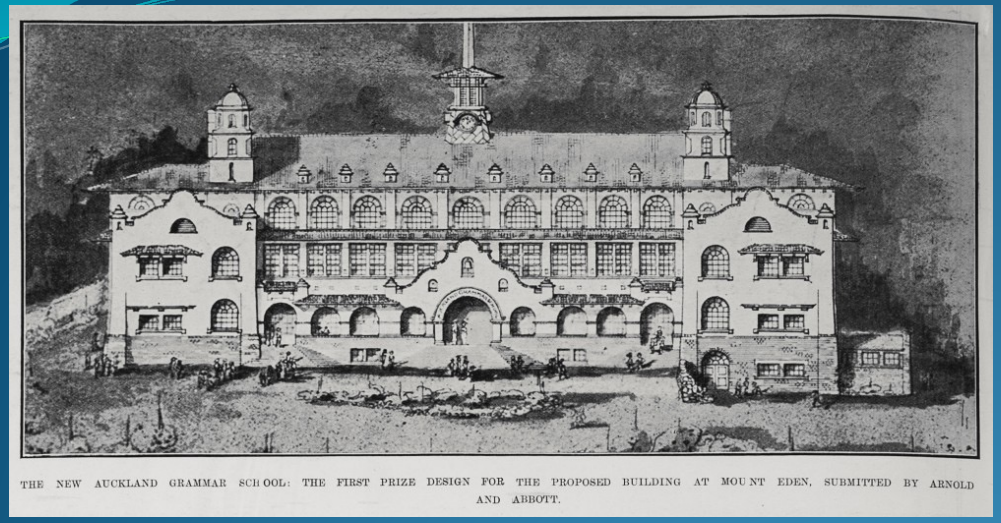
Arthur Rainsford Mowlem (1902–1986)

and the

EMS Maxillofacial Unit

Hill End Hospital, St Albans

Auckland Grammar School; 1916–1919

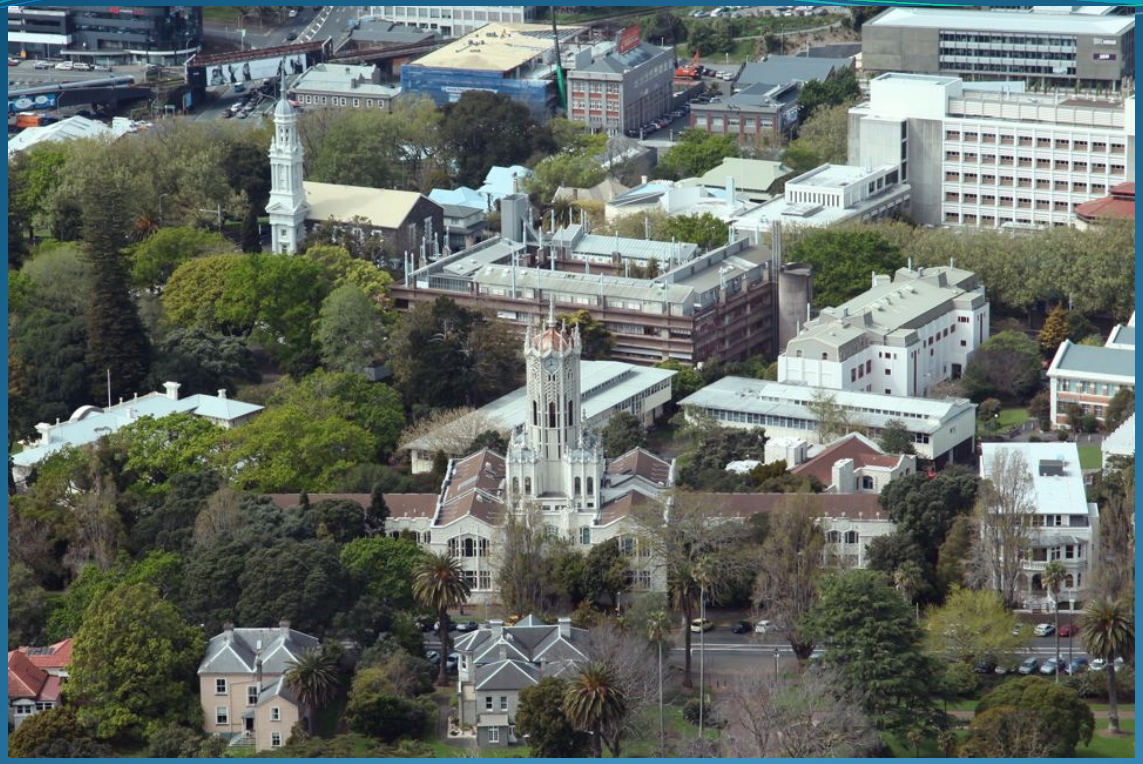


THE NEW AUCKLAND GRAMMAR SCHOOL: THE FIRST PRIZE DESIGN FOR THE PROPOSED BUILDING AT MOUNT EDEN, SUBMITTED BY ARNOLD AND ABBOTT.

- AGS, built in the Spanish Mission style favoured by the Franciscans that had impressed Arnold and Abbott during their visit to California; completed in 1916. The clocktower thankfully was never built.

- Mowlem was a pupil from 1916 to 1919 and fed an unrelieved diet of English, Latin, French, mathematics and science; he left with the Higher Leaving Certificate and the Medical Preliminary Certificate.

