Medical History

Severe Burns in World War II.

John Hedley-Whyte, Debra R. Milamed

Accepted: 16th October 2016
Provenance: externally peer-reviewed.

INTRODUCTION

The Ulster Auxiliary Air Force Squadron RAF 502 were former “weekend flyers”. Officers and most of the air and ground crew were from Ulster. Supported by their medical and surgical care and their leadership they contributed decisively to Allied victory in World War II.

At 3:15 AM on 27th April 1941, Pilot Officer Christopher Carmichael of 502 Squadron took Whitley aircraft Z6501 to roll out on Limavady’s partially completed airfield. A crew of 6, including Pilot Officer Christopher Carmichael, Flight Lieutenant John Dickson, Sergeant Desmond “Des” O’Connell, Sergeant Stanley William Dorney, Sergeant Fred Redhead, Sergeant John Wilson (Air Gunner) were scheduled for a ten-hour anti U-boat patrol over the Atlantic. Shortly after take-off, the starboard propeller broke off. The Whitley hit Loughermore Mountain being unable to gain altitude or fly level on one engine. Fire broke out and ignited aviation gasoline and the 250 pound bombs (Fig. 1).

Flight Sergeant Des O’Connell exited in the middle of the fuselage. The fuel tank ruptured and drenched O’Connell who became ablaze. Flight Sergeant Redhead stamped and swatted O’Connell’s flames, severely burning his hands. Flight Lieutenant Dickson, the plane’s commander was also badly burned and losing blood from head wounds, but Sergeant O’Connell was even more severely burned. Dickson collapsed and cows licked O’Connell’s wounds.

BURN TREATMENT

The treatment of the aircrew’s burns had been recently updated. On November 6th, 1940, after their experience...
of treating RAF pilots in the Battle of Britain, Archibald McIndoe and Sir Harold Gillies had spoken to the Royal Society of Medicine. The aim of “the treatment of burns was to save life and preserve function”. Coagulation, especially by tannic acid, had been carried too far. There must be no coagulation of third degree burns. The raw surface of a third degree burn must be covered by a skin graft. McIndoe continued “he was getting good results by treatment with saline baths at 105°F. The patient could be totally immersed and usually found after the first bath that pain was relieved.” Sir Harold Gillies “thought that saline treatment was improved by the Bunyan bag. An accompanying Lancet editorial fully endorsed the views of Archibald McIndoe and Sir Harold Gillies and added that a Bunyan bag was an oiled-silk envelope which could encase the limb. Five months after the RSM concordat, Max Rosenheim and Roe Valley Hospital Matron Mabel Huddleston and their team so treated Des O’Connell and John Dickson. The local priest said he found it almost impossible to find annointable flesh on Des O’Connell except at the midriff (Fig. 2) (Fig.3).

LIMAVADY HOSPITAL

By 7:00 AM on 27th April 1941 the crew of Whitley Z6501 were all admitted to Roe Valley Hospital, Limavady. Max Rosenheim, later Lord Rosenheim, PRCP, gave instructions for immediate intravenous resuscitation, 24 hour saline baths at 102-105°F for Des O’Connell, and Fred Redhead. John Dickson’s blood loss was corrected and his limb burns placed in Bunyan bags containing tepid 2% saline. Rosenheim, recalled from the Massachusetts General Hospital to supervise Northern Ireland military medicine, had previously formed the highest opinion of Matron Mabel Huddleston and staff. Huddleston summoned Benjamin Rycroft from Musgrave Park to assess the burned eyelids. Rycroft organized the transfer several days later of O’Connell to Princess Mary’s RAF Hospital, Halton, Buckinghamshire, where Bunyan had developed the bags. O’Connell’s family, his parents and a priest brother were unable to fit into the RAF evacuation plane, an Oxford, and were left behind. The transfer flight of Des O’Connell was eventful. The Luftwaffe were bombing Liverpool so the RAF provided an escort of three fighters. Having delivered O’Connell safely, the RAF fighters performed victory rolls before returning to their Northern Ireland base. Senior RAF staff were not amused. Archibald McIndoe operated on Des O’Connell both at Halton and later from Ward III at East Grinstead, where O’Connell was elected an early member of the Guinea Pig Club.

![Fig 3. Sir Harold Delf Gillies (1882-1960), oil on canvas, by Howard Barron, painted 1962, 52 x 42 cm, courtesy of Hunterian Museum at the Royal College of Surgeons of England and reproduced with their permission solely for this Medical History.](image)

Table 1.
Burn Injuries to RAF Home Force, 1939-1945

| BURN SITE | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | TOTAL |
|-----------|------|------|------|------|------|------|------|-------|
| Head      | 2    | 3    | 3    | 3    | 3    | 3    | 1    | 10    |
| Face/Neck| 2    | 77   | 123  | 130  | 113  | 285  | 179  | 825   |
| Eye Area  | 4    | 14   | 36   | 55   | 23   | 20   | 50   | 222   |
| Ear       | 1    | 2    | 3    | 6    | 20   | 1    | 11   | 5     |
| Neck      | 1    | 2    | 3    | 12   | 2    | 9    | 29   | 34    |
| Chest     | -    | 2    | 2    | 10   | 5    | -    | 24   | 32    |
| Back      | -    | 2    | 2    | 10   | 5    | -    | 24   | 32    |
| Abdomen   | -    | 2    | 6    | 2    | 3    | -    | 23   | 33    |
| Pelvic area | -  | 2    | 4    | 5    | 8    | 19   | 38   |       |
| Arm/Hand/Forearm | 6 | 97   | 167  | 204  | 263  | 478  | 238  | 1,425 |
| Arm/Hand/Forearm | 1 | 23   | 69   | 82   | 36   | 178  | 83   | 519   |
| Leg/Ankle | 12   | 91   | 160  | 105  | 181  | 292  | 159  | 1,090 |
| Leg Rest of Body | 3 | 49   | 67   | 94   | 83   | 275  | 80   | 651   |
| Totals    | 38   | 567  | 654  | 799  | 777  | 1,517| 779  | 4,922 |

Des O’Connell was not the first RAF 502 Ulster Squadron crewman to become a McIndoe guinea pig. Thomas Percy Gleave (1903-1993), C.B.E., U.S. Legion of Merit, joined the RAF in 1930 and served in 502 with Coastal Command. Transferred to Bomber Command, then Fighter Command, he was shot down over Biggin Hill on 31 August 1940. Badly burned, he was operated on seven times by McIndoe and twice by Percy Jayes, later Head of Plastic Surgery at Barts. Gleave returned within a year to command RAF Manston in Kent, and ended World War II as Chief of Air Plans at SHAEF under Eisenhower. Gleave remained the one and only “Chief Guinea Pig”.

Varaztad H. Kazanjian emigrated from Turkish Armenia to Worcester, Massachusetts in 1895 at the age of sixteen. He found work in a wire mill. His dexterity with steel wire and Armenian Jesuit training gained him a scholarship to Harvard Dental School and a job at the Peter Bent Brigham Hospital. Harvey Cushing, in 1915, took Kazanjian to France with the Harvard Surgical Unit, where Kazanjian worked at Dannes-Camiers from 1915-1919. Kazanjian was superb at...
Maxillofacial Orthopaedics, which he successfully performed on over 3,000 Allied wounded during World War I; those requiring major plastic surgery were sent to Gillies and Ivor Magill at Sidcup. Gillies tried to recruit Kazanjian to Sidcup, much to the annoyance of President A. Lawrence Lowell of Harvard who granted Kazanjian a Harvard MD in 1922.

On 16 August 1919, A. Lawrence Lowell had written to Kazanjian: “I was very much grieved to hear of your wife’s death. I hope the child will grow to be a consolation to you, as you abundantly deserve.” She did, and the second Mrs. Kazanjian and their children did likewise. This maternal death was caused by peritonitis after a caesarean section (Fig. 4).

After World War I, Kazanjian and Gillies continued to exchange letters chiefly about techniques of nerve regeneration. Kazanjian visited “Giles”, as Gillies was affectionately known, in London and “Giles” was royally entertained by the Harvey Cushings in Boston. Sir Harold Gillies wrote in 1957 to Professor Kazanjian, “So I thank you dear friend for all that has happened since the day that you arrived in Wimereaux in 1915. My wife for 46 years died…this Spring. I had a very tough time, and now comes into my life in a different way my own special friend who has looked after me surgically for over 20 years, and she has decided to hitch me on to her bandwagon. We get married on November 5th. All the best to you.” Signed Giles.

The new Lady Gillies, Marjorie Clayton, was always most popular with everyone at Barts. It was not until 1939 and the onset of World War II that the establishment of Emergency Medical Services (EMS) burn and plastic surgical units at East Grinstead, Hill End in St. Albans, Roehampton and Rooksdown House, Basingstoke that plastic surgeons were trained in significant numbers in the UK; sixty had been trained in the U.S. following Gillies’ 1920 visit.

WORLD WAR II AND AFTER

During World War II, Kazanjian became Harvard’s first Professor of Plastic Surgery. On my’ arrival at the Massachusetts General Hospital, I learned from him that his friend ‘Giles’ had told him of my father’s rescue of the burned from the sinking of the RMS Lancastria on 17 June 1940.

Over 1400 tons of fuel oil had leaked into the sea which was partially set ablaze. The burned survivors had been sent to Gillies at Rooksdown House, formerly the private wing of the Park Prevett Hospital, Basingstoke, Hampshire.

During 1955-1960, the last years of their lives, Giles (Gillies) and Archie (McIndoe) gave advice to the Pink Firm of surgeons at Barts. Gillies had been awarded four Barts beds in 1936. In 1958 and 1959, I was Pink Firm House Surgeon and later Chief Resident at Barts. Giles gave advice on fistulae management and Archie on abdominal surgery for tropical disease.

My boss, Sir Clifford Naunton Morgan was Archie’s sole trustee. Giles, Archie and Cliff were wonderful mentors. Patients, doctors, nurses and orderlies, were awed and generally complied with their advice.

Sergeant Des O’Connell was promoted to Flight Lieutenant

* This and other first-person references refer to the first author.
Severe Burns in World War II

and post-war had a successful career in Air Traffic Control at Heathrow, and in 2015 remained the oldest guinea pig\textsuperscript{3,46} (Fig.5).

![Fig. 5. Des O’Connell is at the extreme right as the Princess Royal in October 2013 opens four new operating rooms at Queen Victoria Hospital, East Grinstead. Bob Marchant, secretary of the Ulster Medical Society, grants to all users on the basis of a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Licence the right to alter or build upon the work non-commercially, as long as the author is credited and the new creation is licensed under identical terms.](image)

When I first was introduced to Professor Kazanjian in 1960, he greeted me warmly. For the next 14 years he was the noblest and most erudite influence for good at Harvard Medical School. Joe Murray, 1990 Nobel Laureate in Medicine\textsuperscript{45} has written of Dr. Kazanjian “He was one of the kindest persons I have ever known.” Always available even after he gave up [in 1964] his “private practice” for even greater good to humanity\textsuperscript{46}.

ACKNOWLEDGEMENTS

The authors thank Mr. Liam O’Reilly of the Public Records Office of Northern Ireland (PRONI) for expert assistance with the Archives of the Royal Air Force Medical Services. Medical School. Joe Murray, 1990 Nobel Laureate in Medicine\textsuperscript{45} has written of Dr. Kazanjian “He was one of the kindest persons I have ever known.” Always available even after he gave up [in 1964] his “private practice” for even greater good to humanity\textsuperscript{46}.

The authors thank Mr. Liam O’Reilly of the Public Records Office of Northern Ireland (PRONI) for expert assistance with the Archives of the Royal Air Force Medical Services. Medical School. Joe Murray, 1990 Nobel Laureate in Medicine\textsuperscript{45} has written of Dr. Kazanjian “He was one of the kindest persons I have ever known.” Always available even after he gave up [in 1964] his “private practice” for even greater good to humanity\textsuperscript{46}.

ACKNOWLEDGEMENTS

The authors thank Mr. Liam O’Reilly of the Public Records Office of Northern Ireland (PRONI) for expert assistance with the Archives of the Royal Air Force Medical Services. Medical School. Joe Murray, 1990 Nobel Laureate in Medicine\textsuperscript{45} has written of Dr. Kazanjian “He was one of the kindest persons I have ever known.” Always available even after he gave up [in 1964] his “private practice” for even greater good to humanity\textsuperscript{46}.

ACKNOWLEDGEMENTS

The authors thank Mr. Liam O’Reilly of the Public Records Office of Northern Ireland (PRONI) for expert assistance with the Archives of the Royal Air Force Medical Services. Medical School. Joe Murray, 1990 Nobel Laureate in Medicine\textsuperscript{45} has written of Dr. Kazanjian “He was one of the kindest persons I have ever known.” Always available even after he gave up [in 1964] his “private practice” for even greater good to humanity\textsuperscript{46}.

ACKNOWLEDGEMENTS

The authors thank Mr. Liam O’Reilly of the Public Records Office of Northern Ireland (PRONI) for expert assistance with the Archives of the Royal Air Force Medical Services. Medical School. Joe Murray, 1990 Nobel Laureate in Medicine\textsuperscript{45} has written of Dr. Kazanjian “He was one of the kindest persons I have ever known.” Always available even after he gave up [in 1964] his “private practice” for even greater good to humanity\textsuperscript{46}.

REFERENCES

1. Currie IS. The White Crows. London: Minerva Press; 1996. p.41.
2. Air Ministry and successors. Operations Record Books. Squadrons. No. 502 Squadron. Summary of Events. The National Archives, Kew, Richmond, UK. File AIR 27/1958/7, entry for 27 April 1941. http://discovery.nationalarchives.gov.uk/results/?, q=AIR+27%2F1958
3. Quinn J. Wings over the Foyle. A history of Limavady Airfield in World War II. Belfast: Shammy Press, World War II Irish Wreckology Group; 1995. p.116.
4. Waller G. Five years in Coastal Command. In: Fopp M, ed. High Flyers. 30 Reminiscences to Celebrate the 75th Anniversary of the Royal Air Force. London: Greenhill Books in Association with the Royal Air Force Museum; 1993. p.217-23.
5. Quinn J, Reilly A. Covering the Approaches. The War against the U-Boats. Coleraine: World War II Wreckology Group; 1996. p.97-101.
6. Overy R. The Battle of Britain. The myth and the reality. New York: W.W. Norton; 2001.
7. Hedley-Whitie J. Burgess GE, Feeley TW, Miller MG. Applied Physiology of Respiratory Care. Chapter 16. Burns and respiratory function. Boston: Little, Brown and Company; 1976. p.205-16.
8. Royal Society of Medicine. Sections of surgery and of therapeutics and pharmacology. Treatment of burns. Lancet. 1940; 236(6116):621-2.
9. Burns of the Hands and Face. Lancet. Nov. 23, 1940; 236(6117):655.
10. Hedley-Whitie J, Milamed DR. Lobular pneumonia treated by Musgrave Park physicians. Ulster Med J. 2009; 78(2):119-28.
11. Hedley-Whitie J, Milamed DR. The battle of the Atlantic and American Preparations for World War II in Northern Ireland, 1940-1941 (before Pearl Harbor). Ulster Med J. 2015;84(2):113-6.
12. Roe Valley District Hospital. Semiannual Report for Half-Year Ending Last Day of March 1941; Semiannual Report for September 30, 1941.
13. Public Records Office of Northern Ireland (PRONI), Belfast, UK. Files HOS 17/3/3/14, HOS 17/3/3/15, HOS 17/3/3/16, HOS 17/3/3/17.
14. Hedley-Whitie J, Milamed DR. Aspects of vitamin A. Ulster Med J. 2009; 78(3):171-8.
15. Mackie M. Wards in the Sky: The RAF’s remarkable nursing service. Chapter 5. The new RAF Hospital, Halton. Stroud, Gloucestershire: History Press; 2014. p.52-65.
16. Mayhew ER. The Reconstruction of Warriors, Archibald McIndoe, The Royal Air Force and the Guinea Pig Club. London: Greenhill Books; 2004.
17. HRH The Prince Philip, Duke of Edinburgh. Foreword. In: Mayhew ER. The Reconstruction of Warriors, Archibald McIndoe, The Royal Air Force and the Guinea Pig Club. London: Greenhill Books; 2004. p.9.
18. Meikle MC. Reconstructing Faces. The art and wartime surgery of Gillies, Pickervill, McIndoe and Mowlem. Otage, NZ: Otago University Press; 2013. p.116, 118,119,126,174, 175, 203.
19. Bishop E, McIndoe’s Army. The story of the Guinea Pig Club and its indomitable members. London: Grub Street; 2001.
20. Rxford Welch SC. The Royal Air Force Medical Services. Medical Statistics. In: Mellor WF, ed. Casualties and Medical Statistics. London: HMSO; 1972. p.457-633. Table 3b, RAF Nosological Table for Home Force, Period of Second World War, September 3, 1939 to August 15, 1945.
21. Deranian HM. Miracle Man of the Western Front. Dr. Varaztad H. Kazanjian, Pioneer Plastic Surgeon. Worcester, MA: Chandler House Press; 2007.
22. Magill IW. Modern surgical anaesthesia. The Robert Campbell Oration delivered in the Whirla Medical Institute, 23rd March 1939. Ulster Med J. 1939;48(3):149-62.
23. Letter: A. Lawrence Lowell to V.H. Kazanjian, 16 August 1919. Kazanjian, Varaztad Hovhannes Papers, 1900—1979, 1984. HMS c51. National Archives of Respiratory Care. Applied Physiology of Respiratory Care. Chapter 16. Burns and respiratory function. Boston: Little, Brown and Company; 1976. p.205-16.
24. Letter: V.H. Kazanjian to H.D. Gillies, 13 January 1922. Kazanjian, Varaztad Hovhannes Papers, 1900—1979, 1984. HMS c51. National Archives of Respiratory Care. Applied Physiology of Respiratory Care. Chapter 16. Burns and respiratory function. Boston: Little, Brown and Company; 1976. p.205-16.
Archives of Plastic Surgery, Center for the History of Medicine in the Francis A. Countway Library of Medicine, Harvard Medical School, Boston, MA. Folder C-171.

25. Letter: H.D. Gillies to V.H. Kazanjian, 8 February 1922. Kazanjian, Varaztad Hovhannes Papers, 1900—1979, 1984. HMS c51. National Archives of Plastic Surgery, Center for the History of Medicine in the Francis A. Countway Library of Medicine, Harvard Medical School, Boston, MA. Folder C-171.

26. Hedley-Whyte J, Milamed DR. Blood and War. Ulster Med J. 2010; 79(3):125-34.

27. Letter, H.D. Gillies to V.H. Kazanjian, 3 October 1957. Kazanjian, Varaztad Hovhannes Papers, 1900—1979, 1984. HMS c51. National Archives of Plastic Surgery, Center for the History of Medicine in the Francis A. Countway Library of Medicine, Harvard Medical School, Boston, MA. Folder C-171.

28. Hedley-Whyte J. Epidemic jaundice: Harvard’s 5th General Hospital at Musgrave Park in World War II. Ulster Med J. 2005; 74(2):122-5.

29. Meikle MC. Reconstructing Faces. The art and wartime surgery of Gillies, Pickerill, McIndoe and Mowlem. Otago, NZ: University of Otago Press; 2013. p.175-6.

30. Gillies HD. Discussion on injuries and inflammatory diseases affecting the orbit and accessory sinuses (combined meeting). Proc R Soc Med 1919; 12(Sect Ophthalmol):xliv-xlv.

31. Gillies HD, Hett GS. Demonstration on cases, casts and models illustrating Rhinoplasty. Proc R Soc Med. 1919;12(Laryngol Sect):257.

32. Gillies HD, Fry WK. A new principle in the surgical treatment of “congenital cleft palate” and its mechanical counterpart. Brit Med J. 1921 Mar 5;1(3140):335-8.

33. Gillies HD. Depressed fracture of nasal and associated bones. Proc R Soc Med 1923;16(Laryngol Sect):4-5.

34. Gillies HD. The design of direct pedicle flaps. Brit Med J.1932;2(3752):1008.

35. Gillies H, McIndoe AH. The late surgical complications of fracture of the mandible. Brit Med J. 1933; 2(3805): 1060-3.

36. Gillies H. Experiences with fascia lata grafts in the operative treatment of facial paralysis: (Section of Otology and Section of Otolaryngology). Proc R Soc Med. 1934; 27(10):1372-82.

37. Gillies HD, McIndoe AH. The role of plastic surgery in burns due to roentgen rays and radium. Ann Surg. 1935;101(4):979-96.

38. Sir Harold Gillies, C.B.E., F.R.C.S., Hon. F.R.A.C.S., Hon. F.A.C.S., Obituary. Brit Med J. Sept 17 1960; 2(5202): 866-7; Comments, Sept 24, 1960; 2(5203):948-50.

39. Obituary. Sir Harold Gillies. Creative pioneer of Plastic Surgery. Times (London, England) 12 Sept.1960; issue 54874:14 (The Times Digital Archive 1785-2010).

40. McIndoe AH. Intrahepatic lithiasis associated with multiple internal biliary fistulas. Surg Clin North Am. 1926;6:1233-40.

41. McIndoe AH, Counsellor VS. Primary carcinoma of the liver of possible multicentric origin occurring in a case of portal cirrhosis. Am J Pathol. 1926;2(6):557-66.

42. Counsellor VS, McIndoe AH. Dilation of the bile ducts (hydrohepatosis). In: Mellish MH, Logie HB, Eigenmann CE, editors. Collected Papers of the Mayo Clinic and the Mayo Foundation. Vol. 18, 1926. Philadelphia: W.B. Saunders; 1927. p.200-18.

43. Dean L. Guinea Pigs return to QVH to see McIndoe’s legacy continue. East Grinstead Courier. 28 October 2013.

44. Lambert T. 2015 Guinea Pigs Lifetime Award 18 April 2015. Available online from: http://www.soldieringon.org/2015-lifetime/ Last accessed November 2016.

45. The Nobel Prize in Physiology or Medicine 1990. Joseph E. Murray and E. Donnall Thomas, “for their discoveries concerning organ and cell transplantation in the treatment of human disease”. Available online from: www.nobelprize.org/nobel_prizes/medicine/laureates/1990/. Last accessed November 2016.

46. Murray JE. Foreword. In: Deranian HM. Miracle Man of the Western Front. Dr. Varaztad H. Kazanjian. Pioneer Plastic Surgeon. Worcester, MA: Chandler House Press; 2007. p.ix.