

Surgical Travellers: Tapestry to Bayeux

John Hedley-Whyte, Debra R. Milamed

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SUMMARY

The planning for surgery in war was revisited in 1937 when Ian Fraser was elected a member of the Surgical Travellers. At their 1938 Surgical Travellers meeting in Vienna, Ian and Eleanor Fraser were evicted from their hotel room by the Nazis. The 1939 meeting in Belfast discussed the organization of surgery and the conduct of Emergency Medical Service Hospitals in the United Kingdom; the vast majority were to be under civilian government and military control.

From 1943 lengthy and informative organizational meetings were held at least monthly under the chairmanship of Sir Alexander Hood, KBE, Head of the RAMC. Surgical Consultants, now Major Generals, Brigadiers or Full Colonels in the British and U.S. Armies stationed in the UK, prepared for the invasion of Europe. The allocation of medical, surgical, nursing and auxiliary responsibilities was delineated. Liaison with the RAF and US Army Air Force was close as it was with the proposed leaders, Ulstermen Brooke and Montgomery. Montgomery chose Arthur Porritt as Surgeon in Chief to Supreme Headquarters Allied Expeditionary Force (SHAEF), and Eisenhower, General Albert W. Kenner.

Just after D-Day, Porritt met Ian Fraser, who had waded in on Arramanches Beach. The triage and evacuation plans for Allied casualties had been controversial, particularly as regards Landing Ship Tanks (LSTs). The dispute with the Hood-selected surgeons on one side, against medical and surgical deployment of LSTs, and Admiral Ernest King and Winston Churchill on the other, favouring LST use for surgery and evacuation. King and Churchill were correct but total Allied air superiority allowed wide use of many of the Allies' Dakotas; 10,000 DC-3s were eventually in service. Supported by forty Allied combat planes to each Luftwaffe, the dispute about Landing Ship Tank use in about a fortnight became moot. The multifaceted role of the Princess Royal in the Emergency Medical Services of the United Kingdom and her close liaison with the Consultant Surgeons was of great value to the Allies.

INTRODUCTION

The planning of surgical response to Nazi aggression began in 1938 both in the Royal College of Surgeons of England and in the Surgical Travellers Club¹⁻³. In 1938, the year of Chamberlain's "Peace in our time" speech, the Army Blood



Fig 1. Sir Ian Fraser (1901-1999), oil on linen, 91.5 x 76.2 cm, by Carol Graham, 1994. Reproduced with permission of Queen's University, Belfast, solely for this Medical History. Sir Ian's father, Dr. Robert Fraser, was a single-handed General Practitioner in Belfast. Ian's mother, Margaret, died in 1903. Ian won a scholarship to his father's old school Inst in 1913. Ian began his medical career as a student at Queen's in 1918; for the next eighty years he led a full and distinguished life. He was created D.S.O. in January 1944 for his legendary war surgery and for his penicillin work with Lord Florey and Dr. Norman Heatley⁵⁻⁷. An Oxford DSc followed, as did heroic surgery near Bayeux. The three months after D-Day the Second Battalion of The Royal Ulster Rifles were just to Fraser's east. From the Normandy beaches to the capture of nearby Caen, this combat cost the Second Battalion 400 killed or seriously wounded⁸. By the end of July 1944 and the Ste. Lô breakout, the First Battalion of the Royal Ulster Rifles had suffered 488 casualties. On D-Day 864 men of the First Battalion had landed by parachute glider or boat⁸.

David S. Sheridan Professorship in Anaesthesia and Respiratory Therapy
Harvard University, 1400 VFW Parkway, Boston, MA 02132-4927 USA
Correspondence to Prof. Hedley-Whyte
john_hedley-whyte@hms.harvard.edu

Transfusion Service was established under the direction of Lionel Whitby¹⁴. During the March 1938 visit of the Surgical Travellers to Vienna at the start of Anschluss, Ian and Eleanor Fraser were moved, despite their protests, out of the Hotel Bristol, as von Papen had taken over the entire hotel (Fig.1). From Vienna, the Frasers bussed down to Budapest. Here the displaced Travellers agreed to meet on Tuesday, 7 March and Wednesday, 8 March 1939 in Dublin, followed by three days of meetings and dinners in Belfast, before leaving from Ulster on the morning of Sunday, 12 March 1939⁹. Ian Fraser was to be host and the fifteen consultant surgeons would plan for the inevitable war³.

Heneage Ogilvie was leader and founder in 1927 of the Surgical Travellers^{2,10}. According to Sir Ian Fraser, members were chosen to “be amiable, enthusiastic, interested, interesting, intelligent, and above all, friendly and clubbable with a sense of humour.” Spouses likewise³.

WORLD WAR II

Howard Florey decided, on the suggestion of Hugh Cairns, that Ian Fraser should test penicillin “in the forward area on war casualties”^{6,7}. Heneage Ogilvie was at the same time, in 1942 and early 1943 in North Africa, Sicily and Italy, testing regimens for sulfonamides¹. Fraser caught diphtheria at the Salerno landings and was flown to Catania to be cured by Max Rosenheim⁵. Ogilvie, promoted to Major General, was recalled to the UK to be the consultant surgeon for the Eastern Command, while my father, having left Musgrave Park in July 1942, was from September 1942 consultant surgeon in the adjacent Northern Command⁹. From Friday, 5 March 1943 my father had been meeting with General Paul Hawley and Colonel Professor Elliott Cutler at the U.S. Army Medical Corps European Headquarters in Cheltenham. Sir Alexander Hood, DGMS, RAMC agreed that Ian Fraser should be Ogilvie’s understudy in Eastern Command and at the War Office. Hood also arranged that Ogilvie and Fraser should meet together with General Paul Hawley and Cutler of the U.S. Army Medical Service, Vice-Admiral Gordon Gordon-Taylor of the Royal Navy (Fig.2), and Brigadier Arthur Porritt, Chief Surgeon designate to Supreme Headquarters Allied Expeditionary Forces, together with Northern command’s Angus Hedley-Whyte (Fig. 3). Meetings of the group were held at 10:00 a.m. during April to December 1943 and on Thursday 13 January 1944, Wednesday, 9 February, Thursday, 13 April and Thursday, 11 May 1944 and Monday, 15 May 1944. Topics discussed included D-Day’s General Plan of Operation for Allied Medical Units and their supply⁹.

The plans for evacuation of wounded and sick led to delineation of Army and Navy responsibility in LSTs, other Allied vessels and on the beaches and harbours on both sides of the Channel and the Irish Sea. The roles and availability of motors, aircraft and Hospital Trains were discussed and priorities assigned¹⁵. The transfer of wounded to RAMC, US Army, US Navy and Royal Navy Hospitals was planned. In general, the Navies would be responsible for their own wounded and the Armies for both soldiers and airmen and

wounded Prisoners of War. Standards for potable water and milk, their testing and procurements in Normandy were enacted. Plans for treatment of tuberculosis and gas gangrene



Fig 2. Portrait of Sir Gordon Gordon-Taylor (1882-1960) in naval uniform, photograph. Wellcome Library, London, Iconographic Collections, image no. M0017976.

Educated at Robert Gordon College in Aberdeen, Gordon-Taylor won the Aberdeen Gold Medal for Classical Studies. In 1898 he entered the Middlesex Hospital Medical School as an Entrance Scholar, winning in 1901 the Gold Medal in Anatomy. For the rest of his career he was associated with the Middlesex.

World War I saw Gordon-Taylor at the Battle of the Somme where he amputated the leg of machine gunner Lionel Whitby. Passchendaele followed and Gordon Gordon-Taylor became Acting Consulting Surgeon to the 4th Army, where his surgical distinction made him a legend. He was promoted to Major and was awarded a Military OBE. In 1932 Gordon-Taylor was elected to the Council of the Royal College of Surgeons of England. In 1934, he visited Australia to examine in the Anatomy Section of the Primary Fellowship. On the outbreak of World War II he was appointed Consultant Surgeon to the Royal Navy. He assiduously visited the Naval Hospitals and the Emergency Medical Service Hospitals and ships. There were also visits to Canada, and the United States, where as Visiting Professor of Surgery at Harvard, he took Elliott Cutler’s place. Further World War II visits to the U.S. led to his heading an Anglo-American visit to Russia in 1943. Created KBE, he became a Commander of the Legion of Merit of the USA. When his former amputee patient Sir Lionel Whitby was Vice-Chancellor of Cambridge, Whitby arranged an honorary Cambridge Sc.D. Over thirty of Gordon Gordon-Taylor’s more than 135 publications concern war surgery^{11,12}.

and the deployment of penicillin and sulfonamides and above all blood and plasma were delineated. "Whole blood will be an item of medical supply and will be distributed through medical supply channels. It will be given the highest priority in transportation"⁹. A ten-day supply of blank forms and stationery were to be stocked in advance dumps and a month's



Fig 3. Baron Porritt of Wanganui and Hampstead, GCMG, GCVO, CBE (1900-1994)¹³. Portrait, oil on canvas, 128 x 93 cm, 1964-65, by Sir James Gunn, RA. Reproduced with permission of the Hunterian Museum, Royal College of Surgeons of England, solely for this Medical History. Arthur Espie Porritt was born in Wanganui; his father was a surgeon as was his maternal grandfather. His commendable academic and athletic performances led to a Rhodes to Magdalen, Oxford. At the 1924 Paris Olympics he took a bronze in the 100 meters. Although a knee problem prevented further competition, he served as captain of New Zealand's Olympic Team in Amsterdam in 1928, the year he qualified BM from Oxford. Through house jobs at Mary's and after being Assistant Director of the Professorial Unit, he became surgeon to Mary's and then Surgeon-in-Ordinary to the Duke of York, later HM King George VI. Placed by Hood in the BEF2, he became known to Ulstermen Brooke, Alexander and Montgomery. In North Africa with Montgomery he was chosen as Surgeon in Chief Designate to SHAEF to help Montgomery and Eisenhower¹⁴.

Always cheerful, optimistic and supremely practical he liaised well after D-Day with Americans, Canadians, French, Poles and the Allied Air Forces. His Presidency of the Royal College of Surgeons of England from 1960-1963 was rewarded with a Baronetcy. In 1967 he was appointed Governor-General of New Zealand. He and Lady Porritt, a former Sister in QAIMNS, were extremely popular and successful for their five-year term in the land of Porritt's birth. His death at their home in St. John's Wood, London was on New Year's Day; he had been fully active until Christmas¹⁴.

supply in Base Depots.

The Allied Invasion of Normandy was to involve 8,000 doctors, six hundred thousand doses of penicillin, 50 tons of sulpha drugs, sixteen hundred pallets of medical equipment each weighing half a ton. Each rifleman, the surgeons decreed, should carry ashore or be dropped with equipment and supplies weighing not more than 43 pounds. The armies, navies and air forces edged this up to 68.4 pounds by D-Day with disastrous results from drowning upon disembarkation¹⁶.

On May 15, 1944, thirty-nine-year-old Pete Quesada was asked to explain the D-Day and Normandy tactical air plan. Major General J. Lawton Collins, known as "Lightning Joe Collins" asked "Pete, how are you going to keep the German Air Force from preventing our landing?" "There is not going to be any German Air Force there," replied Quesada. Winston Churchill's skeptical response was: "Ahhh, young man, how can you be so sure?" He replied, "Mr. Prime Minister, because we won't let them be there. I am sure of it. There will be no German Air Force over the Normandy invasion area"¹⁷. But there were barely enough LSTs¹⁸. On April 28, German E boats were to sink 3 LSTs off Slapton Sands, Devon, and drown over 700 Allied personnel. Each LST carried two physicians and 20 navy corpsmen from either the Royal Navy or US Navy¹⁹.

HOOD AND WAR CABINET

During the Thursday, 13 January 1944 conference in Hood's office, the consulting surgeons could not agree on the partial conversion of Allied LSTs to be casualty evacuation vessels from Normandy. They were flat-bottomed and unsuitable sites for surgical operations. Essentially all Allied Hospital Ships had been deployed to the Pacific or Africa or sunk by German bombing despite their Red Cross marking. The War Cabinet summoned Hood and the Fighter Command leader of the U.S. Army Air Force and asked to predict the Allied air coverage for the LST's landing and evacuation roles. They opined that four British Hospital Ships should be lent for the U.S. Navy to operate on D-Day and the following month²⁰.

1944 INSPECTIONS

On Sunday, 9 January, Brigadier Angus Hedley-Whyte took the train from York to Cambridge, the base of Major General Heneage Ogilvie, to discuss the inspections they would carry out from Middlesex to Scotland. Dinner was with Basil Hume, later Anthony Eden's surgeon. On Wednesday, 12 January, all Consulting Surgeons had meetings in London in preparation for their meeting at 10:00 a.m. next day with Lieutenant General Hood. On Monday, 17 January, I went to London. Next day, I was returned to the Dragon School at Oxford and my¹ father went to see the Princess Royal² at Harewood House. Father's first meeting had been Tuesday, February 9 to Friday, February 12, 1943⁹. From Harewood,

1 "My" or "I" denotes first author.

2 Princess Royal, HRH Princess (Victoria Alexandra Alice) Mary, CI, GCVO, GBE, RRC, TD, CD April 25, 1897-March 28, 1965), was the only daughter of King George V and Queen Mary²¹.

my father went to 103 Field Ambulance near Leeds. According to Ian Fraser, the Consulting Surgeons' job "was to visit all the various hospitals on the east coast to advise them that they must make a plan to evacuate their hospital when "D" day came, so leaving adequate empty beds for the wounded evacuated from France. The government would supply them with the necessary blood afterwards"³. The job from 1940 to 1945 of the Princess Royal was to facilitate the taking over of suitable stately homes for bed expansion. The Princess was to follow, with the Army Consultants, standards of care.

On Sunday, 23 January to 25 January, my father and DADMS Gwynne-Evans visited medical facilities of 2nd corps., Alan Brooke's Corps with the BEF in France in 1940. Menthorpe Gate, Malton and Cottingham, Yorkshire, Askham House, Northumberland and Hutton-in-the-Forest, Penrith, were evaluated. Reports were made late on 25 January to the Royal College of Surgeons of England Council and next day to the Hospitals Committee of the BMA at Tavistock House. That evening, my father dined with Brigadier, later Lord Porritt, Surgeon in Ordinary to King George VI and to Ulsterman Bernard Montgomery, Allied Ground Commander (Fig.3). Ian Fraser and Molly Porritt joined them at the Berkeley Grill⁹.

On Tuesday, February 1, a conference with 'Ford at Reg 2' discussed potential EMS hospital expansions. On Thursday, February 3, the Medical Facilities of 77 Division were inspected together with Brigadier Arnold Stott²² and Major General Philip Mitchiner²³. Stott's wife Kay joined them for dinner. On Friday, 4 February, Arthur Porritt acting for General Montgomery conducted Hedley-Whyte and Stott on a two-day inspection of 2nd Corps. On the evening of 5 February, the three inspectors were joined by Lord Webb-Johnson and Norman Heatley at the York Club. Sunday, 6 February was spent on penicillin matters at Stannington on the Ridley Estate at Blagdon, Northumberland. Porritt got the night train back to London; Heatley spent the night at Moorfield, our house near the Royal Victoria Infirmary, Newcastle-upon-Tyne. Heatley caught the 9:20 a.m. train to Oxford and my father took the sleeper to London with Durham Medical School Dean R.B. Green^{6,7}. On Wednesday, 9 February, they reported to DGMS Hood and dined with Max Rosenheim^{5,24}. My father attended meetings in London until luncheon on Thursday, 10 February at the Royal College in Lincoln's Inn Fields. He then traveled again to Harewood House. On Sunday, 13 February, my father received reports of progress in site expansions for the EMS. On Tuesday, 15 February, my father reported to Balme at the Ministry of Health in London. For the next fortnight my father lectured mostly in Northern and Eastern commands on "Types of Bombs and their wounds". On Wednesday 12 April, father met with senior RAF and US Army Air Force surgeons to describe future plans for air-crew casualties. Air transport of casualties with head, face and hand injuries was assigned to specialists at Oxford (Hugh Cairns and Cecil Calvert) and to East Grinstead Plastic Surgeons, New Zealanders Sir Harold

Delf Gillies and Sir Archibald McIndoe. Sir Alexander Hood was briefed on Thursday, 13 April. On 8-10 May, a 'final' three-day briefing for most surgeons involved in D-Day was held in Lincoln's Inn Fields. On Thursday, 11 May, both U.S. and British Consultant Surgeons met with Sir Alexander Hood. Both Professor Cutler and General Paul Hawley speaking for the United States and Sir Gordon Gordon-Taylor speaking for the Royal Navy and responding to Ian Fraser's pleas, begged for a dozen pints of blood or more on each of the LSTs going to the Invasion. The Whitbys agreed to top up American donations. On Friday and Saturday, 12 and 13 May 1944, my father had to attend to the UK Tax Authorities in Leeds who did not wish to grant tax abatement for stately home transfer to being an EMS hospital⁹.

D-DAY SHIPS

Ian Fraser wrote of wading ashore at Arromanches, "Water up to my nipples... was not strafed"³. Indeed, on the beach he met Montgomery's surgeon Arthur Porritt and was given dry clothes and marched to the site of British Army Hospital 108 near Bayeux^{3,5}. Fraser when in Yorkshire in Northern Command had planned the layout of 108 on photographs provided by RAF reconnaissance. My father, with his record of 1940 Normandy War surgery was a courtesy ex officio advisor. Senior Surgeon Fraser and Matron arranged camouflage over the objections of the Norman Baroness landowner. "Colonel Fraser was causing more damage than the Wehrmacht had in four years"³. Fraser claims he was able to adapt French telegraph pole bore diggers to make almost instantaneous hospital latrines²⁵.

In the three months from mid-June to mid-September 1944, surgery on Allied and POW casualties was almost continuous. Casualties from British attack Epsom (26 June to 1 July), cost 4,020 men killed or wounded²⁶. Charnwood 7 July: after the RAF had dropped 3,500 tons of bombs on Caen, led to 3rd British Division including the 1st and 2nd Battalions of the Royal Ulster Rifles' taking Caen⁸. The Norman capitol was due to have fallen on D-Day. Operation Goodwood began on 18 July, but failed to take Boarguébus ridge²⁷. On D-Day + 43, 20 July, Goodwood fighting finally sputtered out²⁸. On 25 July four American infantry and two armoured divisions attacked just west of St. Lô. They, as VII Corps, were commanded by 'Lightning Joe Collins'^{26,29}.

BREAKOUT

Collins's Corps VII broke through German defenses in late July 1944. Meanwhile, Montgomery renewed British attacks in operations Bluecoat on 2 August and Totalize on 7 August. As August 1944's heat wave continued, Fraser operated eight hours on eight hours off. Fraser, stripped to the waist, treated the wounds of Ulstermen, Canadians, Poles and German POWs, as well as UK and American Casualties³. In late August there was no longer the constant passage overhead of naval support gunfire of 7 battleships, 2 monitors, 23 cruisers and 104 destroyers^{25,27}. Three of the battleships, the *Arkansas*, *Texas* and *Nevada*, had come from Ulster to support the Allies for June. They stayed off Normandy until required

for the French Riviera landings³⁰. The *Nevada* had been beached at Pearl Harbor and there repaired. The fourteen and sixteen-inch guns were accurate up to 25 miles inland: the front south of Bayeux and Hospital 108 was well within the range of Naval gunfire³¹.

EVACUATION OF WOUNDED

On 16 December 1943 the U.S. Ninth Air Force made the inaugural flight of the UK evacuation system³². Initially these flights were generally between Meghaberry Aerodrome near Lisburn and RAF Station Pershore, Worcestershire and took two hours. From December 1943 through May 1944, a total of 2,786 ambulatory and litter patients were flown from Ulster to England; many of whom were American casualties of training mishaps^{19,33,34,35}. In the spring of 1944 an increasing number of patients were flown to Prestwick and thence to the United States. There were 446 in May 1944. Also in May, Membury, Devon, and Ramsbury, Wiltshire Airfields were designated as the main reception air fields; field hospital and ambulance detachments were stationed at these two aerodromes³³. A temporary airstrip near Bayeux was established on 8 June and on 10 June a C-47 evacuated thirteen patients. Patients were also evacuated to RAF Merrifield, Somerset, and RAF Rednall, Shropshire. Allied Air Evacuation Liaison officers were deployed to the Office of the Chief Surgeon, Advance Echelon, Communications Zone, the offices of the Chief Surgeon of the First and Third U.S. Armies, and to the Advance headquarters of the Ninth Air Force. These liaison officers were scheduled to land in France on D-Day and to arrange for airfields, holding stations and medical evacuation planes^{33,36,37}. A week after Fraser's arrival 600 patients a day were being flown to the UK. By the end of June 1944, 8000 patients had been evacuated to the UK from Normandy. During July 1944 only two of the 19,490 casualties air evacuated from Normandy died in flight³³. Heavily loaded transports could land at Querqueville, unload, then 'hop' to Binniville and Colleville or to a combat airstrip to pick up casualties. The only crash was a C-47 not from Normandy near Prestwick killing 13 patients and two crew³³. "Evacuation by air is the only means available at present for the proper evacuation of casualties from the Armies", wrote General Hawley on 30 August 1944³³. "Where there is no supply by air, there is no evacuation by air"^{19,38}. The spring planning at Hood's meetings of the Allied Consultant surgeons and Pete Quesada's promise had been vindicated. During September 1944, partly because of the failure of Arnhem, 26,126 casualties had to be flown back to the UK—an explanation of the sadness and fatigue of the RAF who flew Ian Fraser to the UK and thence to India³.

NORMANDY WOUNDS

About 85% of the battle casualties on which Fraser operated occurred in infantry riflemen; over half were caused by German shells and over half needed surgery of the extremities. Ten percent of casualties required thoracic surgery and five percent laparotomies¹⁹ (Fig.4)

Porritt's SHAEF colleague, General Kenner stated, "Men

wounded in the morning are often on the operating table of a general hospital in the UK within 10 hours"¹⁹. The use of LST Tank ships for evacuation dwindled and the four hospital ships were generally not full. The death rate of Fraser's 108 hospital ranged from 11 to 14 percent of surgical admissions. He and his staff treated "exsanguinations, eviscerations, cardiorespiratory difficulties, and deep shock"^{23,19,25}. On average, 108 hospital staff performed 100 major operations every twenty-four hours. The surgical nursing care was superb but Fraser noted that brunettes went grey-haired⁵, a change that my father said happened in his BEF2 hospital in Normandy four years earlier. Fraser was not short of donated blood. Of the men treated by Hospital 108, less than one percent died after reaching the UK. Kenner and Porritt attributed this to "the echeloning of skilled surgical care throughout the evacuation chain." Professor Cutler concluded after his inspections of the Allied hospitals in Normandy in the first month after D-Day, "The level of professional care is very high...low incidence of serious infection"¹⁹.

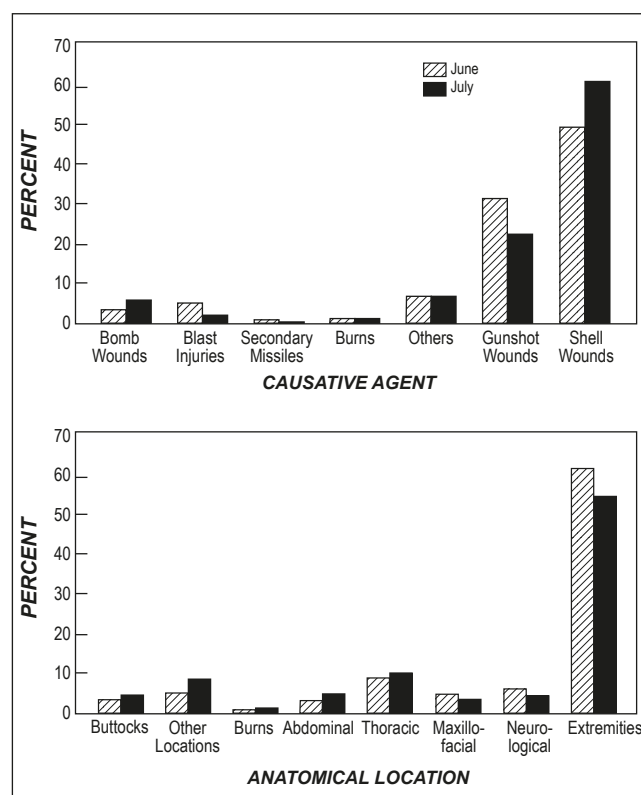


Fig 4. Causes and Locations of Wounds, Battle of Normandy, June-July 1944, Cosmas and Cowdrey, *Medical Service in the European Theater of Operations*¹⁹.

"A prolonged diet of C- and K-rations produced, after D-Day, vitamin deficiency"¹⁹. The U.S. had not yet implemented the results of the 1942 Musgrave Park research³⁹. 'We were vindicated,' Rycroft told Duke-Elder as well as Rycroft's own patients, including the Winston Churchills.

EMS REARRANGEMENTS

With the start in June 1944 of the V1 doodlebug and V2 rocket attacks, a further need for expansion of EMS beds

was mooted. After D-Day, EMS hospitals in Northern Ireland took “a steady stream of service casualties from overseas”^{40,41}. In response to demands on the EMS it was decided by the Northern Ireland Ministry of Health and Local government to appoint as consultant advisors the Professors of Medicine and Surgery at Queen’s, W.W.D. Thomson and P.T. Crymble. These appointments, as effectively Allied Consultants, regularized their previous and existing service and their extensive contributions in both World Wars⁴⁰. Both Brigadiers Ian Fraser DSO, and Angus Hedley-Whyte DSO were demobbed after VJ Day. Fraser wrote my father’s Lancet obituary⁴².

Montgomery wrote in his memoirs:

“I learnt during the 1939-45 war that four things contributed to the saving of life:

1. Blood transfusion.
2. Surgical teams operating well forward in the battle area, so that badly wounded could be dealt with at once without having to be moved by road to a hospital.
3. Air evacuation direct to a Base hospital many hundreds of miles in rear, thus saving bumpy journeys by road or rail.
4. Nursing sisters working well forward in the battle area. When I joined the Eighth Army in 1942, nursing sisters were not allowed in the forward battle area. I cancelled the order. Their presence comforted and calmed the nerves of many seriously wounded men, who then knew they would be properly nursed. No male nursing orderly can nurse like a woman, though many think they can”⁴³.

The plans of Porritt, Ogilvie, the Surgical Travellers and Eisenhower’s Generals and Admirals, led to organized execution of Montgomery’s four precepts for the saving of life⁴³.

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REFERENCES

1. Ogilvie WH. Some applications of the surgical lessons of war to civil practice. *Brit Med J.* 1945; **1(4400)**:619-23.
2. Wells CA. The surgical travellers: Golden Jubilee 1927-1977. *Ann Roy Col Surg.* 1978; **60(1)**:73-5.
3. Fraser I. *Blood, sweat and cheers.* Cambridge, England: The Memoir Club; 1989. p. 49,125-127, 129.
4. Hedley-Whyte J, Milamed DR. Our blood your money. *Ulster Med J.* 2013;**82(2)**:114-20.
5. Clarke R. *A surgeon’s century: the life of Sir Ian Fraser. Chapter 5. Penicillin – North Africa and Italy and Chapter 6. Normandy.* Belfast: Ulster Historical Foundation; 2004. p. 49–72.
6. Abraham EP, Chain E, Fletcher CM, Gardner AD, Heatley NG, Jennings MA, Florey HW. Further observation on penicillin. *Lancet.* 1941;**238(6155)**:177-89.
7. Florey HW, Chain E, Heatley NG, Jennings MA, Sanders AG, Abraham EP, Florey ME. *Antibiotics: a survey of penicillin, streptomycin and other antimicrobial substances from fungi, actinomycetes, bacteria and plants.* 2 vols. London: Geoffrey Cumberlege, Oxford University Press; 1949.
8. Orr DR, Truesdale D. “The Rifles are there”: 1st and 2nd Battalions, The Royal Ulster Rifles in the second world war. Barnsley, England: Pen & Sword Books; 2005. p. 57, 147.
9. Hedley-Whyte A. (David S. Sheridan Professorship in Anaesthesia and Respiratory Therapy, Harvard University, Boston, MA.) *Diaries* (unpublished). Entries 1938 through 1944. War Office clearance WOMO Serial 243: Authorized 26 August 1942.
10. Ogilvie H. The place of medical societies in the doctor’s life. *Lancet* 1946 April 13;**1(6398)**:525-6.
11. Windeyer B. Sir Gordon Gordon-Taylor. Surgeon, ambassador, scholar and orator. First Gordon-Taylor Memorial Lecture delivered at the Royal College of Surgeons of England on 11th June 1964. *Ann R Coll Surg Engl.* 1965;**36(2)**:98-115.
12. Till AS. Gordon-Taylor, war surgeon and historian. *Ann R Coll Surg Engl.* 1974;**54(1)**:33-47.
13. Kidd C, Williamson D. *Debrett’s Peerage and Baronetage.* Arthur Espie, Baron Porritt GCMG, GCVO, CBE. [Porritt Peerage 1963] London: Macmillan; 2000. p. B836.
14. Royal College of Surgeons. Porritt, Arthur Espie, Baron Porritt of Wanganui and Hampstead (1900-1994). *Plarr’s Lives of the Fellows Online.* Created 2006 May 25. [Last modified 2012 Mar 13]. London: Royal College of Surgeons. Available online from: <http://livesonline.rcseng.ac.uk/biogs/E000234b.htm>. Last accessed June 2014.
15. Billingham E. *Civil defence in war.* London: John Murray; 1941. p.47-52.
16. U.S. Army Medical Department. Office of Medical History. Report of Operations, 20 October 1942-1 August 1944. Operation Overlord. Available online from: <http://history.amedd.army.mil/booksdocs/wwii/Overlord/FUSAMedicalPlanforNeptune.html>. Last accessed June 2014.
17. Budiansky S. *Air power: the men, machines and ideas that revolutionized war, from Kitty Hawk to Iraq.* London: Penguin; 2004. p.160-83, 301-4.
18. Buffetaut Y. *D-Day ships. The allied invasion fleet, June 1944.* London: Conway Maritime Press; 1994. p. 40-1.
19. Cosmas GA, Cowdrey AE. The medical department. *medical service in the European theater of operations. United States Army in World War II. The Technical Services.* Washington, DC: Center for Military History, United States Army; 1992. CMH Pub 10-23. Figure 3, p.225; p.166; p. 231-235, 241.
20. Massman EA. Hospital ships of World War II: an illustrated Reference. Jefferson, NC: McFarland & Co.; 1999.
21. Kidd C, Williamson D. *Debrett’s Peerage and Baronetage.* London, Macmillan; 2000. p.773.
22. Sir Arnold Stott, KBE, FRCP [Obituary]. *Brit Med J.* 1958;**1(5086)**:1546-7.
23. Mitchiner PH. Surgery in two wars: 1914-18, 1939-45. *Ann R Coll Surg Eng.* 1947;**1(2)**:100-11.
24. Pickering G. Max Leonard Rosenheim, Baron Rosenheim of Camden. 1908-1972. *Biogr Mem Fellows R Soc.* 1974;**20(2)**:349-58.
25. Fraser I. Historical Note: Random recollections of World War II. *Ulster Med J.* 1994;**63(2)**:201-13.
26. Keegan J. *The Second World War.* Chapter 20, Overlord, p.307-29.

- Chapter 21, Tank battle, Falaise, p.331-45. London: Pimlico; 1997.
27. Beevor A. *D-Day. The battle for Normandy*. London: Viking, Penguin Books; 2009.
 28. Hastings M. *Overlord. D-Day and the battle for Normandy*. London: Michael Joseph; 1984. p.196-265.
 29. Atkinson R. *The guns at last light: the war in Western Europe, 1944-1945. Vol. 3 of The Liberation Trilogy*. New York: Henry Holt & Company, Inc.; 2013, p.1-168.
 30. Kelly MP. *Home Away from home: the Yanks in Ireland*. Chapter 5: Bangor Bay to D-Day. Belfast: Appletree Press; 1994. p.111-33.
 31. Moorehead A. *Eclipse*. London: Hamish Hamilton; 1945. p.85-132.
 32. King EJ. *US Navy at War 1941-1945: official reports by Fleet Admiral Ernest J. King U.S.N.* Washington DC: U.S. Navy Dept.; 1946. p.296-7. Available online from: <http://www.ibiblio.org/hyperwar/USN/USNatWar/>. Last accessed July 2014.
 33. Futrell RF. *Development of Aeromedical Evacuation in the USAF, 1909-1960*. USAF Historical Studies, No. 23. (Draft) IV. Aeromedical evacuation comes of age in Europe, 1943-1945; Air evacuation in the United Kingdom and Normandy, Washington, D.C.: USAF Historical Division, Research Studies Institute; 1960. p.197-212, 224,233, 240. Available online from: <http://www.afhra.af.mil/shared/media/document/AFD-090602-048.pdf>. Last accessed July 2014.
 34. Annual Report of the Medical Department. Activities of the Eighth AF, 1943; Eighth AF. Medical Section Meetings, 7 Oct-15 Nov 1943.
 35. Chauncy, CC, Brigadier General. (Chief of Staff USAAF, UK). Letter to CG, Ninth AF. Subject: Air movement of hospital patients from Northern Ireland to England, 11 Dec. 1943.
 36. Office of the Surgeon, Ninth Airforce. *Preliminary Operational Report. 17 July 1944, Maxwell Air Force Base*. Office of Medical History, USSTAF, Jan.-July 1944, p.15.
 37. Pace JW, Lt. Col. Air evacuation in the European Theater of Operations. *Air Surg Bull.* Oct 1945; 2(10):323-4.
 38. Hawley, Paul. (Chief Surgeon of the European Theatre.) Memo to: Major General Albert W. Kenner, 30 Aug 44. Subject: Evacuation by air. File HD:ETO:370:Evacuation, September-December 1944.
 39. Hedley-Whyte J, Milamed DR. Aspects of vitamin A. *Ulster Med J* 2009;**78(3)**:171-8.
 40. Dunn CL. Work of the hospitals from April 1941 to the end of the War. (Chapter 3) In: Dunn CL, editor. *The emergency medical services. Vol. II. Scotland, Northern Ireland and the principal air raids on industrial centres in Great Britain. Part II. The Emergency Medical Services in Northern Ireland*. London: Her Majesty's Stationery Office, 1953; p.142-51.
 41. Mellor WF. *Medical history of the second world war. Casualties and medical statistics. (United Kingdom Medical Series.)* London: HMSO; 1972. p.804-5.
 42. Fraser I. Angus Hedley-Whyte, D.S.O., M.S. Durh, F.R.C.S., F.R.C.S.E., *Lancet* 1971;**298(7722)**:498.
 43. Law B, Viscount Montgomery of Alamein, 1887-1976. *The Memoirs of Field-Marshal the Viscount Montgomery of Alamein*. Cleveland, Ohio: World Publishing Co.; 1958. p.312.