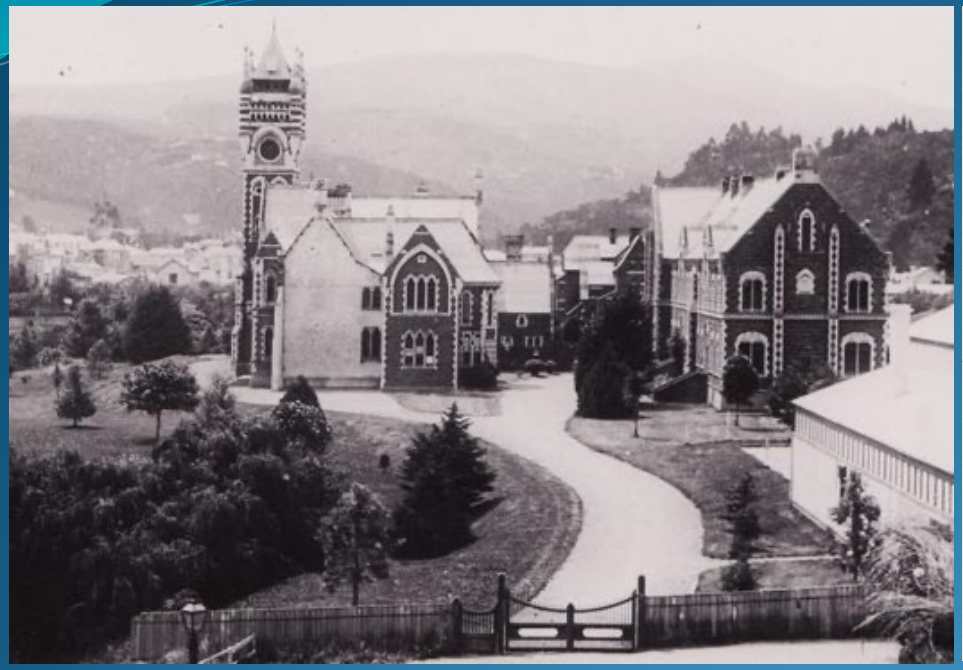
Auckland University College; 1920



- Mowlem's obituary in *The Lancet* records that he initially trained for a legal career like his father, but soon changed to medicine.

- Whatever the truth of the matter, in 1920 he enrolled as a student at Auckland University College and passed the intermediate medical examination (biology, physics, organic and inorganic chemistry) which enabled him to start the 4-year medical course in Dunedin.

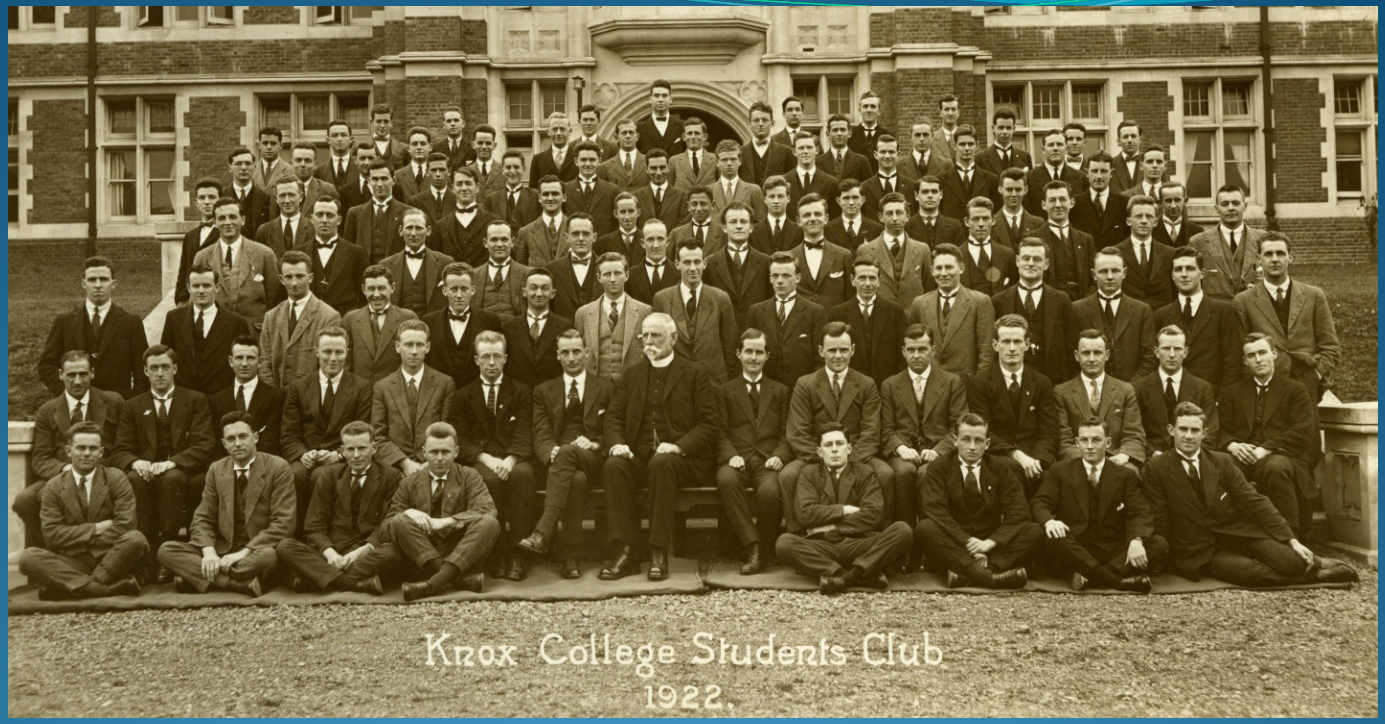
University of Otago; 1921–1924



- The building behind the Clocktower complex was occupied by the Medical School until 1917, when it was relocated to the new Scott Building in Great King Street where both McIndoe and Mowlem studied medicine.

- Built of brick in the textile factory style favoured by some academic institutions at the time, and named after James Halliday Scott, Professor of Anatomy and Physiology and Dean of the Medical School 1890–1914.

Knox College, Dunedin; 1922–1924



- Rainsford Mowlem is at the extreme left, back row. The College was established in 1909 as residential accommodation for male students and the training of ministers for the Presbyterian Church.

- Mowlem graduated MB ChB (NZ) in 1924.

- (Photograph kindly provided by Donald Cochrane, Curator of Photographs, Archives Research Centre, Knox College)

Journey to Britain; 1927

- 1925–27 were spent as a house surgeon at Auckland Hospital and in general practice. He then worked his passage to England with the intention of pursuing a surgical career; sailing from Wellington on 19 July 1927 via Cape Horn as a ship's surgeon on the *SS Mamari,* an 8113 ton steam freighter.

Richard W Griffiths (2013). Arthur Rainsford Mowlem (1902–1986), plastic surgeon. *Journal of Medical Biography* **21**, 180–192.

Mowlem encounters Gillies

Hammersmith Hospital, Du Cane Road, East Acton. Completed 1904 as a workhouse and infirmary for the Hammersmith Poor Law Guardians.

In January 1916 became the Military Orthopaedic Hospital.

In 1930 it came under the control of the LCC who renamed it the Hammersmith Hospital.

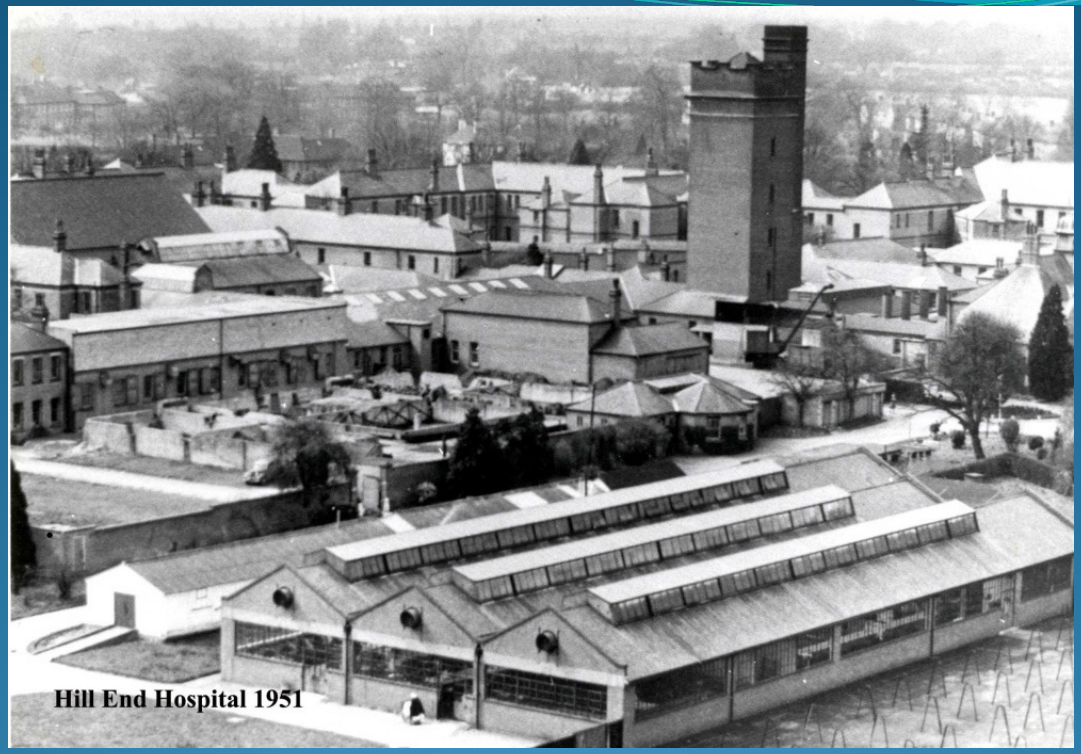
- After qualifying FRCS (Eng) in 1929, Mowlem was appointed one of five RSOs at the Hammersmith Hospital. Early in 1930 when packed up to go home to Auckland planning to train in orthopaedic surgery, he received a call to say that the Welsh medical officer in charge of the ward in which Gillies had four beds had become ill, and would he stay on as a locum?

St James' Hospital, Balham

- In 1933 when the Hammersmith became a teaching hospital for the Royal Postgraduate Medical School, Mowlem moved with Gillies to St James' in Balham; the hospital subsequently played a key role in the development of plastic surgery in the UK.

- In 1936 Mowlem became consulting surgeon to the Middlesex Hospital and became the junior partner in the partnership of Gillies, McIndoe and Mowlem.

Hill End Hospital, St Albans



- The EMS Maxillofacial Unit at Hill End was established in 1939 by Mowlem and JL Dudley Buxton, and in anticipation of the bombing of London, most of St Bartholomew's Hospital was evacuated to St Albans.

- The thinking of the day was that the bombers would always get through, and that Britain would be defenceless against air attack.

Plastic and Jaw Unit, Hill End

- Plastic and Jaw Unit 1951. Left: John Barron.
- Back row: Gordon Fordyce, Charles Dundas, Louis Rouillard (South Africa), M Derganc, Klementek (both from Yugoslavia), RLG Dawson.
- Front row: Stewart Harrison, Alex McGregor, Rainsford Mowlem, Benjamin Fickling. (Courtesy of the Antony Wallace Archive, BAPRAS)

Contributions of Hill End

The Hill End Unit made important contributions to surgical practice in several key areas:

- Trials with the sulphonamide group of drugs.
- Pin fixation to stabilize fractures and bone grafts of the mandible.
- The use of cancellous chip grafts from the iliac crest to repair osseous defects of the jaws and long bones.
- Early clinical trials of penicillin.

Sulphonamide trials

- The early months of 1940 during the “Phoney War” were spent working on methods to reduce the high failure rate of skin grafts from haemolytic streptococci.

- Building on the research of Leonard Colebrook at Queen Charlotte’s Hospital, the Hill End team showed that sulphonamides applied daily to a cleansed wound prior to grafting, followed by postoperative oral administration for 36 hours, minimized or prevented infection.

- At a meeting at the Royal Society of Medicine in February 1941, Mowlem reported that out of almost 40 patients, there had been just one failure; in the face of such evidence the technique was soon adopted at other EMS units for general use.

The problem of flying glass

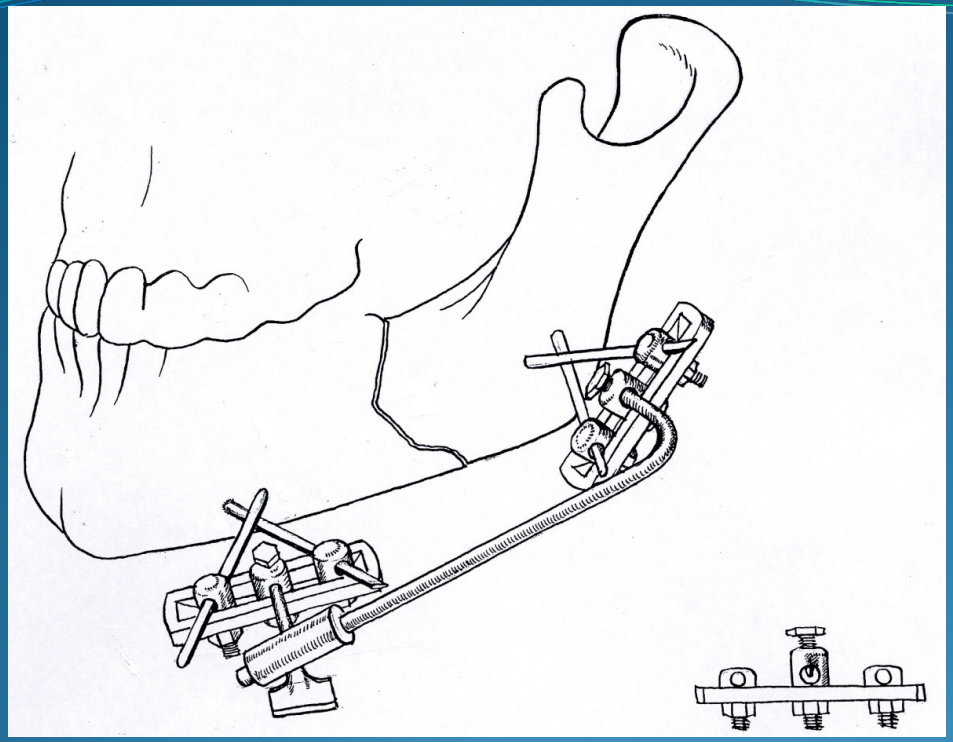
Photographs from *History of the Second World War: Surgery* (1953), Edited by Sir Zachary Cope.

Fixation of jaw fractures

- At a meeting of the BDA in 1941, the various EMS maxillofacial units described their wartime experience in fixing mandibular fractures.

- East Grinstead favoured cap splints cast in silver-copper alloy, but these were rather bulky and unhygienic and required skilled technical help with laboratory facilities. Both methods also required teeth.

External pin fixation



Drawing by Diana Orpen, Antony Wallace Archive, BAPRAS

- Hill End had developed the method of external pin fixation to immobilize fractures of the mandible. Each pair of pins was fixed to a single plate and joined by a sliding bar in a tube giving complete universality of movement.

- Pin fixation was ideally suited for immobilizing the edentulous posterior fragment and at the same time allowing for jaw movement.

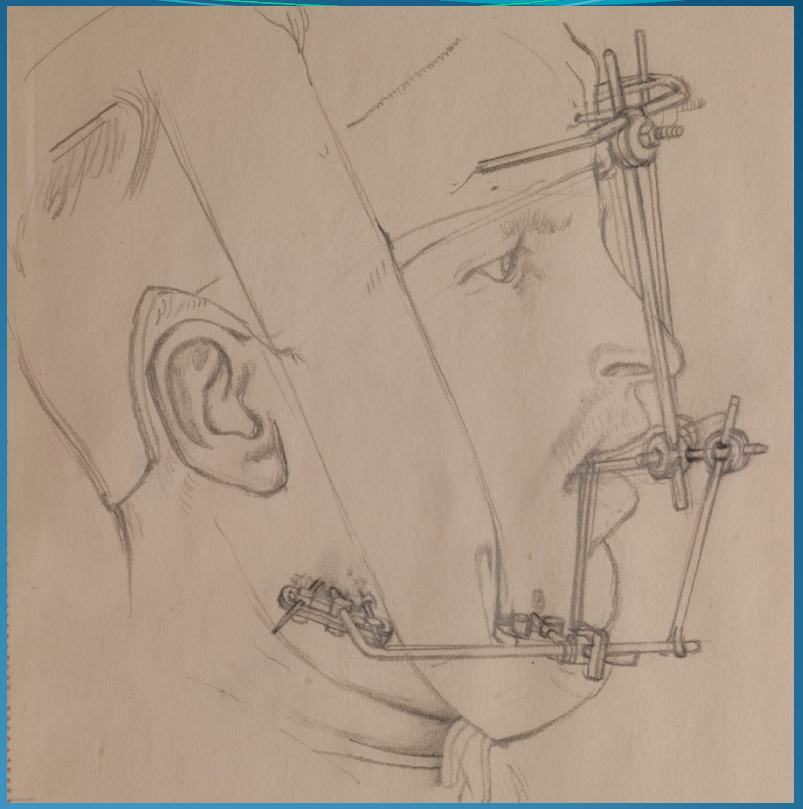
Rooksdown case

- Mandible fractured by a bomb blast in the Blitz; three fragments were pinned (anterior displacement of the condyle was ignored); pins removed after 4 weeks - plastic surgery then performed.

- Case treated by Major DO Brown (David Officer Brown), Australian Army Medical Corps and FA Walker at Rooksdown House, Basingstoke.

Photograph taken by Percy Hennell 22 days after the operation and used by Gillies to illustrate his 1941 *British Dental Journal* article. One of the few Hennell photos from Rooksdown that survives.

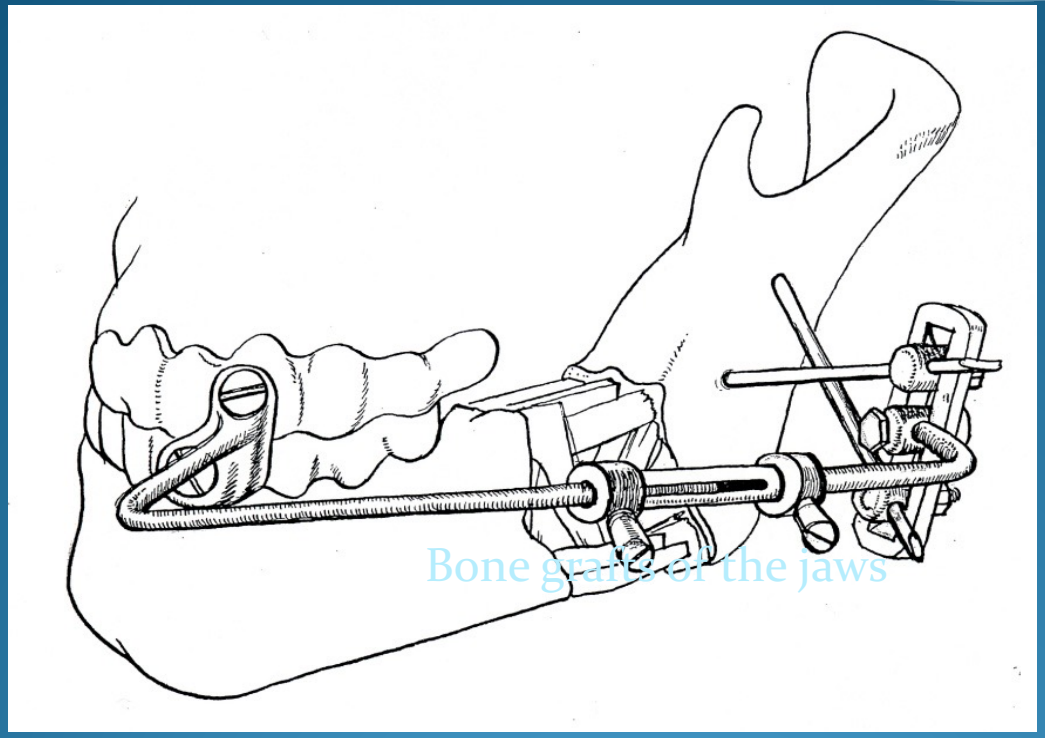
Box-frame with bars



- Box-frame with two attachment bars fixed to a plaster head cap enables the frame to support the fractured mobile maxilla as well as the external pin fixation device inserted into the mandible.

Photograph taken by Percy Hennell of the Metal Box Company; drawing by Diana Orpen, Antony Wallace Archive, BAPRAS.

Bone grafts of the jaws



Drawing by Diana Orpen, Antony Wallace Archive, BAPRAS.

- Mowlem reintroduced and developed the technique of filling bone defects with a cellular mass of bone chips from the iliac crest.

- Bone was deliberately fragmented to increase the exposed surface area. Small bone implants were rapidly vascularised, increasing vitality of the tissues, and together with the greater number of ossifying centres led to more rapid healing.

Penicillin trials at Hill End

- In 1943 when sufficient quantities of penicillin became available, the MRC Penicillin Clinical Trials Committee allocated supplies to four main centres, one of which was Hill End.

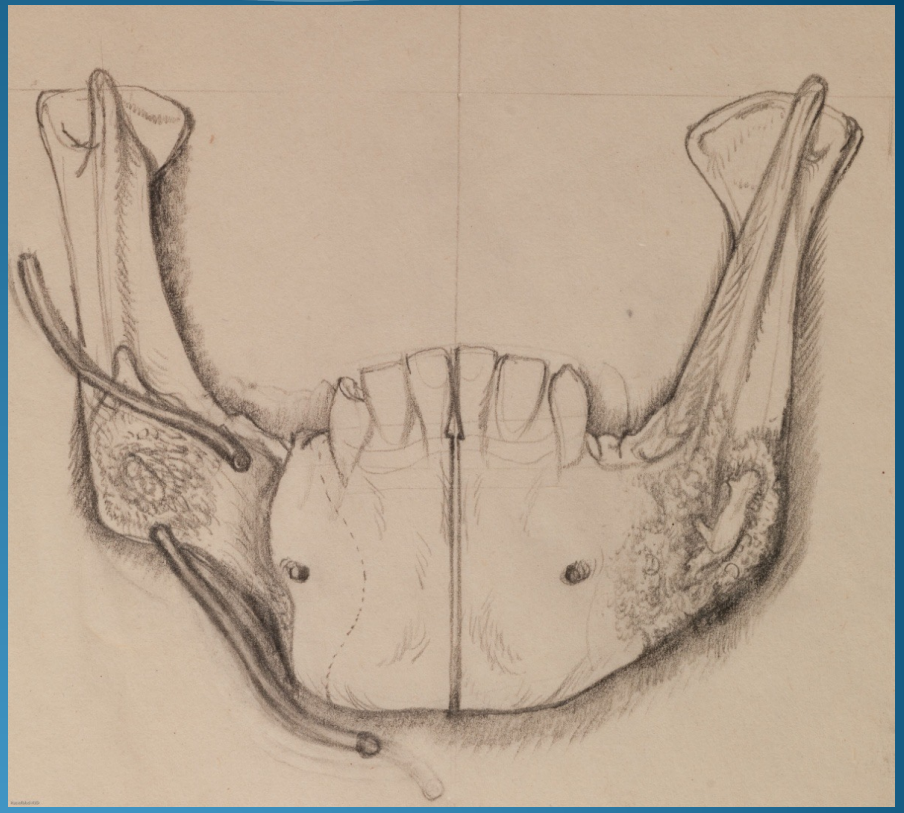
- Most of the testing of the clinical effectiveness of penicillin was carried out in the special orthopaedic, thoracic and maxillofacial units. The results were published in the *British Medical Journal* in April 1944. One hundred and ninety-eight patients had been treated by the local application of penicillin and 18 by systemic administration.

- Mowlem reported on a series of 20 cases of mandibular infection treated with a combination of surgery and penicillin; 16 were cases of osteomyelitis of the mandible, a comparatively rare disorder resulting from tooth extraction or, in children, blood-borne infection.

Osteomyelitis of the mandible

- The surgery consisted of subperiosteal excision of the lower border of the mandible together with the outer buccal plate of bone and the infected medullary area, followed by closure of the soft tissues.

- Bacteriological swabs were taken during the operation for penicillin-sensitivity testing – within 18 hours a bacteriological report was available and penicillin administered, the usual dosage being 1,000 units injected into each tube every 24 hours.



Original drawing by Diana Orpen to illustrate Mowlem's 1944 report in the *British Medical Journal*. It shows the extent of the surgery to eliminate all infected bone and the position of the tubes used to administer the penicillin.

Postscript

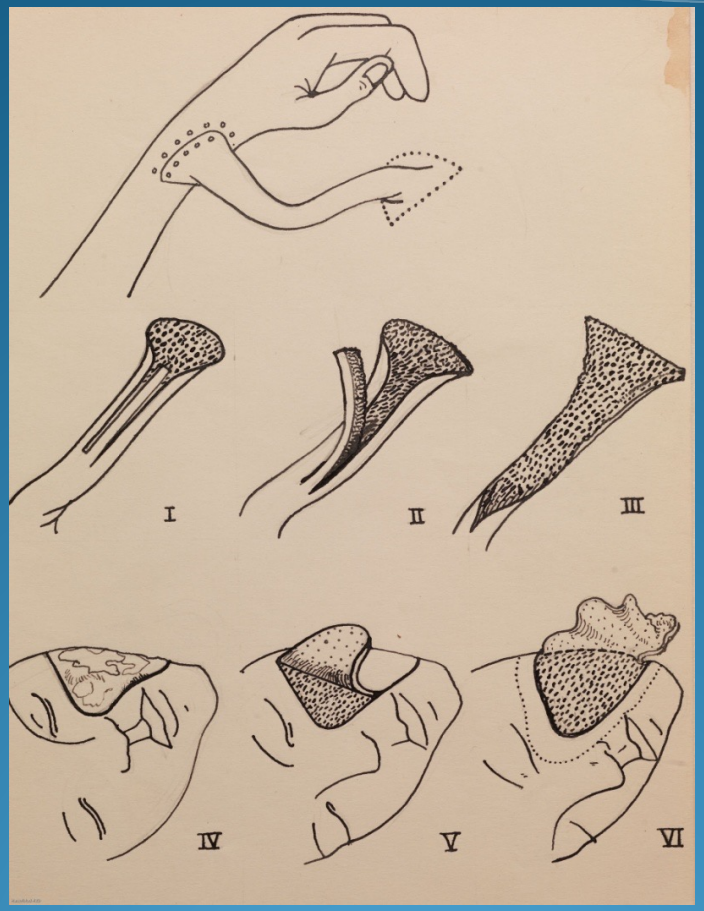
- The wartime patient notes of the Plastic and Jaw Unit at Hill End (the name was changed from Maxillofacial Unit in 1943) have been destroyed. Fortunately, two unique records of the surgery performed at the hospital still exist. The first comprises more than 2500 pencil and pen drawings by Diana 'Dickie' Orpen, faithfully recording in great detail the surgery carried out by Mowlem and the other members of his surgical team from 1942 to 1945. These can be viewed online at www.bapras.org.uk.archive news.

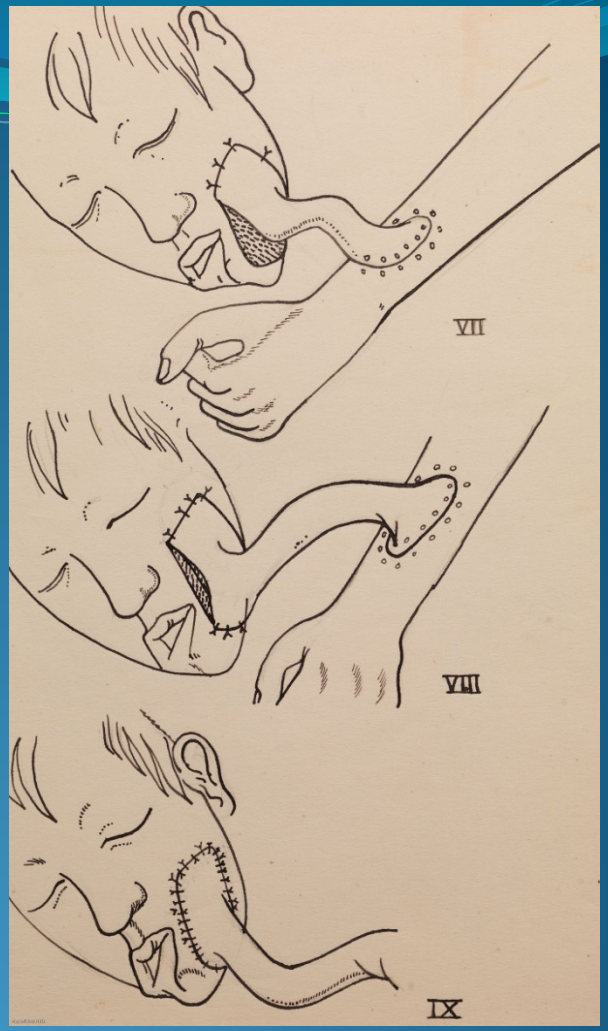
- The second consists of four 16 mm cinemagraphic instructional films *Techniques in Plastic Surgery* produced in 1945 by the J Arthur Rank Organization for the British Council showing Mowlem performing a variety of plastic operations. It is reproduced courtesy of the Antony Wallace Archive on the DVD inside the back cover of *Reconstructing Faces.*

- See last slide of Mowlem reconstructing a nose with a forehead flap.

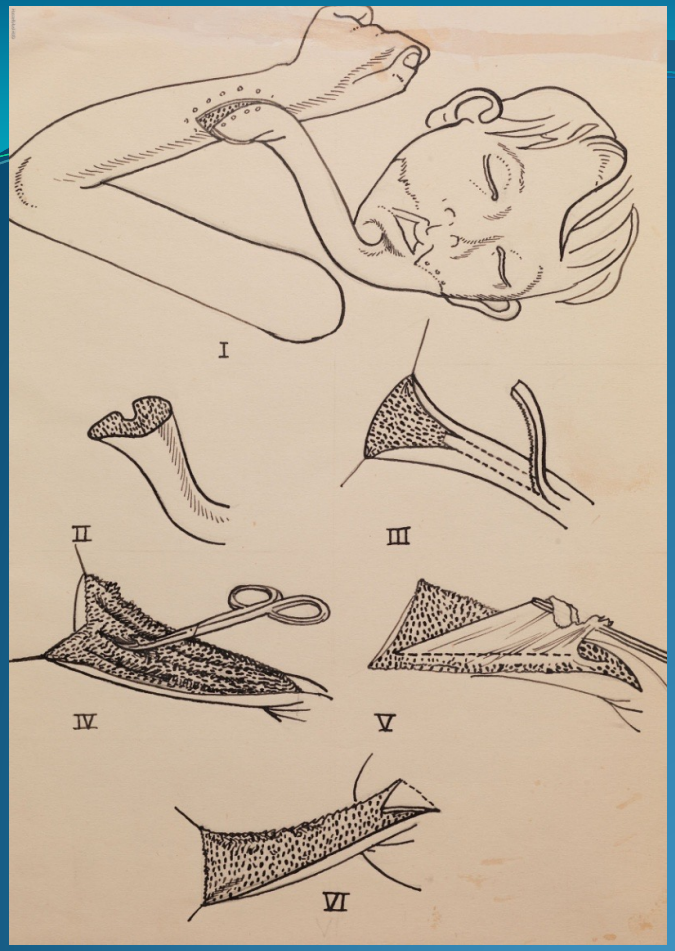
Tubed pedicle to the face

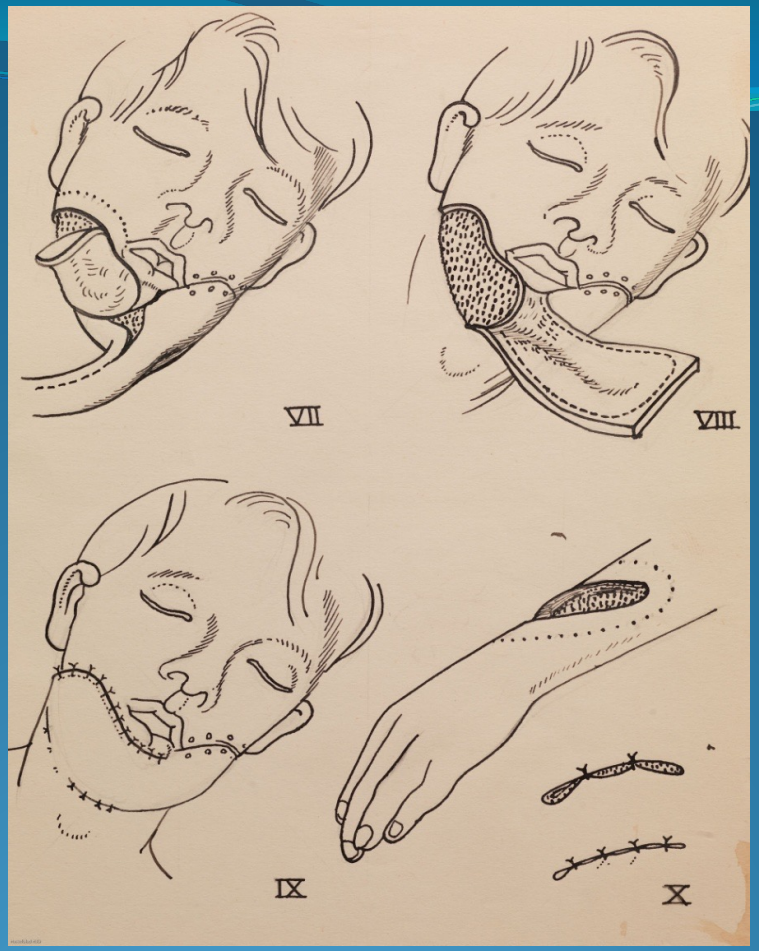
Antony Wallace Archive;
Reference number:
BAPRAS/D200; D201





- Pen drawings by Diana Orpen dated 15 June 1942, showing a full-thickness tubed pedicle graft raised from the skin of the left forearm, being transferred from the wrist to reconstruct the soft tissues of the chin.

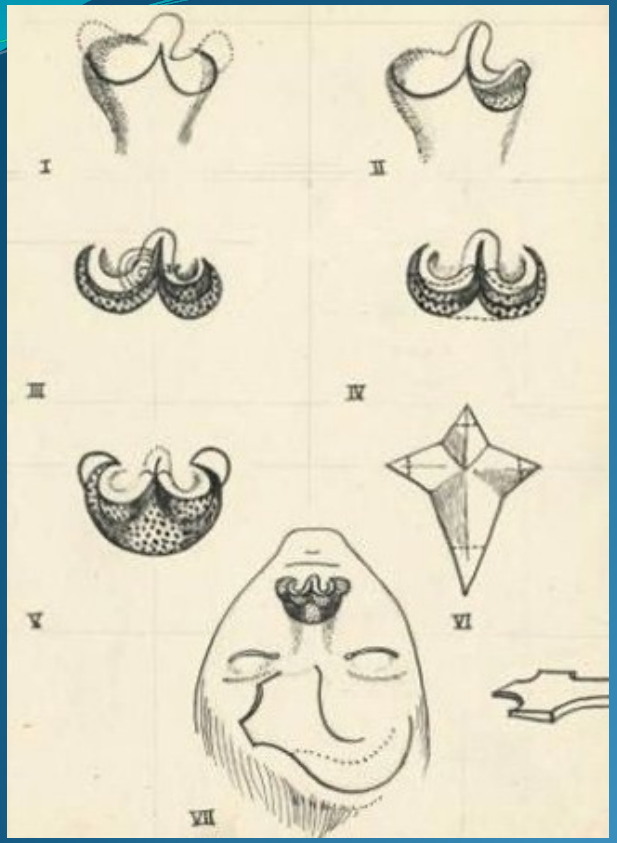


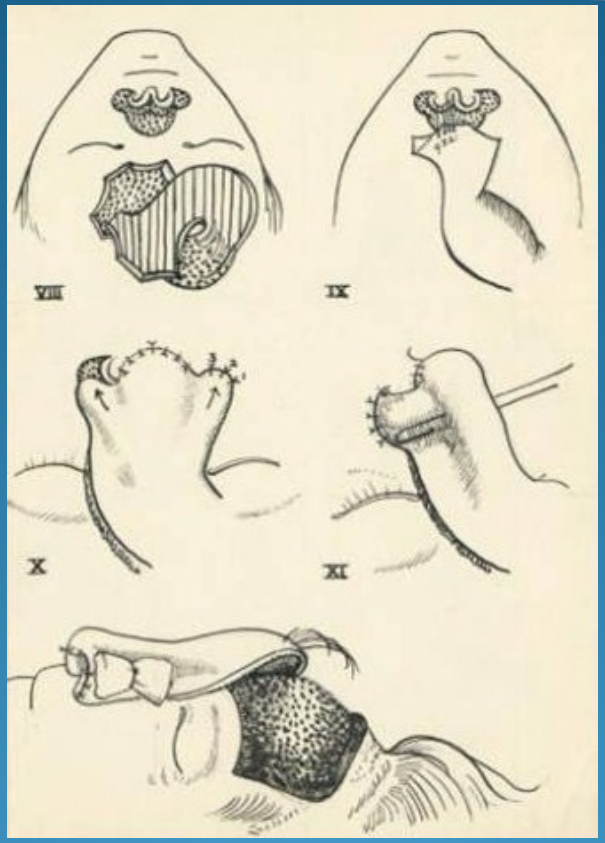


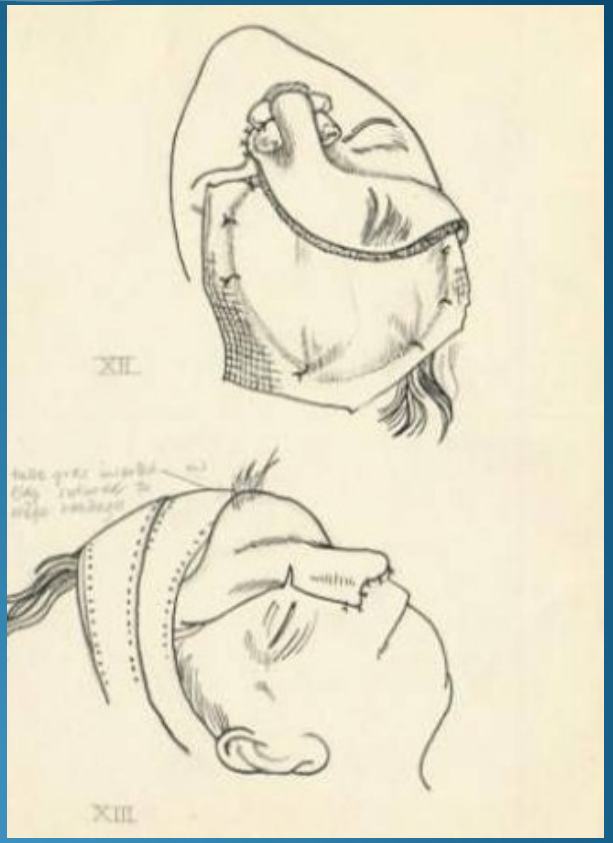
Antony Wallace Archive; Ref: BAPRAS/D202; D204)

- I-VI: 30 July 1942, six weeks later – the end of the pedicle sutured to the face has successfully taken.
- VII-X: Drawings dated 8 October 1942. The pedicle is divided and used to reconstruct the chin. Any defects in the mandible can now be made good with a bone graft.

Rhinoplasty







- I-XIII: Sequence of events involved in reconstructing the tip of the nose with a rotational forehead flap. The final slide is Mowlem performing a rotational forehead flap rhinoplasty. