

Bulletin

OF THE

Canadian Army Medical Corps

ISSUED FROM THE OFFICE OF THE

D.G.M.S., OVERSEAS MILITARY FORCES OF CANADA.

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This Bulletin is issued to every unit of the Canadian Army Medical Corps. It will be passed for reading, and will be initialed by all Officers. After return it will be kept on file by the Officer Commanding for further reference

TYPHOID SPINE.*

By SIR WILLIAM OSLER, BART., M.D., F.R.S.,

Regius Professor of Medicine, Oxford, and Consulting
Physician to No. 15 Canadian General Hospital.
Honorary Colonel, A.M.S.LET me begin at the end by reading a letter received
January 3.

National Hospital, Queen Square, London.

DEAR SIR WILLIAM,—Sapper C., typhoid spine, was admitted
yesterday. You will be interested to know that he is now
walking normally. It was a good case, although he walked
after ten minutes' treatment.

Yours sincerely,

L. R. YEALLAND.†

Had Sapper C. gone to Lourdes—had he gone to our own
Canadian Shrine, St. Anne de Beaupré, what a miracle!
Paralysed for nearly two years! unable to move body or
legs! never out of his bed! and yet he walked in ten minutes!
Well, it is a miracle all the same, an illustration of the faith
that heals—not the same sort of faith, however, that the lame
man at Lystra had, the firm persuasion that Paul and
Barnabas were able to cure him, for I am afraid from what
Dr. Yealland says, and from what we know, Sapper C. was
not very anxious to get well.Now to refresh your memory of the case, which is an
important one from many standpoints. I saw the patient in
April, 1916, with Dr. Whithall, at the V.A.D. Hospital,
Maidenhead. The condition was as follows: Excessive
nervousness and apprehension, so that he broke into a profuse
sweat, trembled, and was very fearful lest we should attempt
to move him. He was well-nourished, no mental disturbance,
special senses normal, pupils widely dilated. When stripped
a diffuse blush spread over the trunk, and there was an
unusually persistent condition of goose skin. He was unable
to move the body, any attempt being followed by agonizing
pain in the back. The legs looked normal, and there was no
wasting, no disturbance of sensation. An attempt to sit up
was followed by severe pain in the back; with great difficulty
he was turned on the left side, but it was impossible to get
him in the sitting posture. The spine was straight, no pro-
jection or unusual prominence. Below the mid-dorsal region
it was very painful on pressure, and over the lumbar spines
the slightest touch caused him to cry out. The examination
of the abdomen was negative; nothing could be felt on either
side or in the iliac regions on the deepest pressure. The
spleen was not palpable. The legs could not be lifted from
the bed or drawn up. On making the attempt they went
into clonic spasm. The toes could be moved and the ankles
flexed. The temperature of the legs was normal, and there
were no trophic changes.Sensation: Normal in hands and face. On the skin of
abdomen in a band about a hand's-breadth in width below
the costal margin there was extreme hyperæsthesia; the
slightest touch caused him to cry out; he could not even
bear the weight of the bedclothes. It extended to the back,
but was not nearly so marked as in front. Below the navel
the sensation was normal. On the skin of the legs he felt
the pin-prick everywhere, and recognized the difference
between heat and cold.Reflexes: Knee-jerks exaggerated, slight rectus clonus, no
ankle clonus; Babinski sign not present. Cremasteric and
abdominal reflexes present. Bowels and bladder normal.In February, 1916, the patient had an attack of typhoid
fever, and was treated in the V.A.D. Hospital, Maidenhead.
Though prolonged it was not a severe attack, the temperature
never rising above 104° F. The convalescence was slow, and
he remained in the hospital all the summer. In October he
had another febrile attack which was thought to be influenza.
Following this he began to have pains in the back and stiff-
ness; these symptoms have persisted, and he has never been
out of bed, and has become more and more incapacitated.

I asked to have the patient transferred here, to the Duchess

of Connaught's Hospital, Clevedon, where he was admitted
May 7, 1917. A spinal jacket gave great relief to the pain
in the back, and the hyperæsthetic girdle rapidly disappeared.
In the eight months the changes have been an improvement
in his general condition, manifested in a gain of weight, in
less marked basal motor changes, and less apprehension and
dread of pain. The area of hyperæsthesia has disappeared.
The rigidity and immobility of the back has persisted. We
have never been able to get him to sit up. An attempt to
move the legs at once brought on the clonic spasm, and there
always was an appearance of unusual effort in attempting
to make the movement. Night and morning one of the nurses
made him draw the legs up and down, and this of late he
has been able to do pretty well, and with less tremor. The
reflexes have remained the same, and there has been no
anæsthesia, though at times the tactile sensations seemed less
acute than at others.Shortly after admission to Taplow an X-ray picture was
taken which showed a very dark shadow in front of the lower
dorsal and lumbar vertebræ, practically identical with the
shadows shown in figs. 2 and 6 of Dr. J. B. Carnett's article
in *The Annals of Surgery*, 1915. I submitted the picture to
a number of experts, some of whom expressed doubts as to
the significance of so large and dark a shadow. Major
Morgan, when he took charge of the department, very kindly
made a special study of the case, and the subsequent X-ray
pictures showed a spine normal in every particular.The case has attracted a great deal of interest, and in the
weekly demonstrations I could not always carry conviction
to the minds of visitors that the condition was purely func-
tional, and that the patient would ultimately get well. My
personal education in the disease is worth noting:—The first case one sees of a special disease or complication
usually fixes itself in the memory. In 1887 I was asked by
Dr. Grasset, of Toronto, to see with him a young officer
invalided from India with paralysis after typhoid fever.
Healthy-looking, excessively nervous, unable to walk or to
move in bed, the striking feature was a painful stiff back,
so that any attempt to turn or move made him scream. There
was nothing to be made out on examination except tenderness
in the dorsal region. The legs were weak, but there was no
paralysis, and the bladder and bowels were unaffected. The
pain and stiffness had lasted for more than five months, and
he was brought home believed to be permanently disabled.
He was so nervous that I regarded the whole condition as
functional, ordered a jacket with massage to the legs, urged
him to get up and go out and gave a favourable prognosis.
The improvement was rapid and progressive, and he got
quite well. This was my introduction to the condition which
Gibney, of New York, first described in 1887 as typhoid spine.
In 1890, at a meeting of the Association of American
Physicians, Dr. Loomis called our attention to Gibney's
observations. In Series I of our "Studies in Typhoid Fever,"
Johns Hopkins Hospital Reports, vol. iv, p. 73, I wrote a
paper with the title "On the Neurosis following Enteric
Fever known as the Typhoid Spine" (the first communication
on the subject to follow Gibney's), in which I reported two
cases, and, in opposition to Dr. Gibney, took the view that
it was a functional disturbance, analogous to "railway
spine" or "hysterical spine." I was much impressed with
the rapidity with which the cases recovered—far too rapidly
in Case II for a spondylitis. In Series II of the "Typhoid
Studies," *J.H.H. Reports*, vol. v, p. 315, I reported three
additional cases, two very mild, all negative on examination,
which improved rapidly with the Paquelin cautery. In
Series III of the "Typhoid Studies," *J.H.H. Reports*, vol. viii,
p. 485, I reported a mild case of "tender spine." To this
time I had seen nothing to make me change my view of the
functional character of the trouble. Meanwhile we had seen
many cases of the bone lesions following the disease, and it
always seemed a strong point in favour of my view that the
typhoid spine never presented any swelling, and never went
on to suppuration. In 1902 I had to change my mind. I saw
a patient of Dr. Reinhardt, in the fourth week of con-
valescence, with stiff, painful back, weak legs, excessive
nervousness, but in addition a well-marked painful swelling
just above the right sacro-iliac articulation. Convalescence
was slow, but no suppuration followed. Several other cases
were seen, and with the help of Dr. T. McCrae I reached the
belief that Gibney's original view was correct for some cases.
Careful X-ray examinations showed spinal changes, and in a
patient at the Clinique in July, 1904, Dr. Baetjer demon-* Clinical Remarks, January 7, No. 15 Canadian General
Hospital, Clevedon, Taplow.† Let me commend to those interested Dr. Yealland's (just
issued) "Hysterical Disorders of Warfare," Macmillan and
Co., one of the most remarkable contributions to neurology
made during the War. Dr. Yealland is a Canadian, who
before the War was in charge of the Out-patient Psychopathic
Department of the Toronto General Hospital.

strated a definite deposit of bone filling the space between the second and third lumbar vertebræ. In 1906 Dr. McCrae reported this case and another with bone changes in the spine,* and in the "System of Medicine" we edited together he gave an excellent analysis of the condition, and grouped the cases into three categories. First, those in which the hysterical features predominate. Secondly, cases with periostitis, or perispondylitis, with fever, pain, rigidity, and evidence of nerve root involvement. And thirdly, a group of cases with definite objective changes in the spine, as shown by the X-ray pictures, as well as by examination.

I confess freely to have taken too one-sided a view of the condition, but it was not without a strong basis of support. Such a prompt recovery, such as followed in several of the reported cases, seemed quite inconsistent with the existence of a spondylitis. In showing a case at the Johns Hopkins Medical Society, 1901, the following features were dwelt upon as indicating the functional character of the condition: First, a state of neurasthenia with vasomotor changes, and in not a few cases the definite stigmata of hysteria. Secondly, stiffness of the back, persisting for weeks and months, is associated with pain, sometimes of an agonizing character, on movement. Thirdly, pain on pressure over certain spinal processes. Fourthly, a negative local examination, with the absence of fever. And lastly, in many cases, prompt recovery, with the use of the Paquelin cautery, and measures directed to the neurotic condition.

This case of Sapper C. is a strong confirmation of this view. You saw him last Monday after the spinal jacket was removed—still very neurotic, the spine absolutely rigid; we could not induce him to sit up; he could just lift the legs off the bed with the same type of general clonic tremor. I know that some of you felt hopeless about him, and he had got hopeless about himself, but new surroundings, a new mind, and very skilfully applied methods did in ten minutes what we have failed to do in a year—put him on his feet. I saw him on the 3rd locking well, walking well, and very happy to be on his legs again.

The literature of typhoid spine to 1905 is fully analysed by Karl Fluss, *Centralblatt f.d. Grenzgebiete der Medizin und Chirurgie*, Bd. viii, and by Elkin and Halpenny in vol. i of the *British Journal of Surgery*, 1914. More than 100 cases have been reported, a large proportion in males. The onset is usually during convalescence, but has been weeks after, and has followed a sudden jar or twist or a blow. Constitutional disturbances are present in all cases. Fever is usually absent, but a range of 100° to 100.5° F. is not uncommon. Paroxysms of fever have been described, and there may be marked leucocytosis. A change in the mental condition has been noted in the majority of instances. The patients are excitable, apprehensive, self-centred, with the features of neurasthenia, and very often positive hysteria. In Sapper C.'s case this has been a striking phenomenon throughout. He was like a shell-shock subject, and at the first examination had an emotional storm with profuse sweating, goose skin, and then a vasomotor hyperæmia spread over the entire trunk. I have not seen a case without neurotic manifestations in some degree, even when signs of local disease were present.

Perhaps the most interesting case on record is the study by Dr. Leonard Ely, of New York, of his own attack (*Medical Record*, September 20, 1902). One hesitates to suggest the existence of hysteria in a professional brother, but one may say, at any rate, that the condition simulated it, and he confesses to have been "considered hysterical by his nurses." The professional baseball pitcher, whose protracted case is reported by Carnett; the cases of Lovett and Withington and Taylor's case had hysterical features combined with organic changes.

Of the local features, pain in the back, particularly on movement, is the most constant, and it may be of extraordinary severity, so that the patient screams on the slightest movement. It comes on in paroxysms, and is aggravated by the slightest jar or at any attempt to move. Patients have had to be chloroformed when they use the bed pan, and the threat of suicide has been recorded in several instances. The pain may be of a definite nerve-root character, extending round one or both sides, or it may pass down one or both legs.

Tenderness on pressure is present over the spinal processes of varying numbers, sometimes limited in the lower dorsal and lumbar regions. Rigidity of the back is a constant feature; the patients are unable to stoop, and have a difficulty in raising themselves to the sitting posture. One patient came into the hospital supported by two friends almost bowed double, and it was only with the greatest difficulty that the back was straightened.

If, as some orthopædic surgeons hold, a rigid back indicates organic disease, all of these patients had it, and no case I have seen has been more marked than in Sapper C. Clonic contraction of the muscles has been present in a number of instances. It may be nothing more than the fine tremor on attempting moving of the legs; but there is one type of muscular contraction in these cases that is of great importance, as to my mind it is an unerring stigma of hysteria. I refer to the rhythmic contraction of the abdominal muscles, noted by Ely in his own case, and present in two of Carnett's cases. In a patient admitted in October, 1902, with pain in the back and the ordinary features of typhoid spine, the abdominal muscles were contracting at the rate of 75 to the minute, which gave a very remarkable appearance to the flanks, which were moved in and out like a pulsation.

Inability to use the legs is present in severe cases, but there is no actual paralysis, no wasting, and the features are quite unlike post-typhoid paraplegia from myelitis or from neuritis. Reflexes are increased, but not changed in type. Disturbances of sensation in the form of hyperæsthesia are common, particularly in the back. Anæsthesia may be present, and it is interesting that Dr. Yealland, in Sapper C.'s case, found a stocking anæsthesia, which certainly was not present on any occasion on which I or others examined him.

The last and important point is the evidence which exists in some cases for disease of the spine. This is of two forms: Kyphosis has been present, and of a type that could only occur from positive disease of the bone. Swelling of the soft parts on either side of the spine has been described and was present, as I have stated, in the patient seen by Dr. Reinhardt, the only one of the ten or twelve cases I have seen in which on physical examination changes were present. Of ordinary scoliosis and of associated atrophy of the lumbar muscles one cannot be so certain, as they are common enough in hysteria.

The X-ray picture has been studied now in a large number of cases. Osteoporosis, absorption of the intervertebral discs, and local bone proliferation have been described. It is extraordinary how few satisfactory skiagrams of the condition exist. I have looked in vain for one through the special journals, and some that have been published elsewhere are in the highest degree unsatisfactory. It is not fair to criticize a print without the plate, but figs. 2 and 6 illustrating Dr. Carnett's paper have had an extraordinary resemblance to the first plate taken of Sapper C., but subsequent study showed them to be artefacts, and the spine and adjacent bones show no trace of disease.

Upon one remarkable feature all writers dwell. Unlike ordinary typhoid periostitis the spondylitis rarely (if ever) goes on to suppuration. When present the lesion must differ essentially from that which we see in the long bones and the ribs. Typhoid bacilli have been frequently found in the bone marrow of the vertebræ, and there is no inherent reason why similar inflammatory changes should not be produced as in other bones. We know, indeed, from the presence of the kyphosis and from the X-ray picture that such changes do occur. Why they are not seen more often is, I believe, that they are not always present, and that we must recognize functional variety, which has its counterpart in certain forms of hysterical and railway spine.

ON THE NATURE OF "SHELL-SHOCK."

By F. DILLON, M.B., Ch.B.Edin., Temp. Capt., R.A.M.C.
Late Officer-in-Charge "Shell-Shock" Centre, — Army,
No. 3 Canadian Stationary Hospital.

It is an interesting and instructive fact that, after the experience of three years and a half of war, there still should be so much diversity of opinion on the subject of the nature of "shell-shock."

* *Amer. Journ. Med. Science*, 1906, ii, p. 140.

The explanation may lie in the inherent difficulty of the subject itself, for it is generally admitted that we are dealing here with a class of cases amongst the most difficult within the scope of medicine. It is possible, on the other hand—and it seems to me reasonably apparent—that certain preconceptions on the part of the writers and investigators of the subject have gone some way towards producing this difference of opinion. It seems, for instance, now to be generally admitted, implicitly if not explicitly, that in dealing with shell-shock, neurasthenia, and allied conditions, we are dealing with disorders intimately associated with the emotional activities of the personality. It is not surprising, therefore, that a certain reluctance, from both egoistic and patriotic motives, should show itself towards admitting that emotions of a certain class should be capable of producing disability amongst our soldiers.

This point will be referred to later. At present it is desired merely to point out that in the scientific investigation of a subject the disagreeableness of a fact should be no obstacle in the way of its acceptance, once it is shown to be a fact. A further partial factor in the production of this indefiniteness of opinion on the subject seems to be that the name "shell-shock" appears originally to have been coined with no clear or adequate conception of the condition it was designed to describe. It was applied indiscriminately to cases incapacitated through shell explosion or other sudden shock of war, without showing sign of visible injury. In consequence, particularly in the earlier stages of the War, cases the most diverse and varied were admitted into hospital under the common label "shell-shock"—fractures of the skull, injuries to the spine, concussion, hysteria, psychasthenia, and several others, and descriptions of some at least have found their way into the literature on the subject. In particular, no attempt seems to have been made to form any conception of a constantly recurring clinical condition which might be said to represent the disorder resulting from the stresses and strains of warfare. In a fairly recent publication it has been affirmed, in fact, that "if by any stretch of the imagination we could speak of a specific variety of disease called shell-shock it would be new only in its unusually great number of ingredients" [1].

That does not accord with my view. The accumulated evidence from several months' experience in the trenches, and subsequent observation of over two thousand cases of the psychoneuroses of war at an advanced centre in France, have led me to the conclusion that a number of definite clinical conditions of psychological origin regularly occur from the stresses of warfare. It may be true to say, as has been stated, that none of the symptoms of these conditions is entirely new. Their combinations, however, into definite syndromes of habitual occurrence form a series of specific entities with a definite common mental pathology, the recognition of which gives a basis for the formation of a prognosis of considerable practical value.

In the consideration of the evidence for the above view, the first problem it is necessary to settle is whether the conditions commonly called shell-shock and neurasthenia are neurological, or mental, or a combination of the two. In the early stages of the War the view seemed to be widely held that these conditions were essentially neurological in nature, the result of damage to the nervous system. This is obviously an important point to settle at the outset, and one of the difficulties in the way seems to have been the general belief that a shell exploding near an individual—particularly a high explosive shell—could not avoid producing damage to the nervous system on account of the liberation of the tremendous forces of compression and decompression. This opinion is, in my view, like the postulated shell, exploded. The fact has been abundantly proved that a shell may explode near an individual and even cause him to be blown up or buried, without producing damage or disturbance in any way important, except a more or less marked mental disturbance. The explanation is, according to the opinion of several artillery officers, before whom the problem was placed, that a shell does not explode equally in all directions. Theoretically this is the ideal aimed at, but in practice it is never found to act. The explosive forces of a bursting shell are distributed, not regularly and equally all round the area of explosion, but in an irregular and unequal manner. In consequence certain sectors in the area of explosion may be missed by the explosive energies, others

may receive only partial and irregular effects. An individual, therefore, in one of these sectors may escape everything but the psychological reaction. It is, further, a fact that frequently men blown up or buried by a shell are not incapacitated, but continue on duty without reporting sick.

The chief suggestions brought forward as affording an organic basis for the conditions under consideration are, so far as can be judged from the writings on the subject, that they are due to concussion or to "commotio," to punctate hæmorrhages, to some minute microscopical damage to the nervous system, or to poisoning by gases. It is considered, too, that they may have some bio-chemical explanation, or may be due to derangement of the ductless glands.

There is, in my opinion, no sufficient evidence that can be discovered on repeated examination of the patient to bear out any of the above views. Undoubtedly cases of concussion, poisoning by fumes, ductless gland disorders, &c., do occur, and may be so indefinite as to present many difficulties in diagnosis. But that there is a constant relation between the suggested pathological changes and the clinical conditions known as shell-shock, neurasthenia, &c., is a view entirely unsupported by the evidence at hand. Apart, however, from the lack of direct evidence for the existence of an organic basis, there are several additional arguments which go still further towards excluding this hypothesis. In the first place there is the well-known fact of the frequent sudden disappearance of the symptoms; in the second place there is the fact of the mutability of the symptoms, one set of symptoms not uncommonly disappearing, others arising to take their place; thirdly, there is the large mass of evidence to show the effect of psychological treatment in curing or ameliorating the symptoms; and lastly, there is the fact that precisely similar conditions are produced in those who have never been subjected to exceptional exposure in any way likely to bring about organic damage.

The above arguments, in my view, render the neurological hypothesis untenable, and, further, they directly suggest the probable correctness of the psychological explanation. Clinical observation, in fact, of the conditions, and the results of treatment and investigation, in my experience, completely substantiate the psychological view, as I hope to show later in the article. This it is apparent is becoming more clearly and widely recognized, and, in particular, the part played by the emotions as the important factor in the production of these disorders. Emphasis has been laid in recent articles on the "emotivity" exhibited by these patients. This, to my mind, however, can scarcely be considered an adequate explanation of an emotional condition. "Emotivity" would seem to be an undue or abnormal tendency towards the arousal and manifestation of emotions, but, in order to clarify our ideas on the subject, it is necessary to ask which emotion, or emotions, shows this abnormal sensitiveness.

THE INNATE DISPOSITIONS OF MAN.

Man is born into the world with a certain mental equipment in undeveloped or rudimentary form. It is the synthesis of this with later acquired factors which forms the personality of the individual. Both series of elements play their part in the production of the psychoneuroses of war, as will be shown later, but at the moment we must endeavour to discover more precisely the nature of the inborn or innate factors. McDougall in his reasoned and convincing exposition of the subject has pointed out that human activities, both mental and bodily, are only to be explained or understood by tracing them back to a number of innate dispositions. These innate dispositions are the instincts, "the springs of human action, the impulses and motives that sustain mental and bodily activity and regulate conduct" [2].

Considerable difference of opinion still exists on the subject of the nature and number of the instincts. Leaving out of consideration certain general innate tendencies, there are at least twelve principal instincts, including anger, curiosity, self-assertion, the sexual, the social instinct, disgust, and fear. An emotion is the central affective aspect of an instinct, aroused by its special stimuli and producing its special conative effects [3]. We may, however, if necessary for the purpose of the argument here advanced dispense with this disputed subject, and simply take as our postulate the fact that there are in man a number of emotions capable of being aroused by certain stimuli. In other words, there is in every normal

individual an inherited tendency towards the arousal of certain emotions by certain stimuli or situations and these emotions once aroused tend to produce their characteristic effects. We cannot obliterate them, they can be guided and controlled in their effects, but the mere fact that a man puts on a uniform does not extinguish the liability or tendency towards the arousal of these emotional dispositions.

If we ask ourselves the effects of war upon our mental reactions, we shall probably find they are of the most complex and varied nature. Without attempting any detailed analysis we may say, in a wide and general sense, that war makes an appeal to the majority of man's instincts, arousing most of his primary emotions—the combative instinct, curiosity, self-assertion, the social instinct, disgust, and fear. It is upon the latter two emotions, however, and particularly the last, that emphasis should be laid as to their importance in the production of the psychoneuroses of war. It is from this source of emotional activity that arise the apparently varied clinical types we are familiar with.

When we consider the fact previously mentioned that an instinct or emotion is an inborn disposition, that it subserves a definite biological function, and can no more be got rid of by willing, repressing, or training than the liver, the thyroid, or any other organ of the body, that it is excited by certain special stimuli, it is not surprising that when the special stimuli appear the associated emotion should be aroused. It would be surprising and, in fact, incredible if it were not so. Modern warfare has lost all of the amenities that convention had previously laid upon it. It consists largely of an environment of fear and horror-inspiring stimuli. When an individual, therefore, leaves an ordinary civil occupation, and after a few months training finds himself in surroundings the most fear-inspiring that the ingenuity of man can create, it is hardly a matter for wonder that the corresponding emotion—being a biological mechanism necessary to human nature—should be set in action.

To most people, however, this argument applied to the special emotion we are considering seems to be an exceedingly painful idea. An extreme unwillingness and resistance is manifested against admitting it; there is a refusal, mentally, to consider it; it is repressed, thrust and kept away from consciousness, and commonly defence mechanisms of various kinds are developed to deal with the difficulty. Amongst, too, the steadily increasing volume of writing on "shell-shock" various aspects have received consideration, but few, if any, writers have recognized the significance of this factor, which is the most fundamental of all.

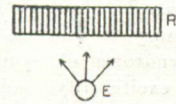
It will, I think, now be generally conceded that the existence and activity of this instinct cannot be denied or ignored. The fact may be painful to our sentiments of patriotism and self-regard, but it is so, in my opinion, only from a false appreciation of these sentiments; and in the second place, scientific investigation should not be debarred from the recognition of a fact because of its unpleasant nature—it should be considered in its proper light and given a position of attention proportionate to its value. If our enemies choose to ignore it and pretend it does not exist, by so much are they falsifying their conceptions of reality, and by so much will their results in practice be inadequate or harmful. The efficient course to pursue is to investigate the subject in as complete a manner as possible with a view to the prevention and cure of the disability it produces.

THE ADAPTATION MECHANISM.

When we consider these aspects of the problem, it becomes evident that one of the most striking facts demonstrated by this War is that the ordinary individual is capable of withstanding active war conditions to an extent never before supposed; in other words, that his power of resistance or of adaptation has been shown to be enormously greater than was ever hitherto believed. Five years ago few people would have believed that the average man would have been capable of emerging mentally unaffected, if physically so, from a bombardment of the intensity known at the present day.

How does the individual react to this? How is he enabled to withstand it? There is, in my opinion, only one method by which this can be effected: by the exercise of what is called self-control, the repression or inhibition of the great emotion which tends to make the individual escape from danger. These are the factors of the adaptation mechanism: on the one hand, the emotion tending constantly to be

aroused; on the other hand, the repression by which it is restrained. A diagram may serve to make this clear.



E representing the emotion, and R the repression [4]. In the individual in whom this adaptation takes place the two processes reach a certain balance or equilibrium, in which the repression activity proves itself the dominant factor, enabling the man thus to "carry on." Different individuals vary in their powers of adaptation; in some it seems that the stimuli received do not arouse the emotion to the same degree as in others; in these, therefore, the required effort of adaptation will be less. In others the repression mechanism is of greater power, and enables them to cope with the strongest stimuli. Others, again, in the conflict that occurs between the emotion and the repressing mechanism display an abnormal development of the emotion or an undue weakness in the repression, and the mechanism breaks down.

In all who live under conditions of active warfare it is probably true to state that the mental system is, as we say, more highly strung, working with more internal strain, more delicately balanced; in other words, the balance or equilibrium of the adaptation mechanism is in a state of potential if not actual instability. We may, in fact, classify individuals, from the point of view of military efficiency, into the normal, i.e., those with normal powers of resistance (that is, those in whom the adaptation mechanism is sufficiently balanced to enable the individual to bear what may be called the ordinary stresses and strains of warfare) and the subnormal, those with impaired and deficient powers of resistance from various causes—inheriting, previous nervous disease, faulty early training and education, &c. The mechanism of repression is, further, beyond a certain point, voluntary and maintained by effort. Long-continued strain, therefore, by exhausting the reserves of mental energy is apt to bring about a breakdown. Commonly, however, what happens is that a sudden, intense shock from an explosion close at hand—which in effect means a sudden inrush of the emotion-arousing stimulus—unless the elasticity or reserve power of the individual is adequate, disturbs the balance and produces a breakdown in the mechanism. These are, in fact, the common causes of breakdown in individuals of the normal type—namely, long-continued strain of ordinary warfare and sudden and intense strain or shock of exceptional nature.

CLINICAL TYPES.

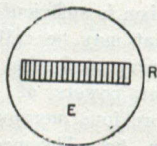
It is a failure of the adaptation mechanism from one or other of these causes which is, in my view, responsible for the occurrence of the commonest form of "shell-shock" illustrated by the following case. It occurred during my experience in the line. I was able, therefore, to keep the patient under observation from the onset of the condition until he was returned to duty. Private B., aged 27, was on duty in the front line trenches when three trench-mortars exploded near him. He was brought down to the aid post with help of two stretcher-bearers, and when seen he sat huddled up, trembling, and shivering in every limb. He looked a limp, nervous wreck, and could scarcely stand without support. His mind seemed dominated by an obsessing fear; he kept groaning and moaning, and he started at practically every sound. His hands jerked and trembled so much that he could scarcely pull off his gloves when asked to do so. He had considerable difficulty in speaking: it took him about two minutes to give his regimental number in jerky, tremulous accents. He complained of pains in the head and giddiness. He was given morphia and kept for the night in the aid post. The following morning he had greatly improved; he was able to stand up without support, was calm and composed, and spoke without difficulty. The shaking had gone, with the exception of a tremor of the hands. He complained of headache and giddiness, and declared he had no memory of being brought down to the aid post the night before. The last thing he remembered was being at the entrance to a dug-out after the second trench-mortar had fallen. He was kept under observation in the aid post for six days longer; by that time all his

symptoms had disappeared with the exception of the amnesia, which still persisted, and he was sent back to duty. A month later he was still serving with his company.

The above case illustrates, in my experience, the commonest form of war psychoneurosis, representing a typical *névrose d'effroi*. It is unnecessary to describe other cases, for they all show the same syndrome of symptoms, tremulousness, nerviness, jumpiness, excitability, subjective sensations of headache and giddiness, frequently some mental confusion, sundry visceral derangements, such as incontinence of urine, dryness of the mouth and throat, excessive perspiration, &c., and the characteristic mental attitude associated with the arousal of the particular emotion.

In the French army apparently this form does not appear with the same frequency. Other forms showing paralyzes, contractures, astasia-abasia, &c., are of more common occurrence [5]. These *trembleurs*, however, form the type which occurs in about 75 per cent. of the cases admitted into the Army centre with which I have been associated during a period of eighteen months.

No indications are discoverable on examination suggesting any damage to the nervous system. When, however, a careful comparison is made between the symptoms of this condition and the manifestations of the emotion under consideration, a similarity becomes evident too marked to be ignored by any impartial observer. The tremors, nervousness, visceral disturbances, excitability, &c., find their exact counterpart in the mental, visceral, and kinæsthetic signs of the emotion and the associated excitement. The state of affairs now existing may be represented by the following diagram:—



where E, the emotion, is seen to have overwhelmed R, the resistance.

Intensity and suddenness of arousal of any strong emotion will produce shock, which in this regard means simply emotional shock. We are dealing here with one of the strongest emotions in human nature; it is not surprising, therefore, that its arousal in an intense degree will produce an apparently severe clinical condition. It might seem that there would be a constant correspondence between the severity of the stimulus or experience, and the resulting clinical condition. This, however, is not borne out in practice. It is a matter of common occurrence for equally severe conditions to be met with in those who have had no exceptional experience to excite them. This indicates that an internal stimulus, originating in the mind, may prove as effective in arousing the emotion as the strongest external stimulus.

When we consider the effect on the mind of the arousal in intense degree of a strong emotion we are given the key to the explanation of another of the clinical types of the war psychoneuroses. This form consists of the confusional and stuporose conditions, which are here considered as different degrees of the same type. It is a matter of common observation that the excitement of most emotions in any fairly considerable degree will produce a certain mental confusion. The experiences of witnesses under cross-examination in our law courts bears this out. The arousal of the emotion we are describing, as McDougall has observed [6], "tends to bring to an end at once all other mental activity, riveting the attention upon its object to the exclusion of all others." It is "the great inhibitor of action." When sufficiently intensely aroused it fills and dominates the mind, overrides the will, disorganizes the normal balance or "equilibration" of consciousness, inhibits the perceptive, reasoning and controlling activities, producing thus a form of mental confusion or mental paralysis, corresponding to the dazed or stuporose cases not uncommonly met with. Careful observation and interrogation of these cases, from their onset to recovery, sufficiently confirm the view here set forth.

With regard to a third class, the cases showing complete amnesias and fugues, they are apparently of less common occurrence now than formerly. Localized amnesia is a frequent symptom met with in most cases, but the type

showing as the chief feature, complete or general loss of memory, occurs, in my experience, in a very small number. It is a form not uncommonly simulated by the malingerer, and in the genuine cases also it appears to offer strong temptations towards a prolongation of the condition when the lost memories have begun spontaneously to return. The emotion we are dealing with is recognized to be at high intensity the most horrible of all experiences [3]. After an incident of this kind the mind must, therefore, make use of measures correspondingly strong and thorough to deal with it if mental integrity is to be maintained. It does this by means of the mechanism of repression, in accordance with the psychological law relating to the repression of painful experiences. It is, in fact, the excessive activity of the repression mechanism which is responsible for the complete effacement of memory. That the amnesia is a repression phenomenon and is not due to an obliteration or absolute loss of the memory content is sufficiently shown by the spontaneous recoveries which take place, and by the fact that by suitable special means, such as hypnotism or mental analysis, the lost memory of events can be restored.

The fourth group to be considered, an important one, which may be called the "conversion" class, consists of cases showing symptoms, such as paralysis, mutism, contractures, disarthria, &c. These are in terms of Freudian psychology, "conversion" phenomena, the result of the conversion of the psychical trauma into the bodily symptom.

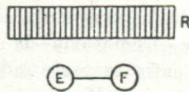
The psychological mechanisms responsible for the production of these symptoms are still a matter of dispute. Janet has attributed their occurrence in hysteria to the formation of a "fixed idea," though in my view it is not rendered very clear exactly what mechanism is implied in the explanation. In the language of Freudian psychology we may say that a "complex" is formed about the memory or anticipation of the painful experience. Undoubtedly this is true in the sense that an exceedingly painful, emotionally toned series of ideas is present in the minds of these patients, about which further secondary psychological mechanisms soon begin to develop. It seems to me, however, that a clearer and more adequate explanation can be given by the consideration of certain principles associated with the arousal of an emotion.

Each emotion is capable of being aroused originally by its own special excitants or stimuli. But by the simple principles of association by similarity and by contiguity, other perceptions or ideas previously unconnected with the emotion may take on, so to speak, symbolic value, and become capable of arousing it. Thus various stimuli of any or all of the sense organs may serve as the excitants of an emotion previously only aroused by a few. In my own experience an interesting extension has taken place. Commonly the idea of the trenches excites the emotion of disgust. By the principle of association by contiguity butterflies and poppies have become associated with the trenches, from experience in the summer of 1916, when they were strikingly in evidence. It happens now that butterflies and poppies directly excite the emotion of disgust. This is, from another aspect, the mechanism of "indirect expression of the complex" or "transference of the affect."

In regard to the explanation of mutism, it is recognized that there is already pre-existing a special relation between the particular emotion under consideration and the function of speech [3]. Horatio in his description of the effect of the appearance of the ghost on Marcellus and Bernardo [7]—"While they, distill'd almost to jelly with the act of fear, stand dumb and speak not to him"—has placed this on record in immortal words.

It is an interesting problem whether the mutism is caused by the paralysing action of the emotion or by the subsequent repression. My belief is in the latter, founded upon observation of many cases in the mute state and during the process of cure. In my view a fixed relation is formed between the emotion and the function of speech, such that on the attempt to speak the emotion is stimulated and the painful experience consequently aroused. By the psychological law of repression of painful experiences this arousal is inhibited, and on account of the fixity of the relation (between the emotion and the function of speech) the whole relation (including the speech function) must be repressed as a unity. This relation, in my view, is formed involuntarily and maintained unconsciously. A relation is a common psychological element [8], comparable to the proposition in logic, and seems in my view

to be the essential element in the conception of a "complex." The mechanism can be represented by a diagram:—



E indicating the emotion, F the function, E—F the relation, and R the repression.

The repression is the resistance the patient has to overcome in the cure of the condition, and success in the treatment consists in supplying an adequate motive which will stimulate the patient to make the necessary effort to dissociate the relation and overcome the repression.

By the same mechanism repression of the fixed relation, paralyses, contractures, and the various other conversion phenomena can be explained, and a rational basis provided for their treatment. It is, further, by the emergence of such a complex to the surface, partially or completely, that an explanation is afforded of the "fits," "attacks," or *crises nerveuses* which form a not uncommon symptom in these conditions.

The fifth and last class consists of the combined types, including, first, cases showing the symptoms of both neurological and psychoneurotic disorders which are occasionally met with, and secondly, those in which a war psychoneurosis has developed in conjunction with a pre-existing psychoneurosis. They require no special explanation; careful investigation suffices to disclose their nature.

PROGNOSIS.

The types described constitute the principal classes of war psychoneuroses seen in the early stages. By the recognition of the causal emotional factor a prognosis can be formed of very definite practical utility, once the different mental elements have been estimated. Incidentally, too, that shows the origin of the frightening dreams which are so frequent and distressing a symptom in these conditions, a dream being the expression of some significant emotional activity in the mind.

It is an important point, further, to notice that the longer the disability persists the more secondary, defence, or "compensation" mechanisms tend to develop and complicate the picture. It is these that seem to me to form the essential factors of difference between the cases seen in the earlier stages and the more chronic conditions that constitute the difficult problem of treatment in the hospitals in England. Descriptions of these secondary developments, however—the fixity and elaborateness to which they apparently attain—must be left to those who have adequate opportunity for their study. It has been assumed by certain observers that no man is capable of being sent back to the trenches after an attack of shell-shock. This view is inaccurate in fact, and, in the majority of cases, in my opinion, prejudicial to the best interests of the patients themselves. *Shell-shock, when treated forthwith and with proper understanding, in the large majority of cases is not a serious condition.* The material fact remains that about 70 per cent. of the cases treated at advanced centres in France are made fit to return to duty. In several instances that have come under my observation decorations for bravery have been won after the occurrence of an attack of shell-shock—in one case after the occurrence of the third attack.

TREATMENT.

The subject of the treatment of these cases is a wide one and a difficult one, and all that can be attempted here is to indicate a few of the main principles that follow from a consideration of the nature of the cases.

The atmosphere of the wards should be one of understanding and of cure. An attitude of firmness, but of rational firmness, must be taken up towards the patient at the outset. Undoubtedly sympathy is necessary, but it must be sympathy of the right kind, an insight into and an understanding of the patient's state of mind. It need hardly be insisted upon the harm a pitying attitude may do. When we realize the emotional disturbance that has taken place in the patient's mind, and the fact that his sentiment of self-regard or self-respect has been overcome by the emotion we have become

familiar with as the basis of the disorder, further emphasis upon this should be unnecessary.

The cure of the individual symptoms is in most cases a matter of little difficulty. In the end, however, we are left with a special mental attitude on the part of the patient, and it is this that forms the main difficulty in the treatment. The chief problem is to effect a rearrangement or re-direction of the mental activities which have become disorganized, to bring the conflicting forces in the mind into a state of stable equilibrium. In my view this can only satisfactorily be done by a rational system of mental analysis, explanation, and re-education with each individual patient, including, no doubt, the mechanism of "abreaction."

It is borne out by experience that it is not so much the arousal of the emotion that is the important factor, but the loss of normal control and the effort that is made towards regaining it. As the chief effort towards this must come from the patient himself, it is obvious that the clearer understanding he has of the state of affairs in his mind the better he will be able to make the effort towards rearrangement and self-control. The details of this, however, though presenting problems of considerable interest, are beyond the scope of the present article.

In conclusion, I wish to express my thanks to Lieutenant-Colonel C. H. Reason, D.S.O., C.A.M.C., through whose courtesy this article is submitted.

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CLINICAL OBSERVATIONS ON THE EARLY STAGES OF TRENCH NEPHRITIS.

By MAJOR G. S. STRATHY, C.A.M.C.,

No. — Canadian Casualty Clearing Station.

In the last three years many reports on epidemic or trench nephritis have appeared in the medical literature; but as most of them have been written by medical officers who have observed the disease in base or home hospitals, they describe only the more severe cases and the later stages of the disease. In a year at this C.C.S. about 300 patients were admitted suffering from this disease, and 205 patients were admitted between December 1 and June 1. The fact that patients in the earlier stages present a rather different clinical picture is the excuse for publishing this paper.

Epidemic nephritis is an affection which in most cases primarily affects the respiratory system, giving rise to cough, dyspnoea, and sometimes sore throat. Symptoms due to affection of the urinary system usually arise later. When the kidneys are attacked most of the symptoms of the nephritis of civil life occur, but toxic symptoms are comparatively rare during their stay in a C.C.S. When the kidneys are mildly affected it gives rise to albuminuria with few subjective symptoms. When the lower part of the urinary tract is attacked hæmaturia is produced.

Not infrequently the lungs and pleuræ bear the brunt of the attack, and the disease is characterized by respiratory rather than by kidney symptoms. In these cases bronchiolitis is usually marked, and hydrothorax develops in greater amount than is accounted for by disease of the kidney; and with no œdema elsewhere in the body the pleural cavities may contain large quantities of fluid. According to Major Dunn [1], R.A.M.C., the characteristic lesion present is a proliferative endarteritis of the small vessels. This is most marked in the lungs, brain, and kidneys, and may lead to multiple minute thromboses and embolism.

Etiology.—Although microbial infection is almost certainly the cause of the disease, predisposing causes probably play an important part. The disease is non-existent in troops before landing in France or other theatres of war, and is not present in the civilian population at home, nor have I heard of it amongst the civilians in France and Belgium.

It would therefore appear as if there is some great predisposing factor in the life of the Army abroad, which prepares the way for infection. It is striking that cases have not broken out in England due to infection from returned soldiers.

The problem of the predisposing cause has given rise to many theories and suppositions. The epidemic is more prevalent on the Western European front than the other fronts, but occurs to some extent on all fronts. It is more common amongst the British troops than the French. It occurs amongst all arms of the Service at the front, and is not unknown amongst troops at the base. We had two cases in the personnel of eighty-five of this C.C.S. while we were four months in Boulogne. McLeod and Ameuille [2] found that albuminuria occurred in a high percentage of troops in training in England. They found that the percentage of men having albuminuria was higher amongst British than French troops. The urea excretion was also higher amongst the British.

Various theories have been advanced to explain these facts. Exposure and fatigue due to Army life were suggested as the cause of so many men having albuminuria. Chlorinated water and immature beer were said to damage the kidneys. I have found nothing to suggest that they were predisposing causes of epidemic nephritis. Several men were affected, who were sleeping in warm, dry billets, and did not do any heavy manual labour. Possibly the high protein diet of the British soldier predisposes him to attack. Of 300 cases admitted to this C.C.S. only two were officers, and they had very mild attacks. One of them was from the Royal Flying Corps and was living in comfortable quarters. My records do not show age as a predisposing factor. Very few men were attacked during their first three months in France. Several Australians developed their first symptoms while on board ship coming from Egypt.

While there is probably some relationship between epidemic nephritis and the high percentage of albuminuria found in healthy troops both in France and England, it is almost certain that these cases of unexplained albuminuria are not mild cases of epidemic nephritis. It would seem likely that there is an extra strain thrown on the kidneys of the British troops which predisposes them to attack by a micro-organism which is prevalent in the Army abroad.

Symptomatology.—The symptoms divide the disease into three main clinical types, namely, (1) mild cases with albuminuria and few subjective symptoms, (2) hæmaturia cases with symptoms pointing to affection of the lower part of the urinary tract, and (3) nephritis cases with œdema. These three main types cannot always be sharply differentiated, for mild, or albuminuria, cases may go on to the more marked type with œdema, or hæmaturia and œdema may be present in the same patient.

(1) It is often difficult to differentiate mild cases of epidemic nephritis from albuminuria due to other causes. Captain Dixon, R.A.M.C.(T.), working in a divisional rest station near this C.C.S., found albumin in the urine of over 20 per cent. of all patients admitted.

Various fevers and chronic infections of the urethra or bladder accounted for but a small proportion of this high incidence of albuminuria. The remainder of the 20 per cent. must be put down to the unknown factor in service which causes albumin in the urine. In many mild cases of epidemic nephritis there is no demonstrable œdema, and albuminuria is the main objective symptom. In even these mild cases of the disease, however, there is usually initial cough, dyspnoea, dizziness, and pain in the back, while the cases of albuminuria due to the unknown factor in active service have no subjective symptoms. The test on which most reliance is to be placed in differentiating these two conditions is blood-pressure. Nearly all cases of mild nephritis, even without œdema, have an increased blood-pressure in the early stages. Few, if any, of the other albuminurias have increased blood-pressure. I have records of the blood-pressure of several hundred soldiers in France, and have found that apart from cases of nephritis or cardio-vascular diseases the blood-pressure of the British soldier when at rest is remarkably constant. A diastolic blood-pressure above 85 or a systolic pressure above 130 mm. Hg. is very rare in healthy soldiers under 35 years of age.

The following is a typical history of this type of nephritis. One of our operating room orderlies developed rhinitis, sore throat, hoarseness, and slight fever. He remained on duty, and twelve days later these had almost disappeared, but his

face became œdematous, his urine showed a considerable amount of albumin, his temperature was 99° F., and his systolic blood-pressure 140. After rest in bed for forty-eight hours all his symptoms, except slight albuminuria, had disappeared. In a month he was normal.

(2) The second type—hæmaturia—is a smaller class. In six months twenty-two patients were admitted to this C.C.S. diagnosed as hæmaturia. Most of these were cases of hæmaturia without œdema, for had all the patients with blood-stained urine been sent in as hæmaturia, the numbers would have been much larger, and if all patients with red blood cells in the urine had been so diagnosed nearly every case of nephritis would have had to be included, for, microscopically examined, the urine of nearly all patients with moderate or severe nephritis showed the presence of red blood cells.

Under the name of hæmaturia, then, I include only those cases in which hæmaturia was marked and there was no œdema. These patients' most marked symptoms were referable to the lower urinary tract, that is, kidney pelvis, ureters, and bladder. Pain in the lumbar region and flanks was usual. Pain over the bladder was not uncommon, frequency of micturition was the rule, and tenderness on deep palpation in the hypogastrium present in a few cases. Fever was often high. The blood-stained colour of the urine disappeared in a few days. Rise of blood-pressure was not always present and was never marked.

(3) The third clinical type comprising those usually sent to C.C.S. diagnosed as nephritis or bronchitis is the most important, for it includes all the severe cases. This type resembles in most respects the acute nephritis of civil life, but shows important differences. Bronchitis, œdema, hydrothorax, and ascites are more marked features than are toxic symptoms, such as headache, drowsiness, vomiting, and convulsions. The lack of symptoms due to cerebral poisoning by chemical products is an outstanding feature in over 90 per cent. of the cases. Convulsions occurred in only five of our cases, yet many patients were in danger from the bronchitis and the mechanical effects of fluid in the thorax. Suppression of urine is seldom marked. There are rarely less than 15 oz. in twenty-four hours. Rapid disappearance of acute symptoms is usual.

œdema was one of the earliest symptoms in 30 per cent. of the cases of a severe type. Cough and dyspnoea were the first symptoms present in 72 per cent. of cases, and diarrhoea was the earliest symptom in 10 per cent. In many cases the patients had cough and dyspnoea for several days, and in some cases for three weeks, before œdema appeared. Patients were seldom sent to hospital before the œdematous stage.

Nearly all the severe cases admitted were markedly dyspnoeic due to bronchiolitis and fluid in the pleural sacs. *This marked tendency to affection of the lungs and pleuræ, and the unequal distribution of œdema in the body, is the most outstanding feature of the disease in contrast to nephritis of civil life.* So much is this so, that one doubts if the disease should be described as a nephritis, but rather as a proliferative endarteritis of the smaller vessels affecting different organs with varying severity in different cases.

Case No. 467 illustrates this severe type of lung infection. Pte. G., aged 25, gave a history of not feeling well for ten days. He had had slight œdema of the face and feet, shortness of breath, headache, and severe pains in the back. He was on duty until the day before admission. Admitted at 2 p.m., he was markedly dyspnoeic, had much œdema of the head, but little elsewhere. Dry persistent cough, which was not relieved by morphia gr. $\frac{1}{4}$. He died in nine hours.

At post-mortem there was an acute bronchiolitis with about 40 oz. of fluid in the right pleural cavity, about 30 oz. in the left, and only 8 oz. in the peritoneal cavity. Liver and spleen were much enlarged. Kidneys were not swollen, slight congestion around pyramids, pale elsewhere. The spleen showed many minute hæmorrhages. This patient died from lack of gaseous exchange in his lungs.

œdema of the face was present in all cases except one, and he gave a history of slight swelling of the face prior to admission. This patient died without œdema appearing anywhere, and post-mortem showed marked hydrothorax and very little ascites. A striking feature was lack of œdema in some of the bronchial type cases and the patchiness of the œdema. The thighs sometimes showed marked swelling when the legs were normal. The genitals seldom showed œdema. Ascites were present in thirty-eight cases, doubtful

in six, not detected in twenty-four. Hydrothorax was thought to be present in forty-five cases, doubtful in five, and absent in eighteen. In a few doubtful cases an exploratory paracentesis was done, and each time fluid was found. The spleen was palpable in thirty-three cases, thought to be enlarged as shown by percussion in six, and apparently not enlarged in thirty. Enlargement of liver and spleen occurred in a much lower percentage of cases early in 1916 than of those admitted at a later date. The liver was felt below the costal margin in thirty-six patients and not felt in thirty-two. Albumin was found in the urine of all patients examined, but the percentage of albumin was not always proportionate to the severity of the case.

The temperature was always normal during stay in hospital in nineteen cases, and above normal in forty-seven. In most of the nineteen cases of normal temperature the patient was not admitted until over a week after the onset of symptoms, and it is probable that they had fever before admission. None of the cases of bronchitis went on to a bronchopneumonia.

During the acute stage of all cases the blood-pressure, diastolic and systolic, was taken once a day and sometimes morning and evening. The systolic blood-pressure was 135 mm. Hg. or over in all but two cases examined. In one of these the diastolic pressure was raised, but the systolic was normal. In the other both were normal. In the most severe cases the pressure was always very high, 180 to 210 systolic, the diastolic 100 to 120 mm. An aneroid sphygmomanometer was used. There was no apparent relationship between the blood-pressure and the amount of albumin in the urine, but an interesting fact was that in the more severe cases the amount of subcutaneous oedema was usually inversely proportionate to the height of the blood-pressure. In the patients with marked oedema the systolic blood-pressure averaged 10 mm. lower than in those with moderate oedema. The rise of blood-pressure in the evening over that of the morning, reported by Abercrombie [3], was not present in my experience.

In seven cases the pressure of the cerebro-spinal fluid was tested to see if headache was due to increased pressure. In four cases it was not increased, being between 120 and 130 mm. water. In three of these the headache was severe, and two of them received no relief from withdrawal of fluid. The third had had a slight convulsion and fell asleep after the puncture was done.

In three cases the pressure of the spinal fluid was found to be increased. In two of these cases the headache was severe, and in one the headache was not eased by withdrawal of fluid until the pressure was normal. The other patient was unconscious following a severe convulsion. The third patient had no headache, although his pressure was 230 mm. of water. There is apparently no connexion between the headache of this disease and the pressure of the spinal fluid.

It was also found that the pressure of the blood and of the spinal fluid bear no relationship to each other, for removal of spinal fluid had no effect on the blood-pressure unless the pressure of the spinal fluid was reduced to a dangerous degree, when a fall in blood-pressure occurred.

The percentage of urea in the spinal fluid is probably of considerable importance, but to date I have tested so few cases that I cannot give an opinion of my own. French workers have reported much increase in the urea in the spinal fluid in the uræmic type of case.

Treatment.—With rest in bed and a simple diet of milk and milk puddings the large majority of cases improve rapidly. As we had to send our patients on as soon as they were fit to travel, I cannot speak of late results. The symptoms calling for active treatment are cough, dyspnoea, decrease in urine, headache, and convulsions.

If a patient was markedly oedematous or his blood-pressure high a hot-air bath was given. In nearly all cases this produced free sweating, relieved the cough and headache, and decreased the oedema. The patient's bowels were kept fairly free with Epsom salts, but patients were not severely purged. If the dyspnoea did not then subside and was severe, oxygen inhalations almost invariably gave considerable relief.

After losing two patients whose deaths were both directly due to the affection of the lungs and pleuræ, oxygen treatment was given to all cases of extreme dyspnoea, and apparently carried several severe cases through, but when the dyspnoea was not relieved by oxygen, and later, when the use of oxygen was forbidden owing to shortage of oxygen

supply, aspiration of the hydrothorax was carried out, and immediate improvement resulted. One patient who was in *extremis* and appeared likely to die within five minutes was aspirated. After the removal of the fluid he was immediately improved and ultimately recovered. The hydrothorax did not recur.

Opium in any form for the relief of cough or sleeplessness I abandoned after some unhappy results from its use. It appeared to increase the patient's cyanosis. For convulsions spinal puncture and withdrawal of fluid was done in three out of four cases. The three recovered and the unpunctured patient died. Why withdrawal of fluid helps convulsions I cannot explain. It is not due, I believe, to decrease of the spinal pressure, but probably to the removal of certain poisons in the fluid. French observers report excess of urea in the spinal fluid. The good results obtained by this method in delirium tremens, eclampsia, and other convulsive conditions coincide with the results in the treatment of uræmic convulsions, and I believe it should be done either when an attack of convulsions is threatening, or as soon after the first convulsion as possible. Morphia gr. $\frac{1}{4}$ was always given at the onset of a convulsion.

Prognosis.—The mortality in the disease is everywhere reported as low. Three of our patients died. To judge of the seriousness of the disease in cases apparently cured we shall have to wait many years. Only then will we be able to judge if there is a tendency to pass into a chronic nephritis as in the acute nephritis of general practice.

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BOTULISM.

By ERNEST C. DICKSON, M.D.Tor.

Associate Professor of Medicine, Stanford University, San Francisco. Captain, C.A.M.C.

It is timely to draw attention to a type of food-poisoning caused by the ingestion of home-canned products, which has assumed considerable importance on the Pacific coast of the United States during the past few years, and is occurring with increasing frequency in other portions of that country. I am unaware of any established cases in Canada, although there is little doubt that some will appear, but recent reports suggest that botulism is appearing among the troops stationed in England, and it therefore behoves us to become acquainted with the condition, to recognize the causes for its occurrence and the means by which it can be prevented, and to distinguish between true and "pseudo-botulism."

Botulism or Allantiasis, the old "Wurstvergiftung" of Southern Germany, has been recognized as a serious type of food-poisoning since the early part of the nineteenth century, but it has been thought to be exclusively a type of *meat poisoning*, since the greater number of cases, as the name implies, were caused by the ingestion of sausages. So firmly has the idea that it is exclusively a meat poisoning been established that when, in 1904, an outbreak of poisoning from bean salad occurred in Darmstadt in Germany, Landmann, who investigated the outbreak, and who proved that it was indeed botulism, made the statement that there must have been some pork cooked with the beans, since it is impossible for the toxin of *B. botulinus* to be formed in other than meat-containing medium.

Our accurate knowledge of the fact that botulism may be caused by the ingestion of foods of vegetable origin dates from December, 1914, when there was an outbreak of food-poisoning of the botulinus type at a Sorority house at Stanford University, in which twelve persons were poisoned by eating a salad prepared from home-canned string beans. We were unable to prove from this outbreak that the intoxication was indeed botulism, as we were unable to demonstrate *B. botulinus* in any of the materials which were available for bacteriological examination, but, stimulated by this outbreak, we obtained cultures of *B. botulinus* from the Museum

of Natural History and from the Department of Bacteriology of Columbia University in New York, and commenced a series of experiments, which have been continued until a few weeks ago. As a result of our experiments we have established beyond all doubt that the toxin of *B. botulinus* may be formed in media prepared from peas, beans, corn, asparagus, artichokes, peaches, pears, apricots, and prunes; and since the outbreak which occurred at Stanford University we have been able to collect records of a fairly large series of outbreaks in which it was established that the poisoning was caused by the ingestion of one or other of these vegetables or fruits, all of them home-canned.

The symptomatology of botulism differs from that of the usual types of food-poisoning in that the intoxication is essentially one which involves the central nervous system. The condition is not an infection but is a true toxæmia, the poisoning being produced by a bacterial toxin, somewhat analogous to the toxins of diphtheria and tetanus, which is formed in the food before it is eaten, and which is ingested with the infected food. The toxin is never formed within the body, as the optimum temperature of growth of *B. botulinus* is from 24° to 28° C., and the toxin will not form at a temperature of 37.5° C., the normal temperature of the body. It differs from the toxins of diphtheria and tetanus in that it is not digested in the gastro-intestinal tract, but is absorbed unchanged into the blood-stream.

The symptoms usually appear in from eighteen to thirty hours after the ingestion of the poisonous food, although they may appear in from four to eight hours. The earliest symptom is usually a sensation of languor and fatigue, but this is soon followed by characteristic disturbances of vision, blurring of vision, diplopia, and loss of accommodation. There is often early vertigo and incoordination of muscular movement. Dryness of the mouth and pharynx, a sensation of enlargement of the tongue, and a peculiar sensation of constriction of the throat soon follow. There is marked inhibition of the serous salivary secretion, and the mucous portion is secreted in a thick, tenacious form, which is removed from the pharynx with great difficulty. Speech soon becomes impaired and unintelligible, and there is difficulty, and eventually inability, to swallow. The patients suffer greatly from strangling spells induced by their attempts to swallow or to raise the thick mucus from the pharynx. There is rarely any acute gastro-intestinal disturbance, although there may be initial nausea, vomiting, and diarrhoea. A characteristic feature of the intoxication is that there is obstinate constipation, which may be so severe as to resist all efforts to induce evacuation of the bowels.

There is early blepharoptosis and mydriasis with loss of pupillary reaction to light, and occasionally there is paralysis of all the extrinsic muscles of the eye, so that the eyeball remains fixed in the socket. Occasionally there is paralysis of the muscles supplied by the motor portion of the fifth and by the seventh cranial nerves, but this is more uncommon. There is loss of the pharyngeal reflex in the majority of cases. There is marked general muscular weakness, but there is no true paralysis of the skeletal muscles, and the skeletal reflexes are not lost. True paralysis is apparently confined to the muscles which are supplied by the cranial motor nerves.

A striking feature of the botulinus intoxication is that there is no disturbance of mentality, and that sensation remains intact. There may be some inhibition of the sense of taste, but this is probably chiefly, if not entirely, due to the absence of the serous salivary secretion. There is rarely any disturbance of hearing. The disturbances of vision are entirely dependent upon the loss of function of the intrinsic muscles of the eyes, as the retina rarely shows any change. There may be initial headache and nausea, but there is otherwise rarely any pain.

The temperature is usually subnormal; in fact, when fever occurs one should be strongly suspicious of the onset of some intercurrent infection, such as broncho-pneumonia. The pulse rate may be slower than normal at first, but it soon becomes rapid, and the combination of a temperature of between 96° and 97° F., with a pulse rate of over 130, is very striking.

The intoxication usually reaches its maximum severity in from four to eight days, and then, if the patient survives, gradually subsides. Convalescence is very slow and tedious. In fatal cases death usually occurs in from four to eight days, and it is seldom that persons who survive for ten days

succumb unless some complication such as aspiration pneumonia ensues. Death usually occurs from cardiac or respiratory failure.

The mortality in the European cases, occurring during a period of over one hundred years, is about 40 per cent.; but in the United States, probably because only the severe cases are recorded, the mortality has been between 65 and 70 per cent. When patients recover there is rarely any persisting disability.

Treatment is most unsatisfactory. It is important to wash out the stomach even though the poisonous food has been eaten several days before, as there is early inhibition of stomach motility, and cases are recorded where portions of the poisonous meal have been found in the stomach at autopsy several days after it was ingested. Purgation should be induced if possible, preferably with magnesium sulphate or some similar saline, and the lower bowel should be frequently washed by enemata. Simple, nourishing food should be given in sufficient quantities, and a generous supply of water should be administered, but it should be remembered that on account of the loss of pharyngeal reflex and the frequent strangling spells when the patient attempts to swallow there is constant danger of insufflation pneumonia. It is therefore advisable to administer food and laxatives by stomach tube and to give water by hypodermoclysis or by rectum. The Murphy drip has been found to be very satisfactory.

Stimulation should be given as required, strychnine probably being of value. Digalin has been used extensively to combat cardiac failure, and pilocarpin may be used to relieve the dryness of the mouth and pharynx, although pilocarpin should be given with caution, since the patient is unable to cough up fluid from the lungs if pulmonary oedema is induced.

Antitoxic serum may be produced, but experiment has shown that it is of little therapeutic value unless it can be given very early. It affords full protection to guinea-pigs when mixed in vitro and injected with the toxin, but when given more than twelve hours after the administration of a M.L.D. of toxin there is little protection. I have used antitoxic serum in two human cases of botulism and both recovered, but I am not at all certain that the serum in any way influenced the course of the intoxication, as it was several days after the ingestion of the poisonous food that the serum was given.

There is no time to discuss the pathology of botulism more than to say that there is a peculiar, characteristic type of thrombus formation in the blood-vessels of practically all organs, the thrombus being studded with leukocytes. The symptoms are not explained by the presence of the thrombi, however, as the thrombi are rarely found in animals which have died within forty-eight hours after the administration of the toxin. There is also marked hyperæmia of practically all organs, and usually there are many hæmorrhages in the meninges, and in the lungs, and serous surfaces. Our experiments and our histologic examination of tissues from human victims do not support the theory that there is a so-called specific action on the finer structure of the nerve ganglion cells.

The importance of this type of food-poisoning at the present time lies in the fact that by far the greater number of cases which have occurred recently in the United States have been caused by the ingestion of home-canned vegetables and fruits. The reason for the prevalence of the botulinus toxin in home-canned vegetables and fruits is that the methods of sterilization which are employed in home-canning are not sufficiently potent to kill spores of *B. botulinus* when mixed with albuminous material in containers such as are used. The common practice is to immerse the filled jar of vegetable or fruit into boiling water in a wash-boiler for from two to three hours, and this is not efficient. We have found in test-tube experiments with emulsions of spores of *B. botulinus* in brain and in vegetable mediums that the spores will resist immersion into actively boiling water for more than two hours, and will resist immersion into water at 95° C. for more than three hours. Eight strains of *B. botulinus* were tested in this way, and the spores survived in seven. When one considers the time necessary for the penetration of heat into the centre of a closely packed jar of vegetable, it is readily understood that the sterilization in the centres of the jars may be incomplete.

The addition of lemon-juice or vinegar to vegetables, as recommended by Cruess of the University of California,

greatly reduces the resistance of the spores to heat, but lemon-juice must be added in amounts of at least 4 per cent. to be of value. I have record of one outbreak of botulism which was caused by the ingestion of string beans to which "a small amount" of lemon-juice had been added, but evidently the amount of lemon-juice was insufficient. Our experiments have shown that the mere presence of 4 per cent. lemon-juice, or of 65 per cent. cane-sugar in bouillon, is not sufficient to prevent the growth of *B. botulinus* and the formation of its toxin, although they do inhibit the toxin formation to a certain extent. It is therefore apparent that one must not depend upon lemon-juice or sugar to preserve the fruits or vegetables unless the sterilization has been complete.

A very few outbreaks of botulism caused by commercially canned vegetables have been recorded, but they are very rare. The rarity depends, I believe, upon the fact that in the United States the vegetables are sterilized with steam under pressure at a temperature of from 240° to 250° F. The freedom from contamination of commercially canned fruits which are canned at lower temperatures is probably dependent upon the fact that only carefully selected, hand-picked fruit is canned. In the only instance of poisoning from home-canned fruit in which we were able to get all the data it was found that the fruit had been unsaleable, wind-fall fruit, and it is probable that the fruit had become contaminated with *B. botulinus* while lying on the ground.

It must not be understood that I am advocating any decrease in the amount of home-canning of perishable foods, but I am convinced that as professional men who are interested in the preservation of the health of the community we should take steps to have the public understand that the use of home-canned food is not unattended with danger, although, with proper care, all danger of poisoning may be averted. Very often the home-canned food which is contaminated with toxin of *B. botulinus* is so evidently spoiled that it is discarded at once, and no accident occurs unless it is fed to domestic animals or fowls. There are many instances of spoiled home-canned food having been fed to domestic animals and fowls, in which these have developed symptoms which are analogous to those produced by botulinus intoxication in human beings, "limber neck" in chickens and turkeys, "forage poisoning" in horses and mules, and paralysis in hogs. At other times the food is not so evidently spoiled, and poisoning may be caused by the housewife tasting it to determine whether it is good. I have records of six outbreaks of botulism which were caused in this way, and five of the six victims died. Usually there is a peculiar cheese-like odour in food which is contaminated with toxins of *B. botulinus*, and it is this odour which attracts the housewife's attention and causes her to taste the food. Often, however, this odour is so faint that it does not attract attention unless one is familiar with it and is looking for it.

All of the cases of poisoning by home-canned products have occurred when the food has not been cooked before it was eaten. It is a common thing to serve home-canned vegetables, without cooking, as salad, and in such cases there is especial danger, as the toxin has a peculiar sharp taste which is quite palatable in salad. At other times the poisoning has occurred after the ingestion of fruits which are "a little turned," and which are not displeasing to the taste. It has been definitely established that the toxin is destroyed if it is heated to the boiling point and that contaminated food is entirely safe, in so far as botulinus intoxication is concerned, if it is cooked before it is eaten. There are numbers of instances in which portions of contaminated food have been cooked and eaten without ill-effect, whereas the remaining portion has been eaten as salad and has caused fatal poisoning.

The important facts that should be emphasized in connection with botulinus intoxication from home-canned foods are the following:—

- (1) That only the best available methods of home-canning should be recommended.
- (2) That the housewife should not be discouraged from canning perishable foods, but that she should be instructed as to the possible danger of poisoning in using home-canned food and as to the methods of preventing its occurrence.
- (3) That under no circumstances should home-canned food which shows any signs of spoilage be used as food or even tasted.
- (4) That the slightest indication of an unusual odour should

be regarded as sufficient reason for discarding home-canned food.

(5) That all home-canned food should be boiled before it is eaten or even tasted.

If these precautions are taken there will be no danger of the occurrence of food-poisoning of this type from home-canned products.

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SOME ASPECTS OF MILITARY OPHTHALMOLOGY.

ABSTRACT OF A PAPER READ AT THE OXFORD OPHTHALMOLOGICAL CONGRESS, JULY 12, 1918.

By S. HANFORD MCKEE, C.M.G., Colonel, C.A.M.C.

Officer Commanding, West Cliff Canadian Eye and Ear Hospital.

MILITARY ophthalmology differs widely from civilian ophthalmology, and varies in a wide degree, as one is at work in training camp, at the base, or in one of the many parts of the various fields. One of my first impressions at camp was how essential it is to have in a military hospital an officer with a special knowledge of ophthalmology. One's first duty, the examination and classification of recruits, very definitely demonstrated this.

That examination, which consists only of sight testing, must prove unsatisfactory. The soldier should always have a good field of vision in each eye, and his eyes should be practically free from disease. Whilst conditions are bound to change, standards of vision that have been latterly adopted seem to me fairly satisfactory. I should certainly recommend no further lowering of the standard.

Much depends upon the individual, whether he is "keen" or not. I consider a soldier who is anxious to do his duty and has only 6/24 vision in each eye more useful, and a better soldier in every respect, than the disgruntled one with 6/6 in each eye. There is also a certain proportion with mental amblyopia, amongst whom the amount of vision is not much of an indication of their usefulness. The military point of view should teach a medical officer to "size up" his patient, and considerable freedom should be allowed to the military ophthalmologist as to who "sees to shoot" and who "sees enough for ordinary purposes."

If the standard of vision had been adhered to, I feel sure millions would have been saved to the country. Lowering the standard of vision will increase the number of passed recruits marked "fit for service," but it will not increase the number of bayonets, and it will very materially lower the efficiency of the Army.

The Canadian Medical Service has been far in the vanguard in this respect. The appointment of an officer specially qualified in ophthalmology to a position in a field ambulance, to attend to special work in certain areas, marks an advance in military medicine. Unfortunately there are still many specially trained medical officers who are enshrouded in that wondrous work, "administration."

Unless a soldier's vision is improved considerably by glasses he will not wear them, so that there is only one reason which warrants prescribing glasses for a soldier, and that is, by prescribing glasses you change him from an unfit to a fit soldier. To my mind there is no other excuse which warrants putting glasses on a soldier; for it is to be remembered that if a soldier can get along without glasses he will, especially since gas masks have come in vogue, and it is a grave mistake to prescribe them, for when you do you supply him with an excuse which he always has with him for lining up on the sick parade. A man who breaks his glasses, or a man wearing glasses, who complains of headaches, is immediately sent

away for examination, and immediately avoids a duty which he does not wish to perform. It is to be remembered that in a soldier complaints of headaches or pains of any sort are not reliable symptoms of disease. I opened two mastoid processes in France before I found out that pain was not a reliable symptom of disease, certainly not in a soldier wishing to get to "blighty." Again, in the healthy out-of-door life of a soldier errors of refraction should not cause headaches. Pains in the head of all kinds, photophobia, and night blindness are frequently complained of; the actual visual defects seem to be the last complaint thought of. Amongst soldiers one finds a tendency to exaggerate a natural defect, so that the estimation of the real error is by no means simple. I consider the wholesale refraction of troops and the supply of glasses to combatant forces a grave mistake. When glasses are ordered I feel they should be as simple as possible. It is a grave mistake to give a soldier with normal vision lenses correcting small degrees of astigmatism and hyperopia.

During the examination for refraction one finds a variety of defects, prominent among them amblyopia ex anopsia. From observation I feel sure that I have seen cases of men who have had normal vision before proceeding to France, and who, from the effects of high explosives, are now men with a high degree of myopia. Cases have also been seen of very high amounts of astigmatism 5 or 6 dioptres in each eye; these patients in civilian life were at such work as falls to engine drivers in which routine examination of the vision is made. They say it would have been impossible for them to have carried on their civilian work with such visual defects. There is no way I know of to explain this defect, except from high explosive.

I have not seen an epidemic of conjunctivitis amongst soldiers and very few cases of gonorrhœal ophthalmia. Trachoma or ophthalmia militaris of the last century has almost disappeared as a military disease. The importation of labour into our Army from the East may, however, alter this. The absence of an epidemic of conjunctivitis and the absence of trachoma is of interest considering the condition of Europe during the Napoleonic wars. Historically it may be of interest to recall to mind the fact that Hannibal's army was incapacitated for one winter in Italy with ophthalmia. Following the original gas attack in France in April, 1915, there was a large number of cases of conjunctivitis. Conjunctivitis has been seen associated with dysentery enough to excite notice. Whilst in the East, recovering from dysentery, I myself developed a severe conjunctivitis. This was prodromal to an acute rheumatic condition. The appearance of a severe metastatic conjunctivitis preceding an acute rheumatism has been noted.

Amongst military symptoms of disease night blindness takes a prominent part. It has been frequently met with, and in a number of cases has been associated with true retinitis pigmentosa. Nyctalopia in soldiers has been put down by some as a symptom of neurasthenia. This, I think, a mistake, from the cases that have come under my observation. Functional night blindness was well recognized before the War, and nyctalopia has been reported as endemic in certain countries, especially in Russia, during the Lenten fasts. It seems to me, we may well attribute this complaint or disease in a certain number of cases to exposure along with the hard work and great fatigue consequent on service. There is, however, no doubt in my mind that many soldiers have heard a comrade complain of night blindness with the desired result, and have then gone and done likewise. A clever malingeringer finds it an easy complaint to simulate, and one the simulation of which is hard to detect.

The result of Wassermann reactions amongst individuals of military age may be of some interest. In 105 cases of iritis the reaction was positive in 33 and negative in 72. These are remarkable figures when one considers the age of the majority of patients and the relationship between venereal disease and active service. In four cases of retinitis pigmentosa the reaction was negative; in eleven cases of optic neuritis five were positive, six negative; in seven cases of interstitial keratitis the reaction was positive in all; in thirty cases of retino-choroiditis fifteen were positive and fifteen negative. To my mind syphilis of the eye reacts better to treatment by inunctions of mercury than by any other.

Among three thousand ophthalmic cases admitted to West Cliff Eye and Ear Hospital I have seen only two cases of sympathetic ophthalmia. The concussion following modern explosives leads to a great variety of fundus lesions. The

injuries are caused by the violence communicated through the bones of the skull, the bones of the orbit, or by air vibration-windage.

One of the commonest lesions of the fundus which I have met with, and one which I have not seen described anywhere, is a condition of traumatic-retino-choroiditis, characterized by diffuse cloudiness of the retina, numerous small exudates in the choroid, and fine dust-like opacities of the vitreous. It is identical with retino-choroiditis of secondary syphilis. It varies in degree from a very slight opacity of the vitreous to diffuse thick opacities with changes in the choroid. I have seen a large number of such cases where I am positive the changes were due to trauma-windage.

Surgery forms one of the most interesting parts of military ophthalmology, though many of the operations of civilian practice are not met with at all. One reason, and one reason alone, should form the basis for all military operative work, necessity. It is most unwise to correct strabismus, for instance, for cosmetic reasons, or to do any operations of a similar nature. If a recruit is accepted for service with a disability of this kind, and an attempt is made to correct it, he first becomes a hospital patient without being ill or wounded; and, secondly, he is given the starting point for an attempt to obtain a pension. Dacryocystitis is not infrequently met with in military work; for military purposes, and the same would hold among industrial workers in civilian life, I can very strongly recommend the West operation.

Esser, in his article in the *Annals of Surgery* for March, 1917, forecasts considerable increase in the types in which his method will be useful, and already most valuable progress has been made in this respect. Major C. W. Waldron, C.A.M.C., first undertook charge of the face injuries service at West Cliff Canadian Eye and Ear Hospital. This service in need of greater space was later moved to a Canadian General Hospital, and later to "The Queens' Hospital." Major Gillies, R.A.M.C., and Major Waldron, C.A.M.C., have enlarged on Esser's methods and given us a most valuable means of remedying many of the war distortions of the lids by a method of epidermic outlay as compared with Esser's epidermic inlay. Waldron has modified Esser's method by making the incision in the conjunctival sac instead of through the eyelid skin.

Major Gillies, R.A.M.C., has made two modifications of the Esser process. The first method consists in the graft-covered mould being buried in the subcutaneous tissues of the eyelid through an incision in the skin, and is removed through that incision. By this method the eyelid skin is increased to the extent of the graft. This is especially useful in contractions following burns. The second method may be termed an epithelial overlay.

It is to the credit of the Canadian Army Medical Service that at a very early period of the War the necessity for a special hospital was noted, and that in October, 1915, the West Cliff Canadian Eye and Ear Hospital was opened with a capacity of 105 beds. There were three administrative and four medical officers, ten nursing sisters, and twenty-seven other ranks. From that beginning the hospital has increased, until at the present time it has an establishment of 400 beds, twelve officers, and forty nursing sisters. There have been admitted to hospital 9,854 cases, and there have been 49,906 consultations in the out-clinic department. Here are prepared the special reports so essential for medical boards, for categorization, for pensions, and for the final disposal of men.

Much credit is due to Colonel J. D. Courtenay, now of Ottawa, who by his initiative had a great deal to do with the establishment of the hospital. By his persistence he saw that it was properly equipped, and by his foresight made the necessary accommodation for its possible growth. The hospital was originally intended to be the head of the Canadian ophthalmic service where civilian ophthalmologists would be sent for military training. Unfortunately, war time is one of changes. We are, however, practising military ophthalmology in as conservative and in as scientific a manner as possible. We have all the equipment, including library and laboratory necessary for such work, and hope a sufficient number of civilian ophthalmologists are being trained for military duty. These officers will later be looked to for the decision of many important questions. What eye injuries and diseases are due to service? What is the relationship between wounds of the cranium and defective vision? Soldiers with loss of central vision and no macular changes—is this due to service, and is it pathological or functional? What injuries are due to

windage? What is rational treatment for malingering, functional amblyopia, war neuroses? What is the amount of disability due to hæmianopsia? All these, of a professional nature, and many medico-legal ones, are questions which must be decided by us with fairness to the individual and to the State.

MEDICAL SOCIETY NOTES.

MEDICAL SOCIETY OF THE C.A.M.C., SHORNCLIFFE.

July 22, 1918.

THE subject of the meeting was MALINGERING. The topic was dealt with by papers from five of the medical officers, followed by a general discussion, which was summed up by Lieutenant-Colonel Chambers.

Lieutenant-Colonel S. R. Harrison offered a tentative definition of the subject as follows: "A malingerer is a soldier who, with or without physical defects, untruthfully complains of pain, disease, or disability which may not exist, or has been wilfully produced, there invariably being a motive for so doing." He suggested that hysteria, neurasthenia, shell-shock must all be eliminated before a diagnosis of malingering can be made, and that other proof, in addition to medical findings, should be forthcoming before any action is taken with regard to a court-martial. Cases were mentioned in which a soldier removed his boot, shot himself through the foot, and forgetfully replaced the boot; and in which iodine and gasoline were injected hypodermically, causing abscess formation. In the case of gasoline injection there was a severe cellulitis over an extensive subcutaneous abscess containing sterile pus. He had heard of cases in which a medical officer had made a diagnosis by the smell of gasoline on incising the abscess. He quoted other cases, one in which a pin had been pushed into the subcutaneous bursa causing acute bursitis, others in which a small foreign body lying harmlessly in some structure, is discovered by an enthusiastic radiologist long after the wound is healed, and this discovery is communicated to the soldier in some way, who straightway complains of pain and disability when told to do an unpleasant duty. He also pointed out how powerless is the medical officer with a man who has a discharging sinus or some condition of that kind who refuses an operation which would make him fit. He cannot discharge him from hospital; he cannot make him work; he cannot have him punished, for a soldier is at liberty to refuse any procedure when the continuity of the skin is broken, even if by so doing his category would be raised from "discharge from Army to A 1." He also mentioned the large number of malingerers who with the label of "myalgia" pass down the chain of hospitals in France and are evacuated to England, it frequently taking weeks and even months before these men got back to the line.

Captain H. H. Argue cited a case in which the patient was unable to extend the fingers of his left hand, and always kept them tightly flexed, and explained that the deformity had been present since birth. He was suspected of malingering, but refused a gas anæsthetic which was proposed for diagnostic purpose. He was then put to sleep with hyoscine and morphine, and suspicions were proved to be justified. A couple of days afterwards he confessed, and added that he had taken on this deformity in order to evade punishment for awkwardly dropping his rifle on an inspection parade in his unit.

Captain Horace Macintyre dealt with malingering with regard to the respiratory system, and quoted two cases in which hæmoptysis was feigned. In one case a fellow-patient described how the malingerer produced the blood by causing the gums to bleed by picking them with a hairpin. In the second case glyco-thymoline mixture used as a mouth-wash was found in the sputum cup. The characteristic smell revealed the deception. Some methods of differentiation between true and false cough, dyspnoea, and night sweats were dealt with, and a few common ruses of malingerers exposed.

Major W. L. Whittemore dealt with malingering with regard to the vascular system, and laid stress on the necessity of considering the family and the personal history of the man

in differentiating between hysteria, malingering, and constitutional debility.

Captain G. S. Gordon reported a case, the previous histories and symptoms of which, given by the patient at various hospitals, were so much at variance in essential details as to convict him out of his own mouth; and another of hypospadias, which had been operated on unsuccessfully, and in consequence the meatus urinarius had been shifted back to the peno-scrotal junction. This condition is widespread in the aborigines of Australia, in whom it is produced artificially before puberty. Much to the chagrin of the would-be candidate for Canada no operation was suggested, and he passed as grade "A" at once.

In the discussion which followed, Colonel Kiddle, A.D.M.S., Shorncliffe, cited the case of a man who professed to be deaf, and whose malingering was discovered by the shrewd wit of his medical officer. He prescribed delicacies, such as chicken, jellies, custards, for the patient in his hearing, and was assured by the orderly in the hearing of the patient at each meal that these delicacies were thoroughly enjoyed by the patient. Actually the patient was being fed on two pints of milk a day. After several days of this treatment the patient could no longer stand it, and exclaimed when a new delicacy was proposed for him: "It's a lie. I've never had any of these things." Lieutenant-Colonel Skelton, R.A.M.C., quoted a case of jaundice produced by picric acid, and mentioned his South African experience of illness produced by cordite. Colonel W. A. Scott and Lieutenant-Colonel Williams and others took part in the discussion, which was closed by Lieutenant-Colonel Chambers, who emphasized the necessity of making a psycho-analysis of every case.

CORPS NEWS.

No. 6 Canadian General Hospital.

On Tuesday, July 3, Sir Robert Borden formally gave to M. Poincaré, President of the French Republic, and through him to France, the magnificent hospital erected by the Canadian Red Cross Association at Joinville-le-Pont in the environments of Paris. There were present at the ceremony the British Ambassador, Lord Derby; Major-General Burtchell, D.G.M.S.; General Phillips, O.C. British troops, Paris Area; M. Philippe Roy, High Commissioner of Canada in France; M. Mourier, Under Secretary of State, head of the French Medical Service (Service Sanitaire); General Guillaumat, Military Governor of Paris; General Fevrier, Director of the Service Sanitaire of Paris, and others.

In the course of the proceedings the President conferred upon M. Roy the insignia of Commander of the Legion of Honour.

The President was escorted through the various sections of the hospital by the O.C., Colonel Beauchamp, C.A.M.C.; Lieut.-Colonel Decarie, head of the Medical, and Lieut.-Colonel Rhéaume, head of the Surgical Service.

This admirably constructed and equipped hospital is built on the pavilion system, with accommodation, at present, for 500 patients, in long wards of 50 beds each, on either side of a broad central passage. Similar covered galleries unite the accessory buildings, administration block, operation theatres, recreation room and theatre, kitchens, staff quarters, &c. It is, in fact, the last word in Canadian War Hospital construction as developed successively at Taplow and Orpington under the Canadian Red Cross Society, with every improvement suggested by the experience of the last three years, and with, in addition, a drainage, water, and gas system installed by the French Government on a scale superior to anything that has been ventured for temporary hospitals in Great Britain. An underground passage some 5 ft. broad by 7 ft. in height, built of cement with brick vaulting, runs down the centre of the hospital, giving off side passages under the various buildings, and in these are carried the pipes and wires for the water, gas, sewage, heating, and electric system. The whole is as solidly constructed as if it were intended not for a temporary but a permanent hospital upon this site. As a matter of fact, *La Presse Médicale* (which affords a full description of what it rightly terms "the princely gift of the Canadian Red Cross to the French nation") points out that after the War it will serve admirably as a hospital for the Paris or Vincennes Garrison. It is so well

placed and in such ample grounds as to be capable of expanding without difficulty to 1,000 beds. As a recognition of this gift the Municipality has by formal vote altered the name of the road leading past the hospital to "Avenue des Canadiens."

The hospital is open to troops of all the Allies, but will in the main receive sick and wounded from the French Army. It is administered by the officers, nursing sisters, and personnel of No. 6 (Laval University) Canadian General Hospital unit.

Honours and Awards.

His Majesty the King has been graciously pleased to approve of the award of the *Military Medal* for bravery in the Field to the undermentioned men:—

No. 529502 Pte. R. E. Alleyn.

London Gazette, No. 30743, June 12, 1918.

No. 522652 Pte. G. Broderick, No. 524673 Pte. R. Forrester.

London Gazette, No. 30797, July 16, 1918.

His Majesty the King has been graciously pleased to approve of the award of the *Meritorious Service Medal* to the undermentioned warrant officer, non-commissioned officers, and man in recognition of valuable services rendered with the Forces in France during the present War:—

No. 530528 L./Cpl. C. F. Davis, 530053 Pte. T. F. Lean, 33106 S./Sgt. J. G. McGernon, 2091 S./Sgt. J. B. Riddell, 74171 Cpl. (A./Sgt.) P. Riley, 33165 Sgt. (A./S./Sgt.) J. L. Robertson, 2361 Cpl. W. A. Stirling, 532169 S./Sgt. J. R. Surman, 156 S./M. C. H. Ward.

London Gazette, No. 30750, June 17, 1918.

His Majesty the King has been graciously pleased to award the *Royal Red Cross* decorations to the undermentioned ladies in recognition of their valuable nursing services in connection with the War:—

AWARDED THE ROYAL RED CROSS, FIRST CLASS.

Matron Elizabeth Bell Ross. Acting Matrons Irene Adele Cains; Jessie Taylor Scott; Jean Stronach, A.R.R.C. Nursing Sisters Hilda Corelli; Alison Dickson, A.R.R.C.; Edith Tilley Hegan; Minnie McAfee, A.R.R.C.; Marion Chastine Ruddick.

AWARDED THE ROYAL RED CROSS, SECOND CLASS.

Acting Matron Gertrude Seymour Radcliffe; Nursing Sisters Mary Jane Allwood, Mary Elizabeth Blott, Anna Leishman Bruce, Elizabeth Nora Campbell, Silla Marguerite Carr-Harris, Katherin De Bellefeuille, Margaret Isabel Fearon, Lillie Ellen Galbraith, Cecily Galt, Alice Maude Grindlay, Phyllis Guilbride, Annie Hayhurst, Alice Gray Hogarth, Isabel Holden, Mary Bell Hubbs, Agnes Huston, Margaret Cecile Kennedy, Mabel Ogilvie Lindsay, Edith Effie Lumsden, Jean Dickson Lyall, Helena Benedicta MacCallum, Mary Elizabeth Macleod, Theodora McKiel, Annie Honora McNicol, Martha Young Elliott Morton, Mina Mowat, Cecil Matilda Oatman, Mildred Florence Parkins, Mae Alice Prichard, Mary Eva Quigley, Gertrude Ramsden, Gertrude Lilian Spanner, Letitia Caskey Stevenson, Jean Elizabeth Sword, Mary White, Maud Ethel Wilkinson, Bertha Mary Wilson.

London Gazette, No. 30758, June 21, 1918.

The undermentioned officers have been brought to the notice of the Secretary of State for War for valuable services rendered in connection with the War:—

Colonel G. E. Armstrong, C.M.G.; Fon. Lieut.-Colonel G. W. Badgerow, C.M.G.; Colonel A. Primrose, C.B.

London Gazette, No. 30783, July 6, 1918

The following are among the decorations and medals awarded by the Allied Powers at various dates to the British Forces for distinguished services rendered during the course of the campaign:—

His Majesty the King has given unrestricted permission in all cases to wear the decorations and medals in question.

Decorations conferred by His Majesty the King of the Belgians:—

CROIX DE GUERRE.

Colonel Arthur Edward Ross, C.B., C.M.G.; Major James Henry Wood; No. 33343 Sgt. Thomas Fulthorpe; No. 530621 S./Sgt. George Swainston.

London Gazette, No. 30792, July 12, 1918.

Promotions.

Temp. Major T. H. MacDonald to be Temp. Lieut.-Colonel.
Temp. Captains F. Tidmarsh and R. Pearse to be Temp. Majors.

London Gazette, No. 30745, June 14, 1918.

Temp. Lieut.-Colonel W. McKeown and J. A. Hutchison to be Temp. Colonels.

London Gazette, No. 30751, June 18, 1918.

Temp. Captains H. Orr and S. J. Streight to be Temp. Majors.

Temp. Major W. H. K. Anderson to be Temp. Lieut.-Colonel.

London Gazette, No. 30760, June 22, 1918.

Temp. Majors (Acting Lieut.-Colonels) to be Temp. Lieut.-Colonels: N. B. Gwyn, H. H. Moshier.

London Gazette, No. 30774, July 2, 1918.

Lieut.-Colonel J. A. Gunn to be Temp. Colonel. (February 2, 1918.)

London Gazette, No. 30778, July 4, 1918.

Temp. Major (Acting Lieut.-Colonel) C. W. Vipond to be Temp. Lieut.-Colonel. (June 6, 1918.)

Temp. Major H. A. Gardner to be Temp. Lieut.-Colonel. (March 12, 1919.)

Temp. Captain A. J. Swan to be Temp. Major. (May 4, 1918.)

London Gazette, No. 30782, July 6, 1918.

Temp. Major (Acting Lieut.-Colonel) R. H. Macdonald, M.C., to be Temp. Lieut.-Colonel. (June 7, 1918.)

Temp. Major P. K. Menzies to be Temp. Lieut.-Colonel. (May 31, 1918.)

London Gazette, No. 30794, July 13, 1918.

Temp. Major J. M. Nettleton to be Temp. Lieut.-Colonel. (June 15, 1918.)

London Gazette, No. 30799, July 17, 1918.

Temp. Captain H. W. Wookey to be Temp. Major. (June 18, 1918.)

London Gazette, No. 30823, August 1, 1918.

THE *London Gazette* of August 10 announces the promotion of Colonel A. E. Ross, C.B., C.M.G., D.D.M.S., to be Brigadier-General and D.M.S. Canadian Section.

Struck off Strength.

Having been returned to Canada for duty: Lieut.-Col. H. C. Parsons, Major H. E. Ridewood, June 28, 1918; Lieut.-Col. J. N. Gunn, D.S.O. April 24, 1918; Major G. B. Peat, June 10, 1918; Capt. E. Sheffield, June 7, 1918; Major W. C. Laidlaw, May 31, 1918; Capt. R. Gibson, May 30, 1918; Qr.-Mr. and Hon. Capt. J. W. Clark, May 30, 1918; Major J. D. Morgan, Major D. McLaughlan, June 27, 1918; Col. K. Cameron, C.M.G., July 16, 1918; Major W. A. McIntosh, July 16, 1918; Capt. R. D. Orok, July 16, 1918; Qr.-Mr. and Hon. Capt. H. J. Middleton, July 16, 1918; Capt. E. C. Beer, July 24, 1918; Qr.-Mr. and Hon. Capt. A. T. Morrison, July 24, 1918; Major R. H. Smith, May 6, 1918; Capt. A. A. Drinnan, July 22, 1918.

Having been invalided to Canada: Capt. G. C. Lawson, C. C. Richardson, June 26, 1918; Qr.-Mr. and Hon. Capt. F. S. Palmer, June 30, 1918; Hon. Lieut. J. E. Coature, June 6, 1918.

Having been returned to Canada for disposal A. G., Ottawa: Qr.-Mr. and Hon. Capt. C. A. Gordon, June 27, 1918; Qr.-Mr. and Hon. Capt. G. H. Emery, June 30, 1918; Capt. H. Bell, May 30, 1918; Capt. G. Mc I. Atkin, July 16, 1918.

Having been transferred to the C.E.F. in Canada for duty, with effect July 27, 1918: Lieut.-Col. J. L. Biggar, Major A. J. Losier, Major J. J. Ower, Capt. J. G. W. Campbell, Capt. T. B. Green, Capt. W. F. Jackson.

Having died while on Service: Capt. W. F. Hale, June 8, 1918 (C.L. 1009, June 15, 1918, Sect. A); Capt. J. T. W. Boyd, June 16, 1918 (C.L. 1010, June 17, 1918, Sect. A).

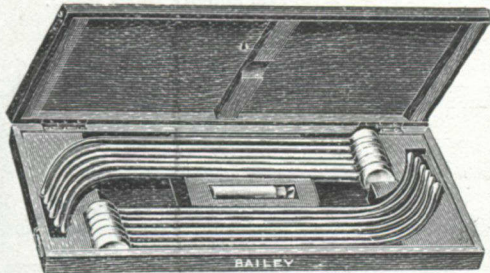
Having died of wounds: Capt. T. Whitmore, August 8, 1918 (C.L. 1055, August 9, 1918, Sect. A); Capt. M. A. McKechnie, August 8, 1918 (C.L. 1056, August 10, 1918, Sect. A).

The names of the officers and nursing sisters who have been struck off strength, believed drowned, will be found in No. 5 C.A.M.C. BULLETIN, August, 1918, pp. 71-73.

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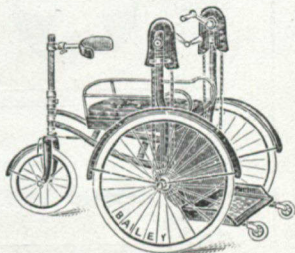
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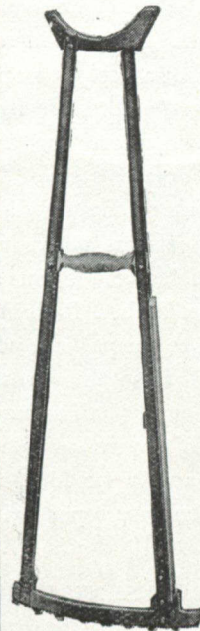
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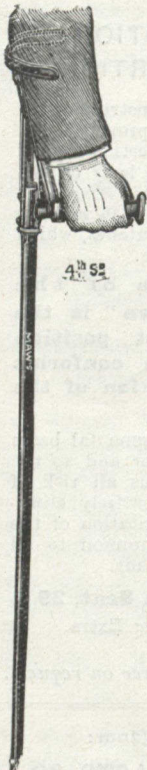
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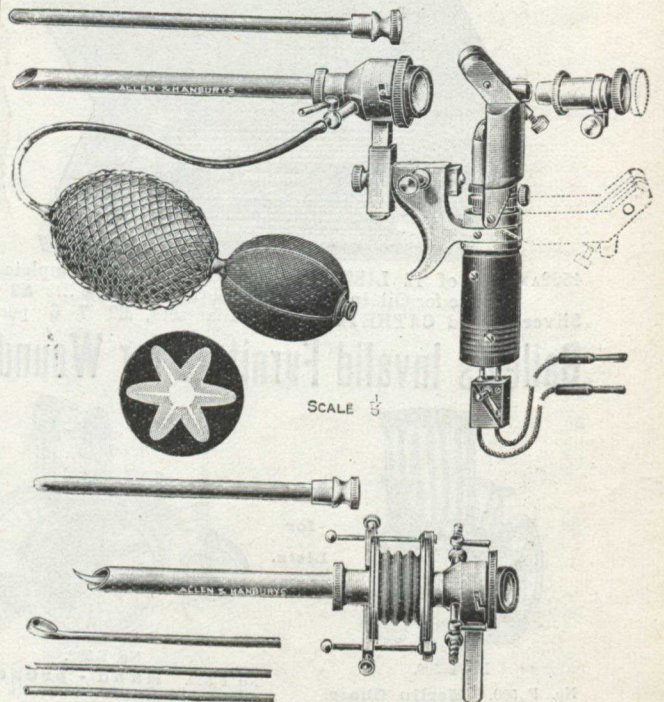
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