

Bulletin

OF THE

Canadian Army Medical Corps

ISSUED FROM THE OFFICE OF THE

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

CONTENTS

ORIGINAL ARTICLES :

The Enemy Air Raids upon Canadian Hospitals, May, 1918. A Report to the D.G.M.S. Canadian Contingents	64
The Sinking of H.M.H.S. "Llandoverly Castle"	69
MAJOR F. B. BOWMAN and CAPTAIN P. D. SAYLOR. Diagnosis of Chronic Infections with Gonococcus by the Complement Fixation Test	73

ADMINISTRATIVE NOTES:—

On Lousing and Disinfestation	75
--------------------------------------	----

CORPS NEWS:—

Canadian Universities in the War	76
---	----



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

THE ENEMY AIR RAIDS UPON CANADIAN HOSPITALS.

May, 1918.

A Report to the D.C.M.S. Canadian Contingents.

By J. G. ADAMI, M.D., ScD., F.R.S., F.R.C.P., &c.
Colonel, C.A.M.C., A.D.M.S.

THE Report which follows is compiled from official communications received at the Office of the Director of Medical Services, Canadian Contingents, supplemented by personal knowledge of the hospitals and areas affected by the enemy air raids.

I. The Air Raids upon the Etaples Area, May 19 and 31, 1918.

On the outskirts of the old fishing town of Etaples there has been developed one of the largest hospital areas in France. Here, since the autumn of 1914, has been collected a large number of British General Hospitals with many thousands of beds. From its earliest days overseas No. 1 Canadian General Hospital has been established here—namely, since the spring of 1915; later, in 1917, No. 7 (Queen's University) Canadian General Hospital, which had returned from the East, took over another hospital site.

At the back of the area, in a hollow beyond No. — British General Hospital, No. 9 Canadian Stationary, transferred from St. Omer on account of its exposure there to shell fire, was, during the latter half of May, engaged in erecting a tent hospital. And lastly, pending allocation elsewhere after removal from St. Omer, the personnel of yet another Canadian Hospital (No. 7 Canadian Stationary) was at this same period distributed among the other Canadian units at Etaples.

Etaples, which is at the mouth of the little river Canche, is a town with a notable history. It was the plain lying below the sand dunes to the north that Julius Cæsar chose as his base for the invasion of England; here, too, eighteen centuries and more later Napoleon collected his troops for the same object, and on this plain it is that the hospital area has been established. Across the plain from north to south runs the National Road from Boulogne southwards to Dieppe. Between the road and the sea runs the line from Calais and Boulogne to Paris.

The hospitals are in the main strung along the landwards side of the high road. Most of them are now established in well-built and spacious huts. Furthest to the north is the hospital of St. John of Jerusalem, next to this No. 1 Canadian General, followed by three British and American units, and then, nearest to Etaples, No. 7 Canadian General. As already noted, No. 9 Canadian Stationary with its tents lies far back away from the road.

NO. 1 CANADIAN GENERAL HOSPITAL.

The wards and administration offices of No. 1 forming the hospital proper lie to the east of the road. Among these note must more particularly be made of the wards set apart for the treatment of cases of fractured femurs. This unit was specially selected by the British Service for the care of these grave cases. Almost always caused by shell wounds, these are in general compound and comminuted with extensive laceration. In the first years of the War the mortality in this class of cases was 40 per cent. Several hundred beds had been set apart at No. 1 for these fractured femurs, and, according to Sir Anthony Bowlby, No. 1 holds the record for successful treatment, with better results, and a smaller mortality than any hospital overseas—namely, 8 per cent, one-fifth of that it used to be.

Opposite to these, and on the other side of the road, between it and the railway, are the officers' mess and quarters (in Alwyn huts of light wooden frames covered by canvas), and still farther from the road, the nursing sisters' quarters. To the north of both are the quarters for the N.C.O.s and men of the unit.

Whit Sunday, May 19th, had been clear and bright. The sky at night was cloudless. By 10.15 most of the personnel not on duty were in quarters, many of them already asleep. There had been a concert at No. 7 Canadian General, and those of the unit who had attended had been back for a few minutes, when at 10.20 two shots were heard from the north,

followed by the sound of aeroplanes. These were invisible although judging from the sound at no great height.

The O.C., Lieutenant-Colonel J. A. Gunn, C.A.M.C., writes to the D.M.S.: "The first bombs that fell in our line, evidently incendiary, landed on our men's quarters, which were situated close to the railway. These were soon in flames, and afforded an excellent target for the enemy, who within a short time dropped eight or ten bombs in this area. The fact that most of the men were asleep accounts for the large number of casualties. More than half of the personnel indeed were casualties, with fifty-one N.C.O.s and O.R. killed and forty-five wounded, of whom six subsequently died. The fire picquets and the N.C.O.s and men who were unhurt set to work at once to rescue the wounded and tried to extinguish the fire. They were ably assisted in this by a number of Guardsmen, camped outside the hospital area, who came over immediately the place caught fire, and, regardless of danger to themselves, gave very valuable assistance in rescuing the wounded."

Another account mentions valuable assistance given by the personnel of the adjoining hospitals.

The O.C. continues: "Immediately following the dropping of the bombs on the men's quarters several were dropped in the neighbourhood of the officers' and sisters' quarters. One large bomb fell right behind the quarters of the officers' servants, and made a crater fully 25 ft. in diameter. Fortunately there were no casualties here. Another bomb fell in the midst of the officers' huts, levelling several to the ground and badly damaging others. Only one, in fact, was not damaged. Luckily no officers were in these huts at the time. Another fell at one end of the sisters' quarters and practically destroyed one wing. Fortunately this wing was mostly used by sisters who were on night duty, and so the rooms were empty at the time, otherwise the casualties among the nursing sisters would have been much greater. As it was, one sister was killed." This was Miss K. S. Macdonald, C.A.M.C. Seven were wounded, of whom two, Miss G. M. M. Wake and Miss M. Lowe, subsequently died from their injuries.

A small bomb fell in the centre of the officers' plot, and of several officers in the neighbourhood one, Captain D. E. Howes, C.A.M.C., was killed, and the O.C. of No. 7 Stationary Hospital, who happened to be attached at the time to No. 1 C.G.H., was wounded. Later in the raid a number of bombs fell into the hospital area proper, partially damaging a number of the wards and causing a number of casualties among the patients, six being killed and thirty-two wounded, all save one from among Imperial troops.

There were that night 1,156 patients in the hospital, 300 of whom were femur cases. The nature of the treatment for these cases demands that the patients have the leg fixed by bandages in an extended position to a firm immovable framework. These patients could not therefore be moved. They lay there helpless. Happily none of the femur wards were hit. Wherever possible the other patients were placed under the beds to afford them as much protection as possible. With the exception of one ward, which had been re-vetted, here at the base, many miles behind the shell-fire zone, no protection had been provided for either patients or personnel.

The raid lasted two hours. At least one aeroplane came down low and used machine guns upon those engaged in rescuing the wounded from the burning huts. Not one bomb hit the railway or fell on the other side of the tracks. The upper part of the hospital where the patients' tents and huts were destroyed is a very considerable distance from the railway, and even from the Boulogne road. It is impossible to contend that the enemy was aiming at the railway communication between Boulogne and Paris.

Appended is the list of casualties:—

(1) Nominal Roll of Members of No. 1 Canadian General Hospital killed by enemy air craft in the raid of May 19-20, 1918:—

Capt. Howes, D. E.	522730 Pte. Baird, J. J.
N/S. MacDonald, K. M.	50930 Pte. Barnsby, G. E.
50888 S/Sgt. Brown, G. H.	645865 Pte. Blatchford, G.
50837 Sgt. Smith, M.	529322 Pte. Chadwick, F. C.
50039 L/Sgt. Firth, H.	524518 Pte. Cuming, F.
50034 Cpl. Dickson, G. M.	34451 Pte. Davies, G. T.
34419 Cpl. Jardine, G.	32871 Pte. Dawson, J.
34491 Cpl. McKay, A. V.	164268 Pte. Findlay, J. B.
536312 Pte. Addison, H.	34462 Pte. Flanagan, T.
527533 Pte. Angus, H. G.	211141 Pte. MacKay, C. G.
466197 Pte. Allen, T. L.	10189 Pte. Forest, P. A.

33339 Pte. Fraser, D. C.
 9402 Pte. Hardy, W. J.
 697061 Pte. Inouye, H.
 261349 Pte. Jeffs, W. J.
 536017 Pte. McDonnell, S. J.
 1078442 Pte. McKenzie, A.
 847724 Pte. Menard, A.
 501402 Pte. Mitchell, C. F.
 108446 Pte. Oxley, E. T.
 159592 Pte. O'Neil, H. V.
 33218 Pte. Parkinson, H.
 1004110 Pte. Poprawka, P.
 602745 Pte. Scanlon, E.
 34529 Pte. Setterstrom, E.
 406836 Pte. Troughton, F.
 536444 Pte. Warden, W.

436204 Pte. Wilson, H.
 2005910 Pte. Pinee, M. W.
 526149 Pte. Richardson, J. L.
 3746485 Pte. Roberts, G. W.
 527379 Pte. Ryea, F. R.
 527293 Pte. Shaver, H. J.
 2098872 Pte. Sime, J.
 536014 Pte. Smyth, E. D.
 527270 Pte. St. Germain, E.
 02620 Pte. Parsons, G.
 10145694 Pte. Conroy, W.
 530129 Pte. Horwell, G. W.
 34534 Pte. Skinner, A.
 527287 Pte. Pettes, J. G.
 1000765 Pte. Hillier, W. F.

(2) Nominal Roll of Members of No. 1 Canadian General Hospital WOUNDED during enemy air raid, May 19, 1918:—

Officers.
 Captain Davies, C. A.
 Lieut. Searle, G. W. P.
 N/S. Wake, G. M. M. (Since died.)
 N/S. Long, G. D.
 „ Lowe, M. (Since died.)
 N/S. Wishart, I. K.
 „ Gallagher, E. A.
 „ Hirsch, M. C.
 „ McKinnon, B.

N.C.O.'s and Men.

50859 Sgt. Leon, N.
 34542 Sgt. Thistle, W.
 50794 Sgt. Ure, J. A.
 33284 Cpl. Bateson, G. M.
 443057 Cpl. Napier, F.
 400152 Cpl. Wilcox, E. E.
 34120 Pte. Appleby, A.
 524925 Pte. Arlow, G.
 524686 Pte. Baker, H.
 528039 Pte. Buckepp, F. J.
 463428 Pte. Buell, C.
 337873 Pte. Coliton, J. H.
 103040 Pte. Couttes, J. D.
 50045 Pte. Fraser A. (Since died.)
 745999 Pte. Gage, R. P.
 920063 Pte. Gill, J.
 129 Pte. Harriman, J.

34481 Pte. Hyde, A.
 523632 Pte. Johnstone, C. (Since died.)
 454929 Pte. Maracle, S.
 34548 Pte. Vien, O. (Since died.)
 32801 Pte. Martin, E. (Since died.)
 524806 Pte. Mould, W.
 925020 Pte. Moulton, H.
 535542 Pte. Newman, R. W. P.
 524681 Pte. Pemberton, J. W.
 50731 Pte. Scott, G. A. W.
 50797 Pte. Stuart A. W.
 859073 Pte. Thorlacious, A.
 529384 Pte. Whittaker, H.
 523564 Pte. Atkinson, G.
 524410 Pte. Cooper, J.
 524389 Pte. Mosley, C. H.
 50724 Pte. Stewart, C. J.
 500305 Pte. Pearson, J.
 5243389 Pte. Wilson, A. E.
 523263 Pte. Pearson, J. H.
 523319 Pte. Pearson, S. E.
 527383 Pte. Skinner, W.
 526853 Pte. Gascoine, F.
 527650 Pte. Shaw, W.
 6775 Pte. Buchanan, T. C.
 Attached to No 1 Can. Gen. Hospital from No. 8 Stat. Hosp., Can.

(3) Nominal Roll of Patients KILLED during enemy aid raid, May 19, 1918:—

98125 W/Oper. Levy, A., R.A.F.; 75170 Pte. Hoyland, J., 24 R. Fusrs.; 2699 Pte. Hitchens, F. W., Aus. Corps Cyclist Btn.; 75175 Gnr. Wilkinson, J., 160 Sge. Bty. R.G.A.; 1418 Pte. Gentry, C. T., 11 Fld. Amb. R.A.M.C.; 1313 Pte. Stenton, A., 2 York and Lanc. R.

(3) Nominal Roll of Patients WOUNDED during enemy air raid, May 19, 1918:—

74061 Bbr. Greenfield, H., 69 Sge. Bty. R.G.A.; 325881 Cpl. Walker, J., 9 Dur. L.I.; 329889 Pte. Purdy, J., 7 Can. Area Employ Co.; 235289 Pte. Stocking, P., 10 Scots Rifles; 4313 Pte. McNaughton, J., 9 Gordons; 107171 Pte. Sharples, N., 120 Bde. Signal, R.E. (since died); 24145 Pt. Barnes, A., 1 Lancs. R. (since died); 1245 Pte. Thompson, J., 11 Arg. and Suth Hgrs.; 204772 Sgt. Charles, J. T., 1 Som. L.I.; 202566 Pte. Pearce, G., 1/5 Dur. L.I.; 200597 Sgt. Tuck, G., 1/5 Ches. R.; 92965 Gnr. Read, A. W., 1 Sge. Bty. C.G.A.; 426313 Pte. Astall, A., 422 Fld. Co. R.E.; 160208 Gnr. Sanders, H. M. F., 284 Sge. Bty. R.G.A.; 21554 Pte. Cooper, J., 8 Seaforth Hgrs.; 492130 Spr. Nixon, F., 46 Div. Signal Co.; 18110 Pte. Wiles, R., 1 Btn. Gren. Gds.; 102 L/C Smith, N. C., 9 M.G.C. Australian; 32495 Pte. Crosland, A., 1 N. Staffs. R.; 50517 Pte. Mills, H. E., 1/13 London R.; 281047 Sgt. Pedder, G., 17 Hvy. Bty. R.G.A.; 47993 Pte. Axson, D. T., 1 North'd Fusrs.; 215846 Pte. Duckworth, A., A/50 R.F.A.; 83312 Gnr. Bagley, A. J., 100 Sge. Bty. R.G.A.; 426 Gnr. Jamieson, A., 317 Bde. R.F.A.; 5205 L/C Dorling, C., 8 E. Surrey, R.; 21/133 Pte. Grabham, A., 1 W. York R.; 3419 Spr. Pugh, V., G.A., 11 Co. R.E.; 34140 Gnr. Stoddart D., Y/4 T.M.B., R.F.A.; W/825 Dr. Woodward, S., 12 Ches. R.; 36330 Sergeant Vass, R. C., 12 E. Surrey R.; 11483 Pte. Naven, J., 30 C.C.S. R.A.M.C.

Wounded in air raid May 31, 1918:—

22599 Pte. Bain, G., 6 Gord. Highlanders.

Captain DAVID EDWIN HOWES, C.A.M.C., was born at Minto, Ontario, May 20, 1877, and graduated in Medicine at the University of Toronto, 1906. He had been in practice at Shallow Lake, Ontario, prior to the outbreak of War. He entered the C.A.M.C., and went Overseas in November, 1916. He went to France in November, 1917.

N/S. KATHERINE MAUD MACDONALD, daughter of Mr. and Mrs. A. Macdonald, of Brantford, Ontario, was a graduate of the Victoria Hospital, London, Ontario, graduating in May,

1915. She reported in England in April, 1917, and proceeded to France in January, 1918. She had been attached to No. 1 Canadian General Hospital since the beginning of March, 1918.

N/S. GLADYS MAUDE MARY WAKE, daughter of Mr. and Mrs. G. F. Wake, was born at Victoria, B.C., and graduated from the Royal Provincial Jubilee Hospital in that city in the autumn of 1912. Her family had returned to England, and it was in England that she was appointed to the C.A.M.C. Proceeding to France May 13, 1918, she had not been a week at No. 1 Canadian General Hospital at the time of the air raid. She died of wounds on May 21.

N/S. MARGARET LOWE, daughter of Thomas Lowe, Binscarth, Manitoba, was born at Morayshire, Scotland, January 26, 1888. She graduated from the Winnipeg General Hospital in 1916, and came overseas in June, 1917. She had been attached to No. 1 General Hospital since March, 1918. She died of wounds May 28.

Later Air Raids in the Area.—A second raid was attempted on the night of the 21st, but no damage was caused; a third on the night of the 30th. This lasted from 10.30 p.m. to 12.30 a.m. The bombs fell in the town, but not in the hospital area. A fourth raid took place on the night of the 31st. This time a bomb fell between the patients' kitchen and bath-house of No. 1 Canadian General Hospital, wrecking both buildings and badly damaging the femur wards alongside. A second bomb fell just outside A and B Wards, and here, without doubt, the re-vetting which had been done about the wards since the first raid saved many lives, only one patient being wounded. The administration building was also badly shaken, including the laboratory, which was rendered temporarily useless.

In the interval between the first and fourth raids, practically all the wards in which lying cases are kept had been sandbagged to the height of 4 ft. 6 in. and trenches made for walking cases and personnel.

It is impossible, says the O.C., to speak too highly of the members of the staff during each of these raids. On the occasion of the first the N.C.O.s and men saved many of their comrades by rescuing them from the burning quarters with absolute disregard for their own personal safety. The sisters on night duty conducted themselves magnificently and stayed with their patients, encouraging them and cheering them.*

No. 7 CANADIAN GENERAL HOSPITAL.

In the air raid of May 19 no other hospital suffered so terribly as did No. 1 Canadian General. Regarding No. 7 Canadian General, situated along the road to the south of No. 1, the O.C., Colonel Etherington, reported to the D.M.S. as follows: "Eighteen bombs and one torpedo were dropped on the hospital precincts. The first were dropped in the men's lines, setting a bell tent on fire and riddling three Alwyn huts. Here nine members of the unit received wounds of varying degrees of seriousness. These bombs were of the light spring type, and, as a result, even those who had presence of mind to throw themselves flat on the floor failed to escape injury. The next fell near the officers' lines, damaging huts and personal property and wounding three officers. An aerial torpedo struck a large marquee, which at once took fire. Patients and members of the personnel hastened to the rescue, but the enemy airmen took advantage of the light to return and drop spring bombs, which took the rescuers at such disadvantage that many were wounded.

"Within a few minutes after this four bombs were dropped on the patients' kitchen and the new cement dining hall. The night cook was killed, and a few men who had sought safety in the cement building were wounded. The damage to these two buildings was extensive, especially the dining hall, which was practically riddled.

"The conduct of the personnel on this occasion was all that could be desired. While the raid was yet in progress stretcher parties hastened to remove the wounded from the scene of action to where they might receive first aid, and, while yet enemy aircraft circled about, nursing sisters went about their work with perfect coolness."

* Principal Matron Ridley adds that many of those off duty went up to the hospital and worked in various places under heavy bombing. To quote Matron-in-Chief Macdonald: The nursing sisters indeed acted as though "they considered themselves fortunate in having an opportunity of sharing the horrors that our men undergo daily in the front areas."

"The officers, too, proceeded to their respective wards as soon as they knew that an air raid was in progress, and remained there until all danger was over."

The casualties for this raid were as follows:—

Hospital Personnel.—Officers, killed, 0; wounded, 3. Other ranks, killed, 1; wounded, 21. Of the 21 wounded 3 have since died. Patients, 9 killed, 37 wounded; total casualties, 71.

On the night of May 30 hostile aircraft again visited the neighbourhood, but no bombs were dropped on the hospital. On the night of May 31 one bomb was dropped on the hospital. This struck and destroyed our incinerator and practically destroyed the patients' ablution house. Fortunately only one patient was wounded. By this date the number of patients in hospital had been considerably reduced.

The list of casualties is as follows:—

MEMBERS OF THE UNIT KILLED.

406908 Pte. Houghton, Wm., bomb wounds neck and chest.

MEMBERS OF THE UNIT WOUNDED.

Officers.—Capt. Parker, W. F. (Chaplain, Bapt.); Captain Duff, J., C.A.D.C.; Capt. Walmsley, J., C.A.M.C.

Other Ranks.—535463 Cpl. McCaig, E.C. (died 31.5.18); 50427 L/C. Prestidge, T. E.; 14549 Pt. Dunn, T. H.; 524061 Pte. Black, W. R.; 522633 Cpl. Duncan, G.; 1099097 Pte. Harrison, W. J.; 877 Pte. Morrison, A. L.; 904003 Pte. Moon, F. W.; 535458 MacDonal, J. A.; 198198 Pte. Brown, A. McE.; 527648 Cpl. Sellwood, W. G. (died 30.5.18); 535456 Pte. Knapp, F. D.; 526586 Pte. Radcliff, J. J. (died 23.5.18); 536025 Pte. Young, H. A.; 868 Pte. Hinks, A.; 34452 Pte. Davies, J.; 133117 Pte. Lovesy, H. R.; 86555 Pte. Conlan, A. C.; 529677 Pte. Young, Jas.; 400370 Pte. Nind, F. B.; 475911 Pte. Klein, H.

No. 9 CANADIAN STATIONARY HOSPITAL.

This hospital, established in tents to the east of the Etaples area, had not yet begun to receive patients. While the marquees had been set up they had not been camouflaged, nor had any part of the hospital been protected by revetments. The O.C., Lieutenant-Colonel Kendall, writes to the D.M.S.:—

"It seems likely that our hospital stood out prominently framed, the white tents being shown up by the dark framework of the surrounding hills (with their pine woods).

"A line of eight bombs was laid across the hospital site, dropping a few yards from each other. Two direct hits were made on the hospital marquees, completely destroying eight, fortunately with no patients within. Four bombs fell among the tents of the personnel. In all fifty tents were completely or partially destroyed.

"The casualties were:—

Officers killed ...	0	Wounded ...	1 (who died subsequently)
N/Sisters ...	0	"	2
O.R. ...	1	"	14
Total casualties	18

"The morale of the unit under existing extremely trying conditions was all that could be desired."

KILLED.—534470 Sgt. McMillan, H. G.

WOUNDED *Officers.*—Capt. W. F. McIsaac. (Atch. to No. 51 Gen. Hosp.) Died of wounds at Red Cross Hospital, Le Touquet, 3.6.18.

Nursing Sisters.—M. C. Hirsch. (Atch. at the time to No. 1 Can. Gen. Hosp.) B. MacKinnon. (Atch. at the time to No. 1 Can. Gen. Hosp.)

Other Ranks.—534460 L/C. Whidden, E. J. (Atch. at the time to No. 1 Can. Gen. Hosp.) 524920 Pte. Adams, H. A.; 292272 Pte. Cooke, C.; 524438 Pte. Couper, C. R.; 532251 Pte. Eaglestone, E.; 524325 Pte. Jones, J.; 602071 Pte. McAllan, W.; 534438 Pte. McLean, A. H.; 534426 Sgt. Power, W. R.; 534508 Pte. Sloan, H.; 157067 Sgt. Taylor, W. J.; 528090 Sgt. Thomson, C. V.; 534452 Pte. Webb, L. M.; 534480 Pte. Young, W. R.

Captain WILLIAM FIELDING McISAAC, C.A.M.C., was born at Antigonish, Nova Scotia, May 4, 1894. He graduated in Medicine at McGill University, February, 1917. He entered the C.A.M.C. and went overseas in March, 1917, and went to France in December, 1917.

No. 7 CANADIAN STATIONARY HOSPITAL.

This hospital had previously worked in the St. Omer area, but had been forced to evacuate this more advanced hospital base by reason of the growing nearness of the enemy. There it had experienced several air raids, but always without mishap. Now during May it had been "parked" at Etaples pending receipt of instructions to establish itself elsewhere. Of its equipment a dump had been made just to the north of the St. John Ambulance Brigade Hospital while the staff

was variously accommodated. The officers were quartered No. 1 General Hospital; the majority of the sisters were doing duty there; the remainder with the matron were attached to No. 7 General Hospital. Most of the N.C.O.s and men were occupying tents in rear of the equipment; others were sleeping in the Company lines of No. 1. They were messing with the corresponding ranks of that unit. In return, No. 7 Stationary was supplying No. 1 with various fatigues and picquets. Thus a picquet of one N.C.O. and twenty men were on duty there on the night of the first raid.

To quote from a letter to the D.M.S. from Major J. M. Stewart, Acting O.C.: "Before we had time to take shelter the bombs were falling, and for a short while they almost seemed to rain down. Of all the hospitals in this area No. 1 Canadian suffered most heavily. No. 7 Stationary, from its close proximity to and connection with No. 1, also suffered."

One bomb dropped not more than 20 yards behind the tent occupied by the sergeants. The rain of shrapnel only caught the upper part of the tent, and no casualties ensued. Several bombs fell directly over the Alwyn huts occupied by the N.C.O.s and men, among them several incendiary bombs, which immediately started a big conflagration. Here one of the men of the 7th Stationary Hospital, Private F. W. Laidlaw of the C.A.D.C. (attached to No. 7), who was on picquet duty, was killed outright. Another, Private T. Takayanagi, C.A.M.C., received wounds from which he died within a few hours. Private W. E. O'Toole, C.A.M.C., was wounded as he lay in his tent. "How this man escaped death is a miracle. His friends of No. 1, who were in the same hut, were all killed on the spot."

The only officer of No. 7 Stationary to receive a wound was the Commanding Officer, Major (now Lieutenant-Colonel) E. V. Hogan. He was caught in the lower leg by a piece of shrapnel which inflicted an ugly wound. In spite of the fact that a considerable portion of their quarters with No. 1 were wrecked, not a single sister from No. 7 received the slightest scratch.

Many of the N.C.O.s and men of No. 7 rushed immediately to the scene of the fire in the men's quarters of No. 1, and assisted in extricating the wounded from the débris and in putting out the flames. What this meant is suggested by a description received from an officer, a layman, attached to No. 1 General, who, though rendered unconscious by the bomb which killed Captain Howes and subsequently invalided to England, went to help in this work. He writes: "I started out again for the fire, and found Captain Howes about five yards from where I fell. He was quite dead . . . It is hard to tell about the next half-hour, which seemed a perfect hell. You can imagine what it was like getting the killed and wounded out of those burning huts. Some had their arms and legs burned away, some were headless."

It must not be thought that the Canadian hospitals alone suffered during the aid raid of May 19. The British hospitals suffered also. According to the report of the D.D.M.S., Etaples area (for abstracts from which we are indebted to the courtesy of Major Brereton, R.A.M.C., Officer in Charge of the Medical Records of the B.E.F.), altogether some 100 bombs were dropped in the area, resulting in the death of 124 other ranks. From this it is clear that No. 1 Canadian General Hospital was the heaviest individual sufferer. Proportionately a larger number at the other hospitals died subsequently of their wounds. Some eighty-nine died of their wounds on the 20th and following days. He notes further that one German machine was brought down by anti-aircraft guns and the three occupants taken prisoners.

The Air Raid upon No. 3 Canadian Stationary Hospital at Doullens.

May 29-30, 1918.

Upon visiting Doullens the first impression given is that of some surprise that the hillside overlooking the little town was chosen to be the site of what during the late 17th and 18th centuries was one of the most powerful forts in France. The whole country thereabouts is rolling; the town is unimportant; the hill not higher than other hills in the neighbourhood. A glance at the map, however, reveals the significance of the site. Doullens lies at the junction of two natural highways, at the junction of the valleys of the

Ruthie with that of its tributary, the Grouches. The Citadel thus dominates a wide area, extending from Albert to the south-east to Arras on the north-east. And at Doullens the main roads from these two important centres, where they join, are crossed by the great North Road from Amiens.

The Citadel is on the rising ground to the south of the town, well outside, separated from it and surrounded by fields and pasture land. It was designed by the great engineer Vauban, the lower portion with its high walls being apparently the older. In erecting this advantage was taken of the slope of the ground to construct or build up a singularly extensive series of tunnels and chambers, large enough to hold several battalions, or, indeed, the whole population of Doullens, the terrace of the fort extending above. In this way the fort presents a massive front, or scarp, to the town. The whole Citadel forms a somewhat irregular pentagon, with large bastions at the angles, and a ravelin opposite each curtain. The moat surrounding all gives it, when seen from above, the appearance of a star with ten blunt rays. From its size and characteristic shape it could not fail to be a most familiar landmark for airmen; in fact, *the* most familiar in all the area. As such it was recognized by our Air Service. According to one of the enemy airmen who fell in our lines it was known to them as "das Herz" (the heart).

With the development of modern artillery all these arrangements became useless, if not worse. During the greater part of the nineteenth century the fort was still retained as a military centre, and towards the middle of this period a large and plain four-storied barrack buildings had been erected in the upper court. Many years ago even this use was abandoned, and the buildings were taken over by the civil authorities to be employed as a reformatory, or house of detention, for unruly girls.

Ever since the War began the fort has been used as a hospital. Since November, 1916, it has been occupied by No. 3 Canadian Stationary Hospital.

And here at Doullens this unit has accomplished notable work, and made a name both for itself and the C.A.M.C. Thus, apart from routine work, it has for the last year been one of the centres for the treatment of "shell shock" behind the front. During the first two years of the War there was, it is stated, an average of 30,000 cases labelled as "shell shock" returned to England. Here at first the majority were sent to no special hospital and received no special treatment. Brooding on their cases many got worse instead of better. They became permanently helpless and useless members of society, melancholic, and lacking in any initiative, where they did not show paralysis, or affections of the organs of sense, deafness, dumbness, blindness.

The D.M.S. Canadians was one of the first to take active steps, and from the moment that the Granville Canadian Special Hospital was established these cases were taken in hand, and some very remarkable cures effected. There was there a veritable chapel of Lourdes—a room full of crutches, sticks, and other appliances belonging to men who had entered the hospital unable to walk by themselves, and who had, after a few treatments, emerged walking without support. But the longer the man had been left to himself the less the hope of bringing him back to full activity. Many of those entering the Granville had been for six months and more at other hospitals, and nothing could be done for them.

At the end of 1916 the British authorities, realizing the seriousness of the state of affairs, determined to establish a shell-shock centre in each Army area for the immediate treatment of these cases. That for the — Army was placed in charge of Captain F. Dillon, R.A.M.C.

At first attached to No. 6 British Stationary Hospital at Frevent in the middle of 1917, at the request of the Canadian authorities, this psychologist was attached to No. 3 Canadian Stationary Hospital, which now rapidly became noted for the remarkable results obtained. By collecting these cases together, reasoning with, encouraging and persuading them, and above all by the force of example, by these men seeing daily those around them recovering wholly their faculties and their good spirits, it has been brought about that only a relatively inconsiderable minority are found so affected that they have to be transferred to England. According to a report by the O.C. the hospital, on the work accomplished since May, 1917, 75 per cent. of these cases have been returned to duty with very few relapses or recurrent cases. Others are given work along the lines of communication. And so to-

day, in place of 30,000, only some 2,000 of these cases are returned from overseas. It is a great achievement, and No. 3 Canadian Stationary Hospital has played a valuable part in bringing it about.

It is, however, during the spring of this year that No. 3 Canadian Stationary Hospital has truly come into its own. With the rapid development of the enemy offensive towards the end of March and his advance all along the line, taking Albert and threatening Arras, the British Casualty Clearing Stations, being exposed to capture, had to fall back rapidly. Report had it that some, indeed, fell into the hands of the enemy. This left some fifty miles of front with great numbers of casualties and no casualty clearing and advanced operating centres. The peculiar position of Doullens has already been referred to, at the junction of the main road systems stretching from Arras to Albert. The hospital, therefore, became the natural clearing station for all this extensive area.

It rose to the occasion. Although equipped to accommodate 1,000 cases under ordinary conditions, the barrack quarters are spacious, and the O.C., Lieutenant-Colonel Reason, D.S.O., gave instructions that no case presenting itself was to be refused. Ambulance car followed ambulance car in rapid succession. Whereas in the month before the offensive the admissions had averaged 50 per diem, now they rose rapidly, thus:—

March 17, admissions ...	33	March 25, admissions ...	673
" 19, " ...	63	" 26, " ...	1,622
" 20, " ...	57	" 27, " ...	1,932
" 21, " ...	276	" 28, " ...	2,333
" 22, " ...	537	" 29, " ...	2,228
" 23, " ...	1,064	" 30, " ...	1,154
" 24, " ...	649	" 31, " ...	941

From the 21st to the 31st of March inclusive there were 13,494 admissions (an average of 1,226 per diem); during the month of April 15,391 (or over 500 a day); during the month of May 7,129 (230 a day); or a grand total of 28,885 for the six weeks (roughly) from March 21 to April 30, of 36,014 for the ten weeks between March 21 and May 30, and of 57,000, odd, from May 1 to July 10.

At the height of this crisis half a dozen surgical teams—Canadian, British, and American—were working by day, another half-dozen by night, and the accommodation was so taxed that some of the milder cases were placed two in a bed, with one on a palliasse under the bed!

His Majesty visited the hospital towards the end of March when it was in the full blast of its activity. He conveyed to the O.C. and the officers his great appreciation of the way in which the unit had encountered the crisis.

No hospital on the British Front, certainly no Stationary Hospital, has quite such a record. It was a great work.

It is this fine unit that was singled out for a manifestation of the enemy's supreme contempt of the Hague Convention and of humanity.

Let it be clearly understood (i) that the fort since the beginning of the War has been used for hospital purposes and nothing else; (ii) that painted prominently on all the roofs are large "Red Crosses"; (iii) that it lies well apart, outside the town, with fields on three sides and a French hospital on the fourth; (iv) that there are in its neighbourhood no ammunition dumps, stores, camps, or artillery; (v) that it is an absolutely characteristic collection of buildings. It could not be mistaken.

The following details are in the main obtained from an account forwarded to the D.M.S. by the Officer Commanding:—

On the night of May 29-30 hostile aeroplanes were heard in the area. The night was clear, the moon shining. About 12.15 a.m. one of the aeroplanes was seen to drop a flare, and immediately following the flare it dropped several bombs. One of these, an incendiary bomb, struck the barrack (hospital).

This "struck the main building over the sergeants' quarters, Ward S.6 (officers' ward), operating theatre, and X-ray room. These immediately collapsed. Almost instantly a fire broke out, and the whole upper group of buildings was threatened. Immediately the alarm was given, and every effort was made to save the patients and to combat the fire."

It should be explained that in this lofty barrack building the attic was employed as an overflow ward for "walking wounded," and below this the sergeants' quarters were in the upper storey. Here a large room had been partitioned off so that each sergeant had a separate small room or cubicle

to himself, this being the privilege of senior N.C.O.s. Below this, again, was the officers' ward, which, fortunately, was only partially filled with patients. Below this on the ground floor were the operating and X-ray rooms.

All the sergeants of the unit were in their quarters, and all became casualties. Five were killed: Sergeant-Major C. H. Ward (W.O.), C.A.M.C.; Sergeant G. A. Wiley, C.A.M.C.; Sergeant R. G. Wallace, C.A.M.C.; Sergeant A. E. Lloyd, C.A.M.C.; and Sergeant F. O. Pattinson, C.A.D.C. All these save the last were original members of the unit, joining in February, 1915, when it was mobilized at London, Ontario. Nine other sergeants were wounded. Similarly of the patients in the officers' ward eight were killed, buried in the collapse of the burning building, and with them Sister D. M. Y. Baldwin, the nursing sister on duty in the ward.

There had been three surgical teams at work that night in the operating room. Two of these had completed their operations, and all the members, medical officers, nursing sisters, and men had left for their midnight meal. The third operation was evidently close upon completion, since the stretcher-bearers had come to remove the patients. Their bodies were subsequently found in the doorway leading into the theatre. This team was composed of Captain E. E. Meek, C.A.M.C.; Lieutenant A. P. H. Sage, M.O.R.C., U.S.A.; two Nursing Sisters, E. L. Pringle and A. Macpherson, and three theatre orderlies. All perished in the ruins of the burning building, together with the two stretcher-bearers already mentioned.

This does not cover the whole list of casualties caused by this one bomb. Certain other patients of other ranks and orderlies on duty were killed and wounded, so that the total casualties were:—

Of the Staff—killed: Two officers, one belonging to the C.A.M.C., one to the American Medical Service, attached to No. 3.

Three nursing sisters C.A.M.C.

Six N.C.O.s, of whom four belonged to the C.A.M.C., one to the C.A.D.C., and one (Sergeant J. P. Watson) to the 46th C.C.S., R.A.M.C.

Ten privates, of whom four belonged to No. 3 Stationary Hospital, C.A.M.C.; three to 46th C.C.S., R.A.M.C.; and three to 293rd A.E. Company.

Wounded: One nursing sister.

Ten N.C.O.s (one quartermaster-sergeant, two staff sergeants, five sergeants, one acting sergeant, and one corporal, of No. 3 Canadian Stationary), together with six private soldiers, of whom one belonged to No. 3 Canadian Stationary Hospital, the others to various Imperial units, attached temporarily for one or other purpose to No. 3 Canadian Stationary Hospital.

Among the *patients* the following were casualties: *Killed*, six officers. *Missing—reported dead*, two officers and three O.R. *Wounded*, nil.

The total casualties from this one incendiary bomb were forty-nine, of whom thirty-two were killed, the bodies of twenty-seven of these being recovered, and seventeen were wounded.

The flames from the burning building rapidly mounted sky high and illuminated the whole hospital area. They caught and destroyed the staircase of the main building, and doing this cut off the patients in the various wards. To quote from the account given by the O.C.: "The nursing sisters and orderlies in the wards behaved splendidly, and, with the assistance of other members of the unit, I am glad to say that there were no casualties other than those brought about by the bombs. The patients were removed with great rapidity and conveyed to the underground passages," i.e., to the spacious tunnels already mentioned.

The O.C. singles out for special mention Corporal R. W. Scully, C.A.M.C., who, when the staircase was destroyed, was the first to mount a ladder, climbing to the building, and beginning the work of rescuing the imprisoned patients. Private D. K. Macdonald, C.A.M.C., and Bugler Morison, C.A.M.C., both climbed to the burning roof, and, regardless of their own safety, succeeded in rescuing their comrades and patients. With them Private Thorne, R.A.M.C., 46th C.C.S., is singled out for recognition, he displaying splendid ability and great devotion to the work of removing the wounded to safety.

In the resuscitation room, when the first bomb fell, two sisters were on duty, Nursing Sister M. Hodge and Nursing

Sister E. J. Thompson. This room immediately adjoins the operating theatre, and with the collapse of the building a heavy beam fell, wounding Sister Hodge in several places and Sister Thompson slightly. Notwithstanding, and with great presence of mind, the two sisters extinguished the fires burning in the coal oil heaters, which had been overturned by the explosion. They thus prevented the patients' beds from taking fire. They then turned to saving and removing their patients, directing the orderlies, and "without thought of self assisted in the removal of patients." To the resuscitation room are removed patients immediately after operation, and although suffering from grave shock, many of them unconscious and all bedridden. They are the most helpless cases of all. Despite their wounds, these two sisters remained in their wards until every patient had been removed.

Principal Matron Ridley, who visited the hospital the next day, in her report states further that Nursing Sister Walker "slid down the debris, leading her patients, the stairway having gone." All the sisters throughout the building remained at their posts, helped to get the patients out, and did dressings afterwards. She gives their names: Sisters H. Potter, L. Gleeson, A. Sutherland, R. McLeish, E. McDougall, M. Kennedy, C. E. Chisholm, and W. W. McPherson.

Meanwhile the explosions and the conflagration had brought companies of British and French troops up from the town to help, whether in removing the wounded or in fighting the flames. Three companies of French troops are noted as having been of great assistance and received the commendation of the O.C., who states that they were commanded splendidly by Capitaine Victor Vannier, 6ième Compagnie, 2ième Chasseurs; Lieutenant René Fairy, 6ième Compagnie 4ième Chasseurs; and Sous-Lieutenant J. A. L. Vincent, 21ième Chasseurs. With their assistance and that of English troops quartered in Doullens the unit was able to save the west wing, though the main barrack was entirely gutted, only the walls standing.

Of his officers the O.C. specially recommends the conduct of Captain G. J. Gillam, C.A.M.C., who this night at personal danger worked extremely hard, and was a splendid example to others.

It was at this period, while the work of rescue was proceeding, while the flames were illuminating the whole citadel and lighting up brilliantly the huge red crosses painted on all the roofs within the fortification, that an enemy aeroplane returned and dropped several more bombs. Fortunately none of these caused loss of life or bodily injury. Indeed, throughout the attack most of the bombs fell harmlessly.

NO. 3 CANADIAN STATIONARY HOSPITAL AIR RAID CASUALTIES, MAY 29-30, 1918.

MEMBERS OF THE UNIT KILLED.

Officers.	
Capt. Meek, E. E., C.A.M.C.	814041 Pte. Glen, E. N., C.A.M.C.
Lt. Sage, A. T. H., M.O.R.C., U.S.A. (attached).	528727 Pte. Metcalfe, F., C.A.M.C.
	192 Pte. Baillargeon, P., C.A.M.C.
Nursing Sisters.	
N/S. Baldwin, D. M. Y., C.A.M.C.	523345 Pte. Minchin, F. H., C.A.M.C.
N/S. Pringle, E. L., C.A.M.C.	463006 Pte. Jefferies, S. G., R.A.M.C., 46th C.C.S. (attached).
" McPherson, A., "	463077 Pte. Sherrell, J., R.A.M.C., 46th C.C.S. (attached).
Other Ranks.	
156 R.Sgt. Maj. Ward, C. H., C.A.M.C.	201021 Pte. Watson, J., R.A.M.C., 46th C.C.S. (attached).
214 Sgt. Lloyd, A. E., C.A.M.C.	372169 Pte. McArdle, R., 293 A.E.Co.
234 Sgt. Wallace, R. G., "	372200 Pte. Collie, J., 293 A.E.Co.
155 Sgt. Wiley, G. A., "	372131 Pte. Ross, C., 293 A.E.Co.
522533 Sgt. Pattinson, F. O., C.A.D.C.	
464,008 Sgt. Watson, J. P., R.A.M.C., 46th C.C.S. (attached).	

PATIENTS KILLED.

Maj. Siedel, K. O., R.F.A., 174 Bde, 39th Div.
 Capt. Bell, J. C. A., R.F.A., B/175 A.F.A.
 Capt. Smith-Grant, J. C., Royal Scots, attached R.A.F. 17th Squad.
 Lt. Anderson, H. M., 63rd M.G. Bn.
 Lt. Miller, D. H., 5/6 Royal Scots.
 4237 Sgt. Gilham, R. W., D. Co. 1st Norfolks.

PATIENTS MISSING, REPORTED AS DEAD.

Capt. Wale, A., 39th Div. T.M.B. att. 186 Bde.
 Lt. Mitchell, A. D., 4th Middlesex.
 13242. Sgt. Oates, F. G., 7th Yorks., 39154-2629 Gnr. Raghu Nath Singh, R.F.A., 57 D.A.C., 171015 Dvr. Edwards, H., R.F.A., 57 D.A.C., M.T.Co. (wd.)

WOUNDED.

N/S. Hodge, M., No. 3 Can. Stat. Hosp.; 159 Q.M./S. Orr, L., C.A.M.C., No. 3 Can. Stat. Hosp.; 201 S/Sgt. Millee, R., No. 3 Can. Stat. Hosp.; 242 S/Sgt. Winters, M. R., No. 3 Can. Stat. Hosp.; 160 Sgt. Osborne, E. M., No. 3 Can. Stat. Hosp.; 154 Sgt. Ashenden, W. E., No. 3 Can. Stat. Hosp.; 205 Sgt. Page, R. G., No. 3 Can. Stat. Hosp.; 400131 A/Sgt. Keller, H. C., No. 3 Can. Stat. Hosp.; 169 Sgt. Tozer, H., No. 3 Can. Stat. Hosp.; 173 Sgt. Smith, A., No. 3 Can. Stat. Hosp.; 170 Cpl. Weldon, F. J., No. 3 Can. Stat. Hosp.; 782113 Pte. Gibbons, M., No. 3 Can. Stat. Hosp. (N.Y.D.N.); 281882 Pte. Peacock, W. S., 1st/4th Londons att. 46th C.C.S. att. No. 3 Can. Stat. Hosp.; 114079 Pte. Lawrence, E., R.A.M.C. 46 C.C.S. ditto att. No. 3 Can. Stat. Hosp.; 52722 Pte. Kelly, A. G., 2/1 W.R. Fld. Amb. R.A.M.C. att. No. 3 Can. Stat. Ho-p.; M2/018947 Dvr. Brown, J., 6th M.A.C., A.S.C.; 770 Pte. Wilmot, J., 7 Norfolks (Off. patient's servant).

Captain ETHELBERG ELDRIDGE MEEK was born at Five Islands, in the Bay of Fundy, Nova Scotia, in November, 1878, and passed his youth at Virden, Man., where his father was a general merchant. He graduated in arts at the University of Manitoba in 1897, and in medicine four years later. After three years' residence in hospital he settled in Regina, Sask., where he made a position for himself as a capable and popular surgeon. At the end of 1915 he was appointed M.O. to the 68th Battalion of the C. E. F., accompanying it to England in May of the following year. After some months on the Surgical Staff of No. 15 Canadian General Hospital at Taplow he went to France, and there was attached as surgeon to No. 3 Canadian General Hospital, No. 2 C.C.S., and for the last two months of his life to No. 3 Canadian Stationary Hospital, being present and actively engaged throughout the strenuous weeks of April and May. On account of his health and on urgent personal grounds he had applied for transfer to England, and authority for that transfer had been received on the day of his death. He leaves a widow, the daughter of Mr. W. J. Higginbotham, of Virden, and one daughter.

Lieutenant ABNER POTTS HERBERT SAGE, aged 29, M.O.R.C., U.S.A., of Memphis, Tennessee, was a comparatively recent graduate of Jefferson Medical College (1913). He came to No. 3 Canadian Stationary from service at the 2/2 West Riding Field Ambulance a fortnight before the raid. His genial personality rapidly made for him many friends. On the evening of the raid he was in the operating room with Captain Meek, having volunteered to relieve the anaesthetist. He was buried on May 31, covered by the "Stars and Stripes."

N/S. DOROTHY MARY YARWOOD BALDWIN, daughter of Mr. and Mrs. Baldwin, of Paris, Ontario, was born at Toronto, and graduated from the Victoria Hospital, London, Ontario, in June, 1917. Crossing to England and joining the C.A.M.C. immediately upon graduation, she proceeded to No. 3 Canadian Stationary Hospital in the early part of July, 1917.

N/S. EDEN LYAL PRINGLE, a native of Glasgow, Scotland, had accompanied her parents, Mr. and Mrs. W. Pringle, to Vancouver, B.C. Here she graduated in the Vancouver General Hospital in January, 1915. Reporting in England in the service of the C.A.M.C. in June, 1917, she joined No. 3 Canadian Stationary Hospital in July, 1917, on the same day as did Nursing Sister Baldwin. Both died of wounds, the result of enemy air raid, upon May 30, 1918.

N/S. AGNES MACPHERSON, daughter of Mr. and Mrs. J. Macpherson, of Lakeland, Manitoba, was born at Brandon, and graduated from St. Boniface Hospital, Winnipeg, in March, 1913; reported in England in January, 1917, and proceeded to France the following September. She joined No. 3 Canadian Stationary Hospital eleven days before the raid, and died of wounds received during that raid on May 30, 1918.

Sergeant-Major C. H. WARD (W.O.), Sergeants G. A. WILEY, R. G. WALLACE, and A. E. LLOYD were all original members of the unit. Sergeant-Major Ward was well known in Western Ontario, having belonged to the 15th Field Ambulance for several years. For the good work he did on the Island of Lemnos he was mentioned in dispatches. He was promoted Sergeant-major and Warrant Officer September 1, 1917. Sergeant Wallace had also been for years a sergeant in the 15th Field Ambulance. He was one of the members of the baseball team of the unit, and took a keen interest in sports. Sergeant Lloyd had graduated in medicine in the United States, but residing at Forest, Ont., did not practise there. He joined the unit upon its establishment, as did Sergeant Wiley. At the beginning of the War Sergeant PATTINSON, who belonged to the Naval Reserve, was residing at Prince Albert, Sask. He immediately reported for duty at Vancouver, and was through the naval battles of Coronel and the Falkland Islands, at the latter battle being one of the crew of the *Glasgow*. Invalided out of the Navy, after convalescence he joined the C.A.D.C., and in August, 1917, became attached for duty to No. 3 Canadian Stationary Hospital.

On the 31st the bodies of the officers, the nursing sisters, and the others at the hospital whose lives had been sacrificed in the air raid were buried with full military honours. Bishop Fallon, the well-known Roman Catholic Bishop of London, Ontario, was visiting Doullens at the time and took part in the service, delivering a memorable address.

It is unnecessary for me to draw conclusions regarding these infamies and their significance. The facts are here

given as supplied by those on the spot. They speak for themselves, and are in themselves so eloquent that they need no commentary.

THE SINKING OF H.M.H.S. "LLANDOVERY CASTLE."

THE Minister of Overseas Military Forces of Canada, Hon. Sir Edward Kemp, K.C.M.G., having made careful inquiries into the sinking of H.M.H.S. *Llandoverly Castle*, on June 27, has authorized publication of the following article. The information contained therein has been obtained and verified by personal interviews with the survivors, and affords convincing evidence of the deliberate intent and foul motive of this latest German outrage on non-combatants.

Official verification of the facts surrounding the sinking of H.M.H.S. *Llandoverly Castle* confirms two main points—the supreme devotion and valiant sacrifice of the medical personnel and the ship's company, whose courage and resignation were in keeping with the proudest traditions of the British Army and Merchant Marine Service; and the utter blackness and dastardly character of the enemy outrage on this defenceless institution of mercy—a crime surpassing in savagery the already formidable array of murders of non-combatants by the Germans.

Deliberate in its conception, every circumstance connected with the incident reveals the German in the light of the cunning murderer who employs every foul means of destroying all traces of his despicable crime.

No other explanation can be attached to the systematic attempts of the submarine to ram, shell, and sink the lifeboats and wreckage floating helplessly with their two hundred and fifty-eight unfortunate victims, one hundred and sixteen miles from land—a work of destruction so successfully performed that only one boat, containing twenty-four survivors, escaped.

This list of survivors includes only one officer and five other ranks of the hospital personnel of ninety-seven, and the official story of Major T. Lyon, Sergeant A. Knight, Private F. W. Cooper, Private G. R. Hickman, Private S. A. Taylor, and Private W. Pilot, all of the Canadian Army Medical Corps, is a stirring record of the perfect discipline of all ranks and the loading and floating of the lifeboats in the face of every possible obstacle.

Through it all nothing stands out more brilliantly than the coolness and courage of the fourteen Canadian nursing sisters, every one of whom was lost, and whose sacrifice under the conditions about to be described will serve to inspire throughout the whole Empire a yet fuller sense of appreciation of the deep debt of gratitude this nation owes to the nursing service.

At the outset it is well to consider the circumstances under which these fourteen nurses were engaged on hospital ship duty.

Five of them volunteered for service at the very outbreak of hostilities in 1914, and came to England and France with the First Canadian Division, six had seen active service in casualty clearing stations in France throughout the intervening period, four had been with the Canadian hospitals at Salonica, three had been mentioned in despatches, and most of them had been recently transferred to transport duty by way of change, and what would under ordinary conditions prove a rest.

For many months, and, in some cases, two years, these sisters had endured the hazards of the shelled areas in France, splendidly contributing to the efficiency of the Medical Service. (No less, it may be added, than six out of the fourteen had been at casualty clearing stations within the "shell zone" immediately behind the front.) How magnificently they faced the final ordeal on that awful evening of June 27 is simply, yet graphically, related in the story of Sergeant A. Knight, the non-commissioned officer of the C.A.M.C., who took charge of lifeboat No. 5, into which the fourteen nurses were placed.

"Our boat," said Sergeant Knight, "was quickly loaded and lowered to the surface of the water. Then the crew of eight men and myself faced the difficulty of getting free from the ropes holding us to the ship's side. I broke two axes trying to cut ourselves away, but was unsuccessful.

"With the forward motion and choppy sea the boat all the time was pounding against the ship's side. To save the boat

we tried to keep ourselves away by using the oars, and soon all of them were broken.

"Finally the ropes became loose at the top and we commenced to drift away. We were carried towards the stern of the ship, when suddenly the poop-deck seemed to break away and sink. The suction drew us quickly into the vacuum, the boat tipped over sideways, and every occupant went under.

"I estimate we were together in the boat about eight minutes. In that whole time I did not hear a complaint or a murmur from one of the sisters. They were supremely calm and collected. Everyone was perfectly conscious. There was not a cry for help or any untoward evidence of fear. In the entire time I overheard only one remark, when the matron, Nursing Sister M. M. Fraser, turned to me as we drifted helplessly towards the stern of the ship and asked: 'Sergeant, do you think there is any hope for us?' I replied, 'No,' seeing myself our helplessness without oars and the sinking condition of the stern of the ship.

"A few seconds later we were drawn into the whirlpool of the submerged after-deck, and the last I saw of the nursing sisters was they were thrown over the side of the boat. All were wearing life-belts, and of the fourteen two were in their nightdress, the others in uniform.

"It was," concluded Sergeant Knight, "doubtful if any of them came to the surface again, although I myself sank and came up three times, finally clinging to a piece of wreckage, and being eventually picked up by the captain's boat."

To hundreds of officers and men of the Canadian Overseas Forces the name of Nursing Sister Miss Margaret Marjorie ("Pearl") Fraser will recall a record of unselfish effort, a fitting tribute to this nation's womanhood.

Volunteering for active service in the C.A.M.C. on September 29, 1914, Miss Fraser went to France with the First Canadian Division, and for almost three years had been on duty in casualty clearing stations.

In that time not a few of her patients had been German wounded. Many times had she been the first to give a drink of water to these parched enemy casualties. Many a time had she written down the dying statements of enemy officers and men, transmitting them to their relatives through the Red Cross organization.

Her faithfulness was only typical, however, of that service for humanity exhibited by every one of these precious fourteen lives sacrificed in this latest act of Hunnish barbarity.

Major Lyon, Sergeant Knight, and the other four survivors of the hospital ship, Private T. W. Cooper, Private G. R. Hickman, Private S. A. Taylor, and Private W. Pilot are agreed that the *Llandoverly Castle* was torpedoed without warning, was displaying the regulation hospital ship lights, went down within ten minutes after being struck, and that for upwards of two hours the German submarine repeatedly attempted to blot out all trace of the crime by rushing to and fro among the wreckage, and firing twenty shells or more from its large gun into the area where the lifeboats were supposed to be afloat.

That one boat survived is not the fault of the enemy, for at least three efforts were made to run it down, in addition to shell fire directed towards it.

On June 17 the *Llandoverly Castle* had arrived at Halifax with six hundred and forty-four military patients. She started on her return voyage on June 20, carrying her crew and hospital unit establishment of seven officers, fourteen nursing sisters and seventy-six other ranks. Ideal summer weather prevailed. All went well and uneventfully until Thursday evening, June 27.

"At 9.30 p.m. the night was clear," states Major Lyon. "All lights were burning, with the large Red Cross signal prominently displayed amidships. Most of the medical personnel had not yet retired. Without previous warning or sight of any submarine the ship was struck just abaft the engines at No. 4 hold.

"There was a terrific explosion, badly wrecking the after-part of the ship. Immediately all lights went out. The signal to stop and reverse the engines was without response, all the engine-room crew evidently being killed or wounded. Consequently the ship forged forward, but was gradually forced down by the head.

"Quickly the captain found by investigation that No. 4 hold aft was completely blown in, and the ship could not remain afloat. The order was given to lower the lifeboats on either side.

"In perfect order the officer commanding, Lieutenant-Colonel T. H. Macdonald, paraded his personnel at the various boat stations. The extreme slope of the decks by this time, and the continued forward movement of the ship, made the launching of the lifeboats a matter of great difficulty."

According to the survivors, at least two boats were swamped in this operation. With reasonable certainty, however, it can be stated that in the brief ten minutes before the ship submerged everyone had been taken off save those killed by the explosion.

Major Lyon was one of the last to leave the ship. He had gone to his cabin to obtain a torchlight. Approaching the deck he met the captain and the second officer. They discovered a boat hanging in the falls, with its after-end in the water.

They launched it successfully, pushed away with the captain, the second officer, the fourth officer, Major Lyon, one C.A.M.C. other rank, and a few of the ship's company on board. They had moved on but 30 ft. or 40 ft. when the *Llandoverly Castle* disappeared. This boat at once proceeded to rescue work cruising about in the midst of the floating wreckage and picking up survivors.

Living eye-witnesses of the tragedy assert that at least two other lifeboats got clear of the sinking ship, and it is possible that others were successfully launched on the other side.

The appalling scene in the water in the two hours following the disappearance of the *Llandoverly Castle* baffles description, and the mind is stupefied by the exhibition in that period of savagery and callousness on the part of the commander and crew of the submarine.

On all sides survivors were crying for help. Many were clinging to pieces of wreckage floating about the area of the disaster. Within twenty minutes the captain's boat had picked up eleven from the water, including three other ranks of the C.A.M.C.

They were going to the rescue of two others when the submarine appeared, and, according to Major Lyon, ordered them to leave these drowning men and come alongside, threatening to fire with the submarine naval gun in case of refusal.

"Come alongside," was the order given in English, and emphasized by a revolver shot across the bows.

The second officer shouted, "We are picking up men from the water."

"Come alongside at once," repeated the voice from the submarine, and when the lifeboat held on its way another revolver shot was fired at it, coupled with the threat that next the big gun would be brought into operation.

The captain's boat thereupon left the drowning men and pulled alongside the submarine. The commander of the submarine expressed no surprise when the captain stated it was the hospital ship *Llandoverly Castle* that had been sunk. The accusation was then made that the ship was carrying eight American flying officers.

On hearing there was a C.A.M.C. officer in the boat, the submarine commander ordered him to be brought on board. The order was executed very roughly, and with such plain intention to cause an injury that a small bone in Major Lyon's leg was broken.

Major Lyon was accused of being an American flying officer. He denied the charge, and gave his rank and corps. He was then taken to the conning tower, the accusation of being a flying officer repeated, and was asked how much ammunition the ship was carrying.

"I replied," states Major Lyon, "that it was purely a hospital ship, and that we had never carried ammunition at any time.

"I was then ordered back to the lifeboat, and we pushed off. We had gone only about fifty yards when they headed for us again and asked for me. They then took on board the second and fourth officers, questioned them, and placed them back in the lifeboat.

"Then we got the sail up and made some way. Suddenly we saw the submarine coming at us at full speed. There was no doubt of their intention to ram us. She missed us by less than 2 ft. Had we been stationary we certainly would have been submerged.

"We continued on our way, and were distant probably half a mile when we heard shell fire. I can recall at least twelve shots, presumably in the area where the lifeboats and

survivors were supposed to be. One shell came very close to our own boat.

"After thirty-six hours afloat we were rescued by a torpedo-boat destroyer about forty-one miles from the Irish coast, and taken to Queenstown, coming on to Plymouth on Sunday, June 30.

"I can emphatically state," concluded Major Lyon, "that the submarine made no attempt to rescue anyone, but on the contrary did everything in its power to destroy every trace of the ship and its personnel and crew. All I can say on behalf of the submarine is that they were coolly polite in their questions to us."

Another survivor, Private G. R. Hickman, left the sinking ship on No. 7 lifeboat, which was sighted by the submarine about one and a half hours after the *Llandoverly Castle* disappeared. This boat was brought alongside, and Private Hickman taken on board the enemy vessel.

He was asked in English to give the name of the ship, and was taken below to write the name in a book. When he had done so the German officer checked the name in a book which he produced from a desk.

Private Hickman was asked if there had been any American flying officers on board. He replied "No," and gave particulars of its being a hospital ship with only the medical personnel on board. Later Private Hickman was put off the submarine into the captain's lifeboat when it came alongside.

Sergeant Knight bears further testimony to the persistent efforts of the submarine to blot out its crime by cruising many times a zigzag course through the area filled with wreckage and lifeboats at a speed of probably sixteen knots an hour.

He himself was swimming towards a lifeboat believed to be No. 19, which had got safely away, when he noticed this boat being shelled. There was a fairly heavy swell on the water at the time, and he was carried into a trough. When he came to the crest again the boat he had seen being shelled had disappeared.

Eventually while floating on a piece of wreckage he was picked up by the captain's boat. Sergeant Knight's opinion is that at least twenty shells were fired by the submarine into the vicinity of the wreckage.

When he first saw the submarine approach the captain's lifeboat, in his dazed condition, he mistook it for a British rescue boat. He dived alongside it, gripped a rope, and pulled himself aboard. Four or five members of the crew asked him what he wanted, speaking in English. He was promptly thrown back into the lifeboat by four of these men.

The evidence of Privates Pilot, Cooper, and Taylor only serves to emphasize the career of wanton destruction engaged in by the submarine following the disappearance of the *Llandoverly Castle*. They were in the water about an hour, floating on wreckage until taken into the captain's boat.

They verify the statement that the medical personnel and ship's crew, except those killed by the explosion, succeeded in getting off the ship. They witnessed the efforts of the submarine to smash or sink the lifeboats in the water, and later the shelling of the entire area.

They are agreed there could be only one motive for this—to run down every survivor and destroy every possible evidence of the ship and its equipment. For two hours there were cries from all directions for help, none of which received any response from the crew of the submarine.

From eleven o'clock Thursday night, all through Friday and Friday night, until Saturday morning at 9.30, this one surviving lifeboat kept on its way towards the Irish coast, covering some seventy miles by alternately sailing or rowing until picked up by H.M. destroyer *Lysander*.

The *Llandoverly Castle* had been in the service of the Canadian Government as a hospital ship since March of this year. She had made four voyages to Halifax, and, with a tonnage of 11,200, afforded special facilities for the transport and care of wounded soldiers.

The Officer Commanding, Lieutenant-Colonel T. H. Macdonald, C.A.M.C., of Port Hawkesbury, Nova Scotia, had seen considerable service with the Embarkation and Discharge Depot, was for some time on the Standing Medical Board of the Office of the A.D.M.S. London Area, and later served with No. 2 Canadian Stationary Hospital, France.

On her last outward voyage to Halifax the *Llandoverly Castle* carried six hundred and forty-four military patients, one officer and twenty-six other ranks being stretcher cases, fourteen officers and six hundred and three other ranks of a less

serious nature. Fourteen of the cases were tubercular and thirty-seven mental.

On the return voyage there were, of course, no military patients nor any passengers, save her crew, and the regular hospital unit establishment.

It seems unnecessary to assert that the accusations of the German submarine commander, that the *Llandoverly Castle* had on board American flying officers or munitions of war, is pure fiction. The regulations covering the control of hospital ships were being observed, both in the spirit and the letter.

Further, it is clear there was no ground whatever for mistaking the ship for anything other than what she was—a ship immune by every law of war and peace from attack or molestation.

With the exception of six survivors—Major Lyon, Sergeant Knight, Privates Hickman, Pilot, Cooper, and Taylor—the list of casualties includes the entire medical personnel.

OFFICERS LOST H.M.H.S. "LLANDOVERLY CASTLE."

Lt.-Col. MacDonald, T. H.	Capt. Sills, G. L.
Maj. Davis, G. M.	Hon. Capt. and Chaplain
" Enright, W. J.	Macphail, D. G. (attached).
Capt. Leonard, A. V.	

NURSING SISTERS LOST.

N/S. Campbell, Christine	N/S. Gallaher, Minnie Kath- erine
" Douglas, Carola Josephine	" McDiarmid, Jessie Mabel
" Dussault, Alexina	" McKenzie, Mary Agnes
" Follette, Minnie A.	" McLean, Rena, R. R. C.
" Fortescue, Margaret Jane	" Sampson, M. Belle
A/Matron Fraser, Margaret Marjory	" Sare, Gladys Irene
	" Stammers, Anna Irene
	" Templeman, Jean

OTHER RANKS LOST.

536451 Pte. Anderson, J.	535449 Pte. James, W. L.
421035 Pte. Angus, H. T.	195880 Pte. Kelly, R. C.
536234 Pte. Baker, A.	526674 Pte. McAnnally, F. L.
33281 Pte. Barker, F.	2098858 Pte. McDonald, L. H.
02568 Pte. Bentley, J. A.	536277 Pte. McPherson, P. M.
524309 Pte. Bloomfield, B.	529605 Pte. Moore, J. E.
50972 L/Cpl. Bonnell, H. K.	526600 Pte. Murray, J.
524507 Pte. Bristowe, J. F. W.	644511 Pte. Nash, G. E.
2098951 A/Sgt. Brown, D.	213333 Pte. O'Neill, N. R.
526571 Pte. Carter, N. R. S.	213332 Pte. O'Neill, N.
962 Pte. Cates, W. F.	467562 Pte. Pateman, J. C.
536231 Pte. Clark, F.	81693 Pte. Patton, H.
536448 Pte. Clark, W.	1390 Pte. Pollard, F. D.
536023 Pte. Cowie, W.	525545 Pte. Porter, J.
526671 Pte. Curtis, J. H.	50089 Pte. Purcell, J. A.
536282 Pte. Daley, K.	524579 Pte. Renyard, A.
823269 A/L/Cpl. Dawson, W. A.	523324 Pte. Richards, P.
536333 Pte. Duffie, D. W.	525169 Pte. Rogers, J.
418883 Pte. Dunlop, A. L.	910940 Pte. Roseboro, K.
50879 Pte. Eaton, J. C.	536477 Pte. Saere, W. B.
523897 Pte. Elsley, H. C.	527999 Pte. Sanders, W. H.
34408 A/S/Sgt. Evans, H. P.	536403 Pte. Sanderson, R. A.
645609 Pte. Falconer, R. D.	644708 Pte. Sanders, V.
50946 Pte. Foley, J. B.	862726 Pte. Sayaae, F. J. O.
522922 Pte. Gemmell, W. H.	536249 Pte. Scribner, C. G.
535505 Pte. Goldberg, M. P.	524307 Pte. Shipman, L.
770053 Pte. Hannah, J.	527654 Pte. Smith, E. C.
33354 Pte. Harlock, M. H.	03676 Pte. Smuck, D. R.
33079 Pte. Harris, B. D.	536315 Pte. Spittal, J. A.
536276 Pte. Harrison, H.	400171 Pte. Steen, R. A.
524248 Pte. Harvey, G.	51098 Pte. Sutherland, H.
406310 Pte. Hoskins, C. H.	536236 Pte. Williams, F. C.
6315 Pte. Isaac, S.	530063 Pte. Williams, R.
33653 Cpl. Jackson, W.	527674 Pte. Wilson, A.

Lieutenant-Colonel THOMAS HOWARD MACDONALD, C.A.M.C., was born at Port Mulgrave, Nova Scotia, December 15, 1877, and graduated at Bellevue Hospital Medical College, N.Y., June, 1900. Prior to joining the C.A.M.C. he was in practice at Port Hawkesbury, N.S. He was an active member of the Canadian Militia, in which he held the rank of Major before the outbreak of the present War. He came overseas in December, 1915. After receiving a short field training at the C.A.M.C. Depot, he served as an M.O. at the Canadian Convalescent Hospital, Bearwood Park, and Moore Barracks Military Hospital, Shorncliffe. After serving at these hospitals for a short time he was detailed for duty with the A.D.M.S. embarkation, at that time situated at Prior Park, with which formation he was President of Standing Medical Board. Following this, he sat as a member of the Board of Pension Commissioners for Canada, British Branch, at that time situated at Shoreham. On this Board moving to London he accompanied it. Following this, he was detailed for duty as President of the Standing Medical Board with A.D.M.S. Canadians, London Area, which appointment he held until being posted to Canadian Military Hospital, Liverpool. He went overseas to No. 2 Canadian Stationary Hospital on August 15, 1917. From this hospital he was posted to the 4th Labour Battalion on November 6, 1917, with which unit he remained until his return to England in

March, 1918. On H.M.H.S. *Llandoverly Castle* becoming chartered to the Canadian Government, he was appointed as Officer Commanding, which appointment he held until the date of the torpedoing of this ship on June 27, 1918.

Major GUSTAVUS MITCHELL DAVIS, C.A.M.C., was born at York, Ontario, January 8, 1874. He graduated in medicine from the University of Toronto in 1901, and was in practice at Welland, Ontario. He came overseas with the First Canadian Contingent in September, 1914, and went to France in May, 1915. He joined the 5th Canadian Battalion as M.O. in time to take part in the battle of Festubert; and was subsequently M.O. to King Edward's Horse. After leaving France he was attached for a time to the Office of the D.M.S. Canadians in London, and subsequently to the Medical Board of the A.D.M.S. London Area. On April 11, 1917, he was appointed M.O. upon the hospital ship *Letitia*, and given his Majority. When this ship was wrecked on the coast of Nova Scotia in August, 1917, he rendered distinguished service in the care and rescue of patients from the wrecked vessel, and, in the absence of any military decoration which could be granted in recognition of his conduct on this occasion, the Secretary of State for War directed that the information be conveyed to him that he and the General Officer Commanding were fully sensible of the excellence of his service. Later he served in the same capacity upon H.M.H.S. *Araguaya* and H.M.H.S. *Llandoverly Castle*.

Major WILLIAM JAMES ENRIGHT, C.A.M.C., was born at Port Daniel, P.Q., February 19, 1873, and graduated in medicine at Laval University, September, 1897. Major Enright served in Canada for eight months on the staff of the Quebec Military Hospital previous to proceeding overseas. He left Canada July 20, 1915, arriving in England July 30, 1915, and after a period at the C.A.M.C. Depot proceeded to No. 4 Stationary Hospital. He was posted as M.O. to the 22nd Battalion, and proceeded to France with that unit. While serving he was wounded September 29, 1915, and evacuated to England, and returned to Canada for a period of three months sick leave. On his return to England he was posted as S.M.O. at the Canadian Discharge Depot, Prior Park, and moved with that unit from Bath to Buxton. In December, 1916, he was posted to the staff of the A.D.M.S., London Area, and placed in charge of embarkation. On August 6, 1917, his name was published in the list of officers whose services were brought to the notice of the Secretary of State for War. He was sent to France as registrar and adjutant of No. 8 Canadian General Hospital, and served with that unit until he was evacuated to England as a casualty in March, 1918. After a period at the I.O.D.E. Hospital at Matlock Bath he was posted to the *Llandoverly Castle*, and was lost on returning from his first trip on June 27, 1918.

Captain ARTHUR VINCENT LEONARD, C.A.M.C., was born at Warkmouth, Ontario, October 29, 1889. He graduated in May, 1911, at the University of Toronto. He took a prominent part in athletics during his University course. He came overseas in September, 1915, and went to France in November, 1915, where he served as M.O. of various units at the Front. On returning to England from France on October 27, 1917, he was appointed to H.M.H.S. *Araguaya* in December, 1917, and in March, 1918, to the H.M.H.S. *Llandoverly Castle*.

Captain GEORGE LUTHER SILLS, C.A.M.C., was born at Tweed, Ontario, March 14, 1888. While a student in medicine at Kingston University he joined the C.A.M.C. as a private, and served overseas one year with the 5th Stationary Hospital, afterwards the 7th General Hospital. He returned to Canada to resume his medical studies in April, 1916, and graduated in November of the same year. He came overseas as Captain, C.A.M.C., in March, 1917, and was serving on H.M.H.S. *Llandoverly Castle* when she was torpedoed on June 27, 1918.

Acting-Matron M. M. FRASER was born at New Glasgow, N.S. The daughter of one of the best known and most popular Nova Scotians, the late Hon. D. C. Fraser, for some time Lt.-Governor of the Province, she had inherited much of his capacity and the gift of wit and repartee. Of her brothers, one, Lieutenant L. Fraser, was killed in action; the other, Major Alister Fraser, M.C., is at present on the staff of the Corps Commander, C.E.F. Miss Fraser came overseas with the First Contingent, and was on the staff of No. 2 Canadian Stationary Hospital, the first Canadian hospital sent to France, being thus one of the few Canadians to receive the Mons ribbon. She was with the Canadian casualty stations at the front until May, 1917, and since then has been attached to the staffs of H.M.H.S. *Letitia* and *Araguaya*, with intervals, during which she has been temporarily attached to King's Canadian Red Cross Hospital at Bushey Park. In March of this year she was gazetted to H.M.H.S. *Llandoverly Castle* with rank of Acting Matron. Her mother lives at Moose Jaw, Sask.

N/S. CHRISTINA CAMPBELL, born at Blantly, Inverness, Scotland, graduated in 1889 at P.K.G. Hospital, Victoria, B.C. joined the C.A.M.C. in August, 1915, and after service with No. 2 Canadian General Hospital, overseas in France, accompanied No. 5 Canadian General Hospital to Cairo and Salonica. For some months after her experience in the East she was invalided to England, and after being attached to the West Cliff Canadian Eye and Ear Hospital, she was appointed to the staff of the *Llandoverly Castle* in March of this year.

N/S. CAROLA JOSEPHINE DOUGLAS, born at Toronto, graduated at the Pennsylvania Hospital, Philadelphia, in

1907, joining the C.A.M.C. in February, 1915, and in May of that year, like the preceding nursing sister, was sent overseas to join No. 2 C.G.H., and later went to the East with No. 5 C.G.H. She remained with this hospital until its return from the East; later was attached to No. 16 Canadian General Hospital (Ontario), Orpington, and in March of this year was appointed to the *Llandoverly Castle*.

N/S. ALEXINA DUSSAULT, daughter of Mr. M. Dussault, of Montreal, was born in that city, and graduated in April, 1910, from the Royal Victoria Hospital there. She joined the C.A.M.C. in September, 1914, crossing with the First Contingent, and going overseas to France with No. 2 Canadian Stationary Hospital, she wore the Mons ribbon. In February, 1916, she was appointed to No. 2 Canadian C.C.S., and remained at the front with this and No. 1 Canadian C.C.S. until May, 1917. Since May, 1917, she had been on service with the hospital ships *Letitia*, *Araguaya*, and *Llandoverly Castle*.

N/S. MINNIE A. FOLLETTE, daughter of Mrs. A. Follette, of Cumberland, Nova Scotia, was born at Port Greville, and graduated in June, 1890, from the Victoria General Hospital, Halifax. She joined the C.A.M.C. in September, 1914, saw service at the 2nd London General Hospital, Chelsea, and Manor House, Bulford, went overseas to No. 1 Canadian C.C.S. in February, 1915, and in 1916 was attached to No. 2 Canadian General Hospital. In May, 1917, she was transferred to England, and after service at No. 9 Canadian Stationary Hospital, Bramshott, she was appointed in July, 1917, to H.M.H.S. *Letitia*. She was posted to the *Llandoverly Castle* in March, 1918.

N/S. MARGARET FORTESCUE, born at York Factory, Hudson Bay, the daughter of a factor of the Hudson Bay Co. She graduated from Montreal General Hospital in 1906, joined the C.A.M.C. in May, 1915, and was almost immediately transferred to No. 1 Canadian General Hospital, Etaples, being transferred to No. 3 Canadian General Hospital in July of that year. In April, 1917, she was transferred to the 3rd Canadian C.C.S., returning in December of that year to No. 3 C.G.H. After a period of invaliding to England, she was appointed to H.M.H.S. *Llandoverly Castle* on June 5, 1918. Miss Fortescue had been mentioned in dispatches (*London Gazette*, May 28, 1918).

N/S. MINNIE KATHERINE GALLAHER, daughter of Mr. and Mrs. M. E. Gallaher, of Ottawa, was born at Kingston, Ontario, and in May, 1901, graduated from the General Protestant Hospital, Ottawa. She arrived in England in October, 1915, and served successively at Moore Barracks Hospital, West Cliff Eye and Ear Hospital, No. 1 C.G.H., overseas, and No. 3 Can. C.C.S., returning after three months service at the front to No. 1 C.G.H. She joined the *Llandoverly Castle* in March, 1918.

N/S. JESSIE MABEL McDIARMID, born at Arblon, Ontario, was a graduate of the Kingston General Hospital, and prior to the outbreak of the War had been engaged at the Jubilee Hospital, Vancouver, B.C. Joining the C.A.M.C. in August, 1915, after service at the Duchess of Connaught Canadian Red Cross Hospital, Taplow, she went with No. 5 C.G.H. to Cairo in December, 1915, and after temporary duty with No. 5 C.S.H. at Abbassia, she was transferred to No. 5 C.G.H. at Salonica in February, 1916. She returned with the Canadian hospitals from the East in the autumn of 1917, and after being attached to Basingstoke and Kirkdale, was appointed to H.M.H.S. *Llandoverly Castle* in June, 1918. Miss McDiarmid was mentioned in dispatches (*London Gazette*, November 28, 1917).

N/S. MARY AGNES MCKENZIE, daughter of Mr. and Mrs. T. C. McKenzie, of Toronto, was a graduate of the Rochester General Hospital, Rochester, N.Y. (1903). Joining the C.A.M.C., she arrived in England in April, 1916, and after nursing at the Ontario Military Hospital, Orpington, and Moore Barracks Hospital, Shorncliffe, she was appointed to the *Llandoverly Castle* in March, 1918.

N/S. RENA McLEAN, R.R.C. (2nd Class), daughter of the Hon. Senator and Mrs. McLean, of Souris, P.E.I., graduated in September, 1908, at Newport, Rhode Island, U.S.A. She joined the C.A.M.C. in September, 1914, and crossing to France with No. 2 Canadian Stationary Hospital in the autumn of that year, had received the Mons ribbon. Overseas she was attached temporarily to No. 12 British Stationary Hospital. Returning to England in November, 1915, she was attached to the D. of C. Hospital at Taplow, and after duty on transports joined No. 1 Canadian Stationary Hospital at Salonica in October, 1916. On her return in the autumn of 1917 she was posted to No. 16 Canadian General Hospital (Ontario), Orpington, later to the hospital ship *Araguaya*, and in March, 1918, to the *Llandoverly Castle*.

N/S. MAE BELLE SAMPSON, daughter of Mr. H. A. Sampson, of Duntroon, Ontario, where she was born, graduated at the Hamilton City Hospital in June, 1913, and in September, 1914, joined the C.A.M.C., crossing with the First Contingent. She crossed to France with No. 2 Canadian Stationary Hospital (Mons ribbon), and in June, 1915, was posted to No. 1 Canadian C.C.S., returning to England in September, 1916. She was then posted to No. 1 Canadian Stationary Hospital, Salonica, in October, 1916, returning with that hospital in September, 1917. After service with No. 16 Canadian General Hospital (Ontario), Orpington, she was posted to transport duty to Canada (s.s. *Sazonia*, and s.s. *Grampian*). In March, 1918, she joined the staff of the *Llandoverly Castle*. Miss Sampson was mentioned in dispatches, *London Gazette*, June 27, 1918.

N/S. GLADYS IRENE SARE, born at Bath, England, was the

daughter of Mrs. A. G. Sare, of Montreal. She graduated in 1913 from the Montreal General Hospital, and joining the C.A.M.C., arrived in England in April, 1916. After seven months service at Moore Barracks Hospital, she was posted in February, 1917, to No. 6 C.G.H. at Troyes, France. Later she was posted to the Duchess of Connaught Hospital at Taplow, Moore Barracks Hospital, Shorncliffe, and in January, 1918, to the Granville Canadian Special Hospital at Buxton, where she became instructress in massage. She was posted to the *Llandoverly Castle* in June, 1918.

N/S. JEAN TEMPLEMAN, daughter of Mr. and Mrs. J. Templeman, of Ottawa, where she was born. She graduated in 1912 at St. Luke's Hospital, St. Paul, Minn., joined the C.A.M.C. in 1915, was posted in succession to the Canadian Military Hospital, Shorncliffe, July 2, 1915, No. 1 Canadian General Hospital, February 19, 1916, No. 21 British C.C.S., July 4, 1916, Ontario Military Hospital, Orpington, May 28, 1917, on transport duty s.s. *Scandinavian*, June to August, 1917; returning to Ontario Military Hospital, Orpington, she was posted to *Llandoverly Castle* in June, 1918.

N/S. IRENE STAMERS, daughter of Mrs. L. L. Stammers, of St. John, New Brunswick, was born in that city, and graduated at the St. John General Public Hospital in January, 1913. Joining the C.A.M.C. in June, 1915, she was posted in succession to Moore Barracks Hospital, No. 1 Canadian General Hospital, overseas, where she spent ten months, returning to the Ontario Military Hospital, Orpington. In March, 1918, she was posted to the *Llandoverly Castle*.

DIAGNOSIS OF CHRONIC INFECTIONS WITH THE GONOCOCCUS BY THE COMPLEMENT FIXATION TEST.

By F. B. BOWMAN, M.B.Tor.; Major, C.A.M.C.;
late O.C. No. 1 Canadian General Laboratory,

AND

P. D. SAYLOR, M.D.; Captain, C.A.M.C.

DURING the last six months of 1917 gonococcus complement fixation tests were carried out in a routine manner at No. 1 Canadian General Laboratory, Folkestone. The results obtained would seem to be worthy of publication, in view of the facts that the venereal question is receiving so much attention at the present time, and that the diagnosis of chronic or latent gonorrhoea and its complications and sequelae present so many difficulties.

It is a recognized fact that in chronic gonorrhoea, either of man or woman, the uncertainty of obtaining positive results by the examination of stained films of the discharge is very great, and, in regard to cultural methods, here again a negative result may be wholly misleading.

In men, when a thin discharge is expressed from the meatus, in practically all cases very few gonococci are present, either intra- or extra-cellular, and usually there are many other bacteria which may be Gram-negative, or may have become Gram-negative by degenerative processes. A positive culture is, of course, definitely diagnostic, but the difficulties encountered in this procedure can only be appreciated by those who have attempted it in numerous cases.

In women, still more difficulties are presented. In sub-acute and chronic gonorrhoea, the gonococci, if present, are usually very few in number, and are found only in the cervix and urethra, and then the number and variety of other organisms make a diagnosis impossible, either by freshly stained smears or culture. The organisms present may include the *Micrococcus catarrhalis*, degenerated Gram-positive cocci, *Bacillus coli*, and many others.

HISTORY.

The first publication on the subject of complement fixation in gonococcal infections was made by Müller and Oppenheim [1] in 1906, who studied a case of gonorrhoeal arthritis. They used as an antigen simply a suspension of gonococci in salt solution. Bruck [2] reported favourably on the reaction in the same year. The findings of the earlier workers were somewhat contradictory, Vannod [3] reporting that there was no cross fixation between gonococcus antigen and anti-meningococcus serum and vice versa, while Wollstein [4], in 1907, reported findings opposed to the above. Meakins [5] reported the first work on the subject in America in 1907 on cases of arthritis. Teague and Torrey [6] pointed out in 1907 the importance of using several strains of the gonococcus in preparing an antigen. Schwartz and McNeil [7] also emphasized the facts brought out by Torrey and Teague,

and stated that the reaction never occurred in cases of anterior urethritis. They found that positive tests were given with Flexner's anti-meningococcus serum, but not from serum from cases of cerebrospinal fever.

Many other workers since those quoted above have reported on the value of the test as an aid to diagnosis of latent infections with the gonococcus, as well as to determine whether or not the case is cured.

TECHNIQUE.

That outlined by Kolmer [8] has been followed, with the exception that we use one-quarter the quantities of the reagents used by him in the Wassermann test.

Although these amounts would seem to be rather small for practical use, much material is saved, particularly complement, and, with care in the handling of small pipettes, the results are as reliable as when the full system is used.*

Hæmolytic System.—We have always used the anti-sheep hæmolytic system. Fresh guinea-pig serum is used as complement in a constant dose diluted 1:20. Anti-sheep amboceptor is titrated against this in different dilutions, and one and a half times the hæmolytic dose is used in the actual test.

Antigen.—One of us having had difficulty in preparing a satisfactory antigen, even from several strains of gonococci, one prepared in the laboratories of Parke, Davis and Co.† was tested and found to have excellent antigenic qualities. This is made from apparently numerous strains, differing somewhat in their immunity reactions. Twenty-four to forty-eight-hour cultures of the gonococcus are used. These are washed off carefully with distilled water, heated for two hours at 56° C., centrifugalized, and passed through a Berkefeld filter, and a small amount of preservative added (0.1 c.c. of a 1:100 dilution of phenol to each cubic centimetre). The antigen is made isotonic by adding one part of 10 per cent. saline to nine parts of the antigen. This is then diluted again 1:10 with normal saline, and titrated for anti-complementary properties (see Chart 1). When this is determined one-half to one-quarter of this amount is used in making the test. This titration should *always* be done before the actual fixation test.

Kolmer states that he has obtained slightly better results by using simply suspensions of gonococci in saline, with a small amount of preservative added.

An antigenic titration may be done with the serum from a positive case, but usually is unnecessary.

While engaged in this work, one of us was experimenting with antigens prepared from the tubercle bacillus, in complement fixation in tuberculosis. Known cases of tuberculosis, not only of the lungs, but of the testes, kidneys, &c., were tested, not only with tubercle antigen, but also with gonococcus antigen, and there was no evidence of cross fixation, although certain of the cases of orchitis and epididymitis were negative with the gonococcus antigen and positive with the tubercle antigen.

This will not be discussed further, as the work on tuberculosis is still being continued, and will be published, it is hoped, at a later date.

The Test.—This will be explained very briefly, as reference to many of the articles cited in this report will give a full description of the procedure.

The patient's serum should be used as soon as possible after taking the specimen. It should be free from cells and clear.

It is heated for half an hour at 56° C. Six tubes were used by us for each test, with increasing amounts of serum in the first three, and the last three as controls with no antigen, to rule out any anti-complementary effect of the serum.

A positive and a negative serum are introduced as controls, also a tube containing only cells and antigen, and a tube containing hæmolytic complement and cells (see Chart II).

Although it was requested that a short history of all cases be sent with the specimen to the laboratory, in many instances only a bare diagnosis was given. When a positive result was obtained on these we attempted to trace them to obtain more accurate data, and found that very often the cases had

* In the second edition of his work, just published, Kolmer reports good results with one-tenth the quantities.

† It deserves note that later supplies of this preparation have varied in their powers.

been transferred or returned to Canada, and thus many interesting features were not available regarding the ultimate diagnosis, or the results of treatment following positive complement fixation tests.

A short résumé of cases tested, and a few short histories of typical cases will be cited. Only those in our series were called positive where they were distinctly so, and our reports were not sent in as x, xx, xxx, and xxxx, but only as *positive*, *strongly positive*, or *negative*.

Three hundred and eighty-three tests have been done. Of these 177 were positive. 77 cases gave a definite history of having had gonorrhœa, and 60 of these were strongly positive and 17 negative.

Of thirty-six cases diagnosed epididymitis, nineteen were positive, seventeen were negative; of twenty cases diagnosed prostatitis, fourteen were positive, six were negative; of twenty-one cases of orchitis, fifteen were positive, six were negative; of four cases of chronic gleet, three were positive and one negative; three cases diagnosed rheumatic fever were positive; of twenty-six cases with a clinical diagnosis of myalgia and no clinical evidence of gonorrhœa, eight were positive and eighteen negative. It might be stated that a Wassermann test was made on each of these specimens; twenty-five were positive, and all of these had had syphilis, or clinical evidence of this disease was actually present. We have found no evidence of cross-fixation in this series of tests.

The following short histories are illustrative of the cases tested by us. They are from notes made by Captain G. S. Gordon, C.A.M.C., No. 11 Canadian General Hospital, officer in charge of the genito-urinary clinic.

Case 1.—Cysts are present in both right and left globi majores. The bladder is infected and trabeculated. The urine is ammoniacal. Condition apparently long standing, although there has been an exacerbation of symptoms for past five months. Venereal disease denied. Complement fixation test, positive.

Case 2.—Age, 45 years. Chronic prostatitis. Severe myalgia. Gonorrhœa admitted twenty years ago. No evidence of reinfection since. Complement fixation test, positive.

Case 3.—Sexual neurasthenia. Pain in left groin at orgasm. Hyperæsthesia of seminal vesicles. Palpation shows left epididymitis. No pus in semen or urine. Complement fixation test, positive.

Case 4.—Incontinence. Prostatitis. Enlarged epididymis both sides. Tuberculin test, negative. Venereal disease denied. Probably gonorrhœal in origin. Complement fixation test, positive.

Case 5.—Incontinence. Prostatitis. Terminal hæmaturia. Pyuria. No pus from kidneys. Mononuclear cells in urethral specimens from right kidney. Tuberculin test positive, focally. Complement fixation test, positive.

Case 6.—Prostatic abscess. Complement fixation test, positive.

Case 7.—Orchitis. Double epididymitis, vesiculitis. Prostatitis. Local and temperature reaction to tuberculin. Probably infection is both tuberculous and gonorrhœal.

In this case the complement fixation test for tuberculosis was positive. Complement fixation test, positive.

Case 8.—Double epididymitis and recto-urethral fistula following perineal section ten years ago. Passed urine per rectum and fæces per urethra comfortably until recently, when irritability of bladder began, which condition may be attributed to gonorrhœa. Venereal disease denied. Complement fixation test, positive.

Case 9.—Epididymitis. Gonorrhœa six years ago. Complement fixation test, positive.

Case 10.—Myalgia. Tenderness over prostate and vesicles, and pus in semen. Probably gonorrhœal rheumatism. Complement fixation test, positive.

Case 11.—Myalgia. Severe pains in lumbar region. Gonorrhœa fifteen years ago. Prostatitis, vesiculitis, and double epididymitis. Complement fixation test, positive.

Case 12.—A newspaper reporter. Denies any chance of ever having contracted gonorrhœa. Associates symptoms with appendectomy in June, 1917—five months ago. Epididymitis and prostatitis, pus and blood in urine. Complement fixation test, strongly positive.

Case 13.—Neurotic man. Admits gonorrhœa in 1916. Has posterior urethritis, and pus can be massaged from the prostate. Left epididymitis. Smear negative. Probably not due to the gonococcus. Complement fixation test, negative.

The above cases are cited simply as representative examples,

from whom sera were submitted to us for examination, and not as being of any special interest. In all of these, however, from stained smears it was impossible to diagnose the condition. Many of them denied ever having had gonorrhœa, and thus, for many reasons, as they were soldiers, it was important to have further evidence as to the possibility of a focal infection with the gonococcus being the seat of the trouble.

SUMMARY.

From our work and from the work of serologists during the past decade, it can be definitely stated that the complement fixation test for gonorrhœa is specific. If a positive reaction is given, we must conclude that there is an active focus of the gonococcus present.

Where a large amount of pus is present and intracellular Gram-negative cocci numerous, a diagnosis of gonorrhœa can be accepted. But, in cases such as those quoted in this paper, where there may be no discharge, or very little, with very few bacteria present, a positive diagnosis of gonorrhœa cannot be given. In many large genito-urinary clinics, particularly in America, it is well recognized that seldom can positive cultures be obtained from material expressed from the genito-urinary tract, and the complement fixation test must be relied on to confirm the diagnosis.

The importance of the reaction in the Army should not be underestimated, because of the value of a definite diagnosis being given where clinical symptoms are obscure, in order that the proper treatment can be instituted. It is of great value where pension claims, &c., are being considered to know whether a man is suffering from the results of venereal disease or a condition due to the hardships of active service. Nearly all soldiers deny the possibility of venereal disease where the acute condition has been "cured."

It is important in cases of prostatitis to massage the prostate a day or two before taking a specimen of blood for examination.

In this series the number of cases diagnosed "myalgia" giving a positive test is remarkable. These cases of obscure muscle pains have always been a source of trouble to the diagnostician, and the question of the possibility of the gonococcus in certain instances being the cause of the trouble should be considered. It is true that our series of cases is small; so far as it goes, it indicates that close upon one-third of all the cases of myalgia among soldiers coming under examination in a General Hospital were of gonorrhœal origin. Remembering how frequent and how difficult to deal with are these cases of myalgia our results deserve notice, and, we urge, demand that a special inquiry be instituted on a larger scale.

Although we have had few opportunities of studying cases of chronic gonorrhœa in women, from a review of the literature it would seem that positive reactions are seldom given unless the cervix at least is involved.

From our work the following conclusions may be cited:—

- (1) Chronic gonorrhœa can seldom be diagnosed by stained smears alone.
- (2) Cultural methods are too difficult to be of practical use.
- (3) The complement fixation test in gonorrhœa is definitely specific.
- (4) Where the test is positive an active focus of infection is present.
- (5) The test is never positive in localized anterior urethritis.
- (6) The test is not usually positive before the sixth week of the disease if no complications are present.
- (7) A case should not be considered cured if the test is still positive, even two months after the disappearance of all symptoms.
- (8) No cross fixation takes place with either syphilitic or tuberculous sera.
- (9) Because of the difficulty in cultivating strains of gonococci, antigens should be prepared, if possible, at central laboratories, and thoroughly tested and standardized before issue.

THE CHARTS.

From the test here shown the antigen should be used in a dose of 0.5 or 0.1.

In the chart the serum shows anti-complementary properties only in 0.5 c.c., therefore the final result in this amount cannot be taken. Using 0.025 there is no inhibition without antigen, and complete inhibition with antigen, showing that the serum is definitely positive.

CHART I.

GONOCOCCUS ANTIGEN.

Anticomplementary Titration.

Tube	Antigen 1 : 20	Complement 1 : 20		Amboceptor units	Sheeps' corpuscles		Result
1	0.05	0.25	0.9 per cent. saline sol. added to 0.5 c.c. Shake and incubate $\frac{1}{2}$ hour in water bath at 37° C.	1 $\frac{1}{2}$	0.25	Tubes shaken and in- cubated for $\frac{1}{2}$ hour in water bath at 37° C.	Complete hæmolysis
2	0.1	0.25		1 $\frac{1}{2}$	0.25		"
3	0.15	0.25		1 $\frac{1}{2}$	0.25		"
4	0.2	0.25		1 $\frac{1}{2}$	0.25		Slight inhibition
5	0.25	0.25		1 $\frac{1}{2}$	0.25		Marked inhibition
6	0	0.25		1 $\frac{1}{2}$	0.25		Complete hæmolysis

CHART II.

FIXATION TEST.

Positive Serum.

Tube	Patients' serum	Antigen 1 : 10	Complement 1 : 20		Amboceptor units	Sheeps' corpuscles 2.5 per cent.	Result after incubation $\frac{1}{2}$ hour in water bath at 37° C.
1	0.015	0.05	0.25	0.9 per cent. saline to 0.5 c.c. Incubate $\frac{1}{2}$ hour at 37° C. in water bath	1 $\frac{1}{2}$	0.25	Slight inhibition
2	0.025	0.05	0.25		1 $\frac{1}{2}$	0.25	Complete inhibition
3	0.5	0.05	0.25		1 $\frac{1}{2}$	0.25	"
Control test without antigen	4 0.015	—	0.25		1 $\frac{1}{2}$	0.25	Complete hæmolysis
	5 0.025	—	0.25		1 $\frac{1}{2}$	0.25	"
	6 0.5	—	0.25		1 $\frac{1}{2}$	0.25	Slight inhibition

REFERENCES.

- [1] *Wien klin. Wochenschr.*, 1906, xix, p. 894.
- [2] *Deutsch. med. Wochenschr.*, 1906, lxx, p. 36.
- [3] *Zeitschr. f. Bacter.*, 1907, xlii, p. 10.
- [4] *Journ. Exp. Med.*, 1907, ix, p. 588.
- [5] *Johns Hopkins Med. Bull.*, 1907, xviii, p. 255.
- [6] *Journ. Med. Research*, 1907 xvii, p. 223.
- [7] *Amer. Journ. Med. Sci.*, May, 1911; *Ibid.*, September, 1912; December, 1912.
- [8] "Infection, Immunity, and Serum Therapy," Kolmer, 1915, p. 477.

ADMINISTRATIVE NOTES.

ON LOUSING AND DISINFESTATION.

We have received from the author, Professor Nuttall, F.R.S., a copy of the special edition of some 160 pages of his very full article in the May number of *Parasitology* upon combating lousiness among soldiers and civilians. This special edition has been distributed by him to the Allied Armies gratuitously, a graceful and most useful act.

Professor Nuttall is as well known in North America as he is in Great Britain, he having been a distinguished member of the staff of Johns Hopkins Hospital prior to his transfer to Cambridge, where he is now Quirk Professor of Biology. To him we owe the pioneer general study upon the rôle of insects in the distribution of disease. He writes, therefore, with peculiar authority. Not only does he afford a thorough study of the various methods, practical and impractical, which have been brought forward to combat the plague of lousiness in armies, but, what is more important, he details his own studies and their outcome. This combination of original work and full bibliographical detail is evidence of Professor Nuttall's early training. It is characteristic of the best studies in the various branches of science emanating from the United States.

The basal problem in combating the plague of lice in armies is how to destroy these pests at once effectively and economically. Great hopes had been centred by the British authorities upon the Thresh Disinfector, but for any large body of men this is found too leisurely in its action. Any attempt to pack large numbers of articles into the chamber leads to faulty penetration.

It is not mentioned by Professor Nuttall that the first

practical method of using steam heat for large bodies of clothing was that evolved by Lieutenant-Colonel Amyot, C.A.M.C., some years before the War (at Sudbury, Ontario), and put into effect in the Canadian First Division in 1915, when he was Sanitary Officer of that Division—namely, the establishment of chambers in which clothes can be hung loosely, the air and the clothes being heated by steam pipes around the room before live steam under pressure is turned on. The huts described by Captain J. T. Grant, R.A.M.C., on p. 459, and the railway vans converted into steam disinfectors on p. 461, *et seq.*, are applications of Lieutenant-Colonel Amyot's principle.

But notable as was the advance inaugurated by this officer, yet further advances were possible, and Professor Nuttall relates in detail how his observations in 1915 demonstrated that lice and their nits are killed by exposure to dry heat at the comparatively low temperature of 55° to 61° C. for ten minutes. Major H. Orr, C.A.M.C., then Captain and Sanitary Officer, Shorncliffe area, now Sanitary Officer 3rd Canadian Division, was already engaged in a research upon disinfestation. His results seemed to indicate that it was heat rather than coke fumes which brought about the destruction of lice and their nits in his experiments. Consulting Professor Nuttall regarding the life-history of pediculi, he learnt from him the outcome of his studies, and at his suggestion continued the work on a larger scale. Authority was obtained to build a hut in which he could carry on experiments under practical conditions. His preliminary tests showed that exposure at 54° C. or at 60° C. for fifteen minutes was lethal. To allow a good margin of safety under working conditions, Captain Orr adopted an exposure at 60° to 65° C. (140° to 149° F.) for fifteen minutes. By this exposure no harm is done to clothing of any order (including leather articles), and if they be hung loosely in the chamber all pediculi and their eggs are surely destroyed. All that is required is a hut, moderately heat proof; a brazier large enough to heat it and maintain the temperature, and clothes lines or hooks upon which the clothing can be suspended loosely.

This system has been in action at Shorncliffe since the autumn of 1915. It is in active operation in all the Divisions of the Canadian Army Corps, and "Orr's huts" are now to be employed throughout the British Army overseas. To quote Professor Nuttall: "Incidentally, I desire to put on record that the credit for having first employed hot-air huts belongs

entirely to Captain Orr, who erected and proved the efficiency of one built at Shorncliffe in the end of 1915. The tests subsequently carried out by Grant and Peacock were conducted with this identical hut."

CORPS NEWS.

CANADIAN UNIVERSITIES IN THE WAR.

As affording an indication of the whole-hearted way in which the Universities in Canada have entered into the War, a luncheon given on July 10 in London deserves note. This luncheon was given to meet Sir William Peterson, K.C.M.G., Principal of McGill University, Montreal. All those present were members of the medical faculty of McGill University actively engaged in the War.

The chair was taken by the Rt. Hon. Sir Auckland Geddes, K.C.B., Minister of National Service, and Professor of Anatomy in that University; the others present in order of University seniority were Col. J. G. Adami, Professor of Pathology, A.D.M.S. Office of D.G.M.S. Canadians, London; Col. F. G. Finley, C.B., Professor of Medicine and Clinical Medicine, Canadian Consultant in Great Britain; Lieut.-Col. T. A. Starkey, Professor of Hygiene, who is adviser in sanitation to the D.G.M.S. Canadians; Lieut.-Col. C. F. Martin, Professor of Medicine and Clinical Medicine, recently arrived from Canada on his way to be head of the medical service at No. 3 Canadian General Hospital (McGill), France; Col. J. Alex. Hutchison, Professor of Surgery and Clinical Surgery, Canadian Consultant in Great Britain; Major Sir Andrew Macphail, Professor of History of Medicine, A.D.M.S. Office of D.G.M.S. Canadians, London; Col. Kenneth Cameron, C.M.G., Lecturer in Clinical Surgery, late A.D.M.S. Canadians, Bramshott Camp; Lieut.-Col. J. C. Meakins, Director of the Department of Experimental Medicine, head of the Medical Service, No. 15 Canadian General (Duchess of Connaught Canadian Red Cross) Hospital, Taplow; Col. C. F. Wyld, Demonstrator of Medicine and of Pediatrics, A.D.M.S. Canadians, London Area.

It should be added that the above represent only a small proportion of the teaching staff who are, or have been, on active service. Thus, two other full Professors have recently returned to Canada after service overseas. These are Col. G. E. Armstrong, C.M.G., Senior Professor of Surgery, late Canadian Consultant in Surgery in Great Britain, and Col. H. S. Birkett, C.B., Professor of Oto-Laryngology and Dean of the Medical Faculty, late O.C. No. 3 Canadian General Hospital (McGill), B.E.F., France.

Of those still overseas in France, Col. John M. Elder, C.M.G., Assistant Professor of Surgery, has been appointed Consultant to a British Army Corps overseas; as just before his death had been the late Lieut.-Col. John McCrae, Lecturer in Medicine and in Pathology, the author of "In Flanders Fields."

From the teaching staffs of the medical faculties of the other Canadian Universities an equally large proportion have come overseas with the C.A.M.C.

Queen's University: G. E. Kidd, Professor of Anatomy; A. E. Ross, Professor of Materia Medica and Jurisprudence; Thos. Little, Lecturer in Histology; S. M. Polson, Demonstrator of Anatomy; J. P. Quigley, Demonstrator of Anatomy.

Dalhousie University: John Stewart, Professor of Surgery; E. V. Hogan, Professor of Clinical Surgery; L. M. Murray, Professor of Medicine; K. A. Mackenzie, Lecturer in Medicine.

University of Manitoba: C. Hunter, Lecturer in Clinical Medicine; E. L. Pope, Lecturer in Clinical Medicine; F. T. Cadham, Demonstrator in Bacteriology; F. C. Bell, Demonstrator in Bacteriology; O. S. Waugh, Demonstrator in Pathology; G. Stephens, Demonstrator in Pathology; J. O. Todd, Professor of Surgery; W. L. Watt, Lecturer in Electrotherapeutics; R. M. Simpson, Professor in Clinical Gynaecology; J. W. Good, Professor of Ophthalmology; T. H. Bell, Lecturer in Clinical Ophthalmology; S. W. Prowse, Professor of Otolaryngology; W. Webster, Professor of Therapeutics; J. D. McQueen, Lecturer in Materia Medica; J. Pullar, Professor of Clinical Anatomy; R. B. Mitchell, W. W. Musgrove, J. A. Gunn, W. A. Gardner, Demonstrators of Anatomy.

Western University: Edwin Seaborn, Professor of Clinical Surgery; E. H. Young, Associate Professor of Psychiatry; G. W. A. Aitkens, Instructor in Pharmacology; C. E. Brown, Instructor in Clinical Medicine; E. G. Davis, Instructor in

Surgical Anatomy; G. L. Jepson, Lecturer in Materia Medica; G. A. Ramsay, Instructor in Clinical Surgery.

Toronto University: R. G. Armour, Assistant in Clinical Medicine; J. A. Amyot, Professor of Hygiene; H. K. Bates, Demonstrator in Anatomy; G. F. Boyer, Assistant in Clinical Medicine; H. A. Bruce, Associate Professor of Clinical Surgery; I. H. Cameron, Professor of Surgery and Clinical Surgery; G. A. Campbell, Assistant in Pathology; G. Chambers, Associate Professor Clinical Medicine; A. H. Caulfeild, Special Assistant in Research in Medicine; H. E. Clutterbuck, Assistant in Gynaecology; C. E. C. Cole, Demonstrator in Therapeutics; A. F. Coventry, Lecturer in Vertebrate Embryology; M. M. Crawford, Demonstrator in Obstetrics; A. A. Fletcher, Junior Research Fellow in Medicine; J. T. Fotheringham, Associate Professor of Medicine and Clinical Medicine; R. E. Gaby, Demonstrator in Anatomy and in Clinical Surgery; J. G. Gallie, Assistant in Obstetrics; L. Gilchrist, Assistant Professor of Physics; P. G. Goldsmith, Demonstrator in Oto-Laryngology; A. R. Gordon, Associate Professor of Clinical Medicine; D. A. L. Graham, Lecturer in Bacteriology; W. B. Hendry, Associate in Gynaecology; S. R. D. Hewitt, Assistant in Therapeutics; V. E. Henderson, Associate Professor of Pharmacy and Pharmacology; R. Home, Demonstrator in Anatomy; C. G. Imrie, Lecturer in Chemical Pathology; G. W. Loughheed, Assistant in Pathology; S. J. N. Magwood, Assistant Demonstrator in Obstetrics; W. J. O. Malloch, Associate in Clinical Surgery; P. K. Menzies, Assistant in Clinical Surgery; J. A. McCollum, Assistant in Clinical Surgery; D. McGillivray, Associate in Clinical Medicine; J. J. Mackenzie, Professor of Pathology and Bacteriology and Curator of the Pathological Museum and Laboratories; A. J. MacKenzie, Demonstrator in Pathology and in Clinical Medicine; P. W. H. McKeown, Associate Professor of Clinical Surgery; J. H. McPhedran, Demonstrator in Anatomy and in Clinical Medicine; C. S. McVicar, Demonstrator in Clinical Medicine; F. S. Park, Assistant in Clinical Medicine; H. C. Parsons, Associate in Clinical Medicine; Robin Pearse, Assistant in Clinical Medicine; G. R. Philp, Demonstrator in Anatomy; A. Primrose, Associate Professor in Clinical Surgery; E. F. Risdon, Demonstrator in Anatomy for Dental Students; J. A. Roberts, Demonstrator in Clinical Surgery; D. E. Robertson, Demonstrator in Pathology and Assistant Curator of the Pathological Museum, Assistant in Clinical Surgery; L. B. Robertson, Assistant in Pathology and in Clinical Surgery; A. H. Rolph, Gilbert Royce, Demonstrator in Oto-Laryngology; R. D. Rudolf, Professor of Therapeutics; E. S. Ryerson, Associate in Clinical Surgery; W. A. Scott, Associate in Clinical Surgery, Demonstrator in Anatomy; N. C. Sharpe, Junior Research Fellow in Medicine; N. S. Shenstone, Demonstrator in Clinical Surgery; H. J. Shields, Assistant in Pathology; D. K. Smith, Demonstrator in Clinical Medicine; C. L. Starr, Associate Professor of Clinical Surgery; G. S. Strathy, Demonstrator in Clinical Medicine; G. E. Wilson, Demonstrator in Anatomy and in Clinical Surgery; B. P. Watson, Professor of Obstetrics and Gynaecology; O. C. J. Withrow, Assistant in Biology; H. W. Wookey, Assistant in Physiology; W. W. Wright, Assistant in Ophthalmology; W. E. Gallie, Demonstrator in Clinical Surgery; W. Goldie, Associate Professor of Clinical Medicine.

MAJOR-GENERAL G. L. FOSTER, C.B., Director of Medical Services, Canadians, is appointed Director-General of Medical Services, O.M.F.C. (Authority A.M.S., 8-1-10, M.S. 1a of July 30, 1918.)

THE buildings and equipment of the hospital at Joinville-le-Pont, near Paris, given by the Canadian Red Cross Society to the people of France, were formally accepted by the President of the French Republic on Tuesday, July 3. This hospital is administered by No. 6 Canadian General Hospital unit.

THE following items are abstracted from the *Bulletin of Information*, published July 18, 1918, by Colonel A. E. Ross, D.D.M.S., Canadian Corps, B.E.F., France:—

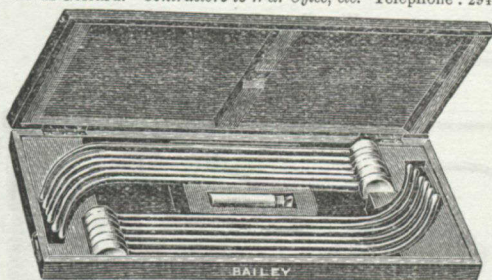
Each of the following units has a trained chiropodist: All Field Ambulances, 1st, 5th, 13th, 18th, 38th, 43rd, 44th, 46th, 49th, and 5th C.M.R. Battalions.

The type of disinfector designed by Major H. Orr, O.C., No. 3 Canadian Sanitary Section, has proved so successful that it has been adopted by H.Q. for use throughout the Army.

W. H. BAILEY & SON.

Everything for OPERATIVE SURGERY, SICK NURSING, THEATRE and WARD FURNISHING.

Telephone : 2942 Gerrard. Contractors to War Office, etc. Telephone : 2942 Gerrard.



4522A.—Set of 12 LISTER'S BOUGIES, N.P. Complete with Bottle for Oil, in Unpolished Mahogany Case ... £2 10 0
Silver-Plated CATHETERS in similar sets, £2 7 6 per case.

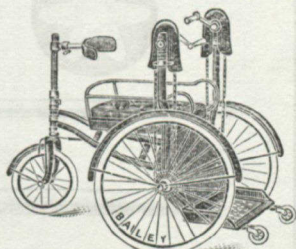
Bailey's Invalid Furniture for Wounded.



No. F 500.

No. F 500. **Merlin Chair**, very strongly built, suitable for Military Hospitals. Detachable Leg Rest.

Write
for
Lists.



No. F 509.

No. F 509. **Hand-propelled Invalid Chair**. Seat with nickel-plated rail. The steering is effected by the back support, ball bearings throughout, and pneumatic tyres.

Hand Brake, extra.

38, OXFORD STREET, LONDON, W. I.
For Surgical Instruments and Appliances.
2, RATHBONE PLACE, LONDON, W. I.
For Hospital and Invalid Furniture.

The Weldon "Auto-Motive" Crutch.

(Pat. 105,185—1916.)

FOR LOCOMOTION WITHOUT EXERTION.

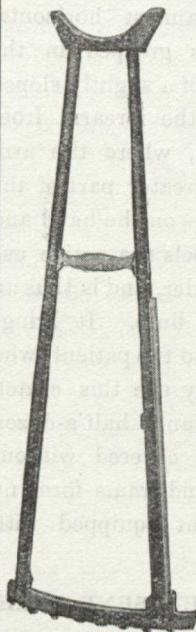
Owing to the unique construction of the base, the user is propelled by gravitation without any exertion beyond resting the weight of the body on the handles.

In proceeding down hill it is only necessary to reverse the crutches, which then act as a natural brake.

But the feature of the "Weldon Auto-motive" is the anatomically correct position of the head, which conforms to the oblique direction of the axilla.

At the same time the segmental bases are parallel to each other and to the line of progression. Thus all risk of "crutch paralysis" is entirely eliminated, there being no irritation of the brachial plexus, as is common to all crutches with parallel heads.

27/6 per pair. With Seat, 29/6.
Carriage and Packing Extra.



A most Instructive Booklet issued post free on request.

Sole Agents for the United Kingdom :

HOSPITALS & GENERAL CONTRACTS CO. Ltd.,
19-35, MORTIMER STREET, LONDON, W.1.

'Phone—MUSEUM 3140-1.

Telegrams—"CONTRACTING, LONDON."

Prophylactic Vaccines

Prepared in the Vaccine Laboratory of St. Mary's Hospital, London (Founder: Sir Almroth E. Wright, M.D., F.R.S., etc.), and supplied to the Medical Profession through the agency of Messrs. PARKE, DAVIS & Co.

ANTI-PARATYPHOID VACCINE

Supplied in sets of two doses, respectively containing 1000 millions and 2000 millions of B. paratyphosus (equal proportions of A and B), as recommended for the immunisation of one adult, also in bottles of 25 c.c., providing sufficient vaccine for 16 adults.

ANTI-TYPHOID VACCINE

Supplied in sets of two doses, respectively containing 1000 millions and 2000 millions of B. typhosus, as recommended for the immunisation of one adult, also in bottles of 25 c.c., sufficient for 16 double doses, as above, or for 32 if short-period protection only is required.

ANTI-TYPHOID-PARATYPHOID VACCINE (T.A.B.)

Supplied in sets of two doses, respectively containing 500 millions and 1000 millions of B. typhosus with 500 millions and 1000 millions of B. paratyphosus (equal proportions of A and B), for the immunisation of one adult, also in bottles of 10 or 25 c.c. (sufficient for 6 or 16 adults).

Further particulars of the above-mentioned and other bacterial vaccines will be supplied on request by

PARKE, DAVIS & Co., 50-54, Beak St., Regent St., LONDON, W.1.

Send all enquiries for Dental Materials to

CLAUDIUS ASH, SONS & CO.,
LIMITED,

5-12, BROAD STREET,
GOLDEN SQUARE,
LONDON, W. 1.

ESTABLISHED 1820.

Telephone: No. 420 GERRARD.

Telegraphic Address: "FRENES, REG., LONDON."

TORONTO ADDRESS—

11-13, GRENVILLE STREET,
Toronto, CANADA.

H. K. LEWIS & Co. Ltd.

Medical Publishers & Booksellers,
COMPLETE STOCK OF TEXT-BOOKS AND RECENT
WORKS IN MEDICINE AND GENERAL SCIENCE.

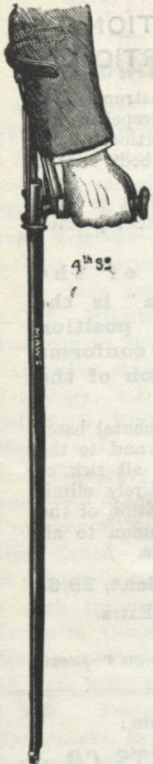
MEDICAL & SCIENTIFIC
CIRCULATING LIBRARY.

ANNUAL SUBSCRIPTION—FROM ONE GUINEA.

All the Latest Works are obtainable without delay.

136, GOWER ST., LONDON, W.C.
Telephone - - - - MUSEUM 1072.

THE FORE-ARM LEVER WALKING STICK CRUTCH (PATENT)



CONSISTS of an almost horizontal handle, which is grasped in the palm of the hand, and of a slightly sloped spring which supports the forearm from the wrist to the elbow, where the arm hangs naturally. The greater part of the weight of the body bears on the hand and the wrist. Its use compels the active use of hands, arm and shoulder, and is thus an exercise for the upper limb. It brings back the joy of walking to the patient, who can easily and naturally use this crutch after a little practice, and half-a-dozen miles or more may be covered without fatigue. Stairs, 'buses and trams form no obstacles for the patient equipped with this invention.

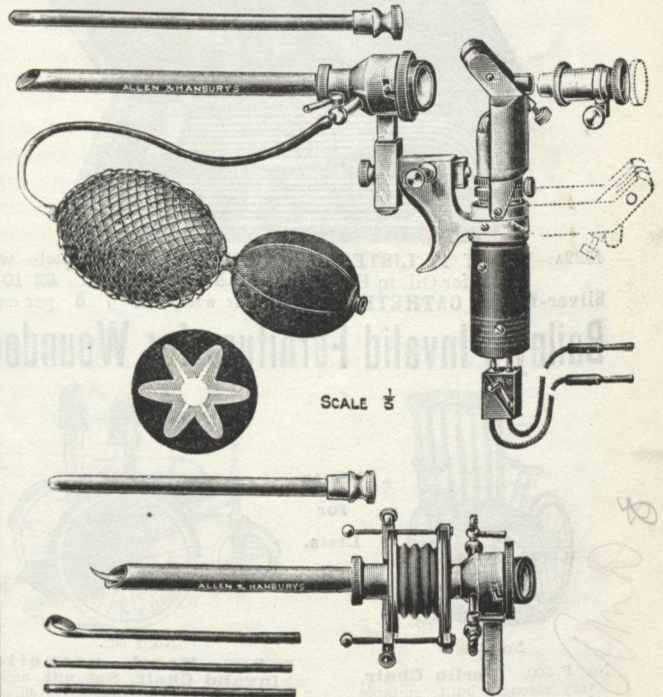
DESCRIPTIVE LEAFLET SENT FREE.

Two Qualities,
18/6 and 28/6 per pair.

S. MAW, SON & SONS, LTD.,
(G.P.O. BOX No. 54),
7-12, ALDERSGATE STREET, LONDON, E.C. 1.

ALLEN & HANBURYS LIMITED, LONDON. AERO OPERATING URETHROSCOPE.

Wyndham Powell's Latest Model.



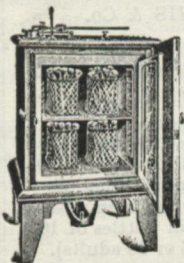
SCALE $\frac{1}{8}$

Made under the supervision of Mr. Wyndham Powell.

Descriptive Circular on application.

ALLEN & HANBURYS, LTD., Manufacturers of Surgical Instruments and Appliances,
48, WIGMORE STREET, LONDON, W. 1.
Works: Bethnal Green, E. 2.

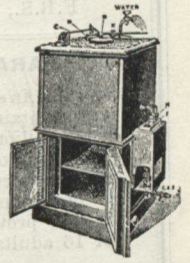
CHAS. HEARSON & CO.'S SPECIALITIES.



Bacteriological Incubator.

Apparatus for Bacteriological, Pathological, Physiological, Chemical, Venereal, and Public Health Laboratories.

New Catalogue, 1918, printed in Five Languages, forwarded on application.



Cool Incubator.

FACTORY AND SHOWROOMS—

68, WILLOW WALK, BERMONDSEY, LONDON, S.E. 1.

CHARLES HEARSON & Co., Ltd., 235, Regent St., W. 1.

DUROGLASS.

STAR

A

BRAND

High Quality

Resistance Glassware

for all

BACTERIOLOGICAL
PURPOSES.

TWICE

ANNEALED

BAIRD & TATLOCK (London), Ltd.,
14, Cross Street, Hatton Garden, E.C.



THE SURGEON'S TOOLS

THE Surgical Tools

MANUFACTURED BY

MAYER & MELTZER

have a reputation for quality extending over half-a-century.

Catalogues on request.

MAYER & MELTZER,
71, GT. PORTLAND STREET, LONDON, W. 1.

Telegrams: "TREPINE, WESDO."

Telephone: GERRARD 5574.