. 1941.

Since the publication of the first edition of *The Avitaminoses* certain vitamins have become available in pure form, and some have even been synthesized. This has led to the treatment of patients with the pure products, and much information has been acquired about deficiency diseases generally. The authors of this book have gallantly tackled the very difficult problem of sorting out the evidence which has accumulated during the last few years, for the information available is mostly the result of observation (no controls), not of experimentation (performed with controls). Their main conclusions, emphasized time after time throughout the book, are that a deficiency of one vitamin does not in general produce one specific lesion but a number of lesions which are not all specific to the vitamin in question, and, moreover, that most patients suffering from a deficiency of one vitamin are also suffering from deficiencies of several others. They also show clearly that the picture produced by a severe deficiency is not merely a more pronounced picture than that produced by a partial deficiency but a more complicated one altogether.

In connexion with the vitamin values of foods it would have been useful to have a short account of the need for and use of international standards of reference until the time when pure preparations should be available for comparisons in determinations of the vitamin contents of foods. It is a pity even to mention the obsolete units which were at best a temporary makeshift until international standards and units could be adopted. Vitamin B₆ (p. 6) is not a filtrate factor but an eluate factor from liver extracts, and pantothenic acid was the first factor (there may be others) identified in liver and yeast filtrates. But apart from various minor inaccuracies this is a valuable book of reference for all who are interested in deficiency diseases, and particularly for those (such as our own general practitioners) who may have to diagnose cases of partial deficiency in their daily rounds. The book contains 41 excellent plates from photographs of patients or morphological sections of deranged tissues.

GASTRIC OPERATIONS

Technique of Gastric Operations. By Rodney Maingot, F.R.C.S. Oxford Medical Publications. (Pp. 240; 15s. net.) London: Oxford University Press. 1941.

Mr. Rodney Maingot has produced a very readable and well-illustrated book of convenient size dedicated to a list of sixty-two students from the London Hospital who because of the war were transferred to the Southend Hospital for part of their clinical training. We hope, however, with all due respect to Mr. Maingot, that medical students will not spend time on memorizing the contents of a work such as this, which admirably deals with technical details important to the gastric surgeon but, we hope, as yet not within the visual range of the undergraduate student, who, faced with the extensive curriculum of to-day, is likely to be in real danger of missing the wood for the trees. The book has not the advantage of a historical introduction, which might have given it some value to the student, who will surely tend to be confused by the many variations in technique to which names of different surgeons are attached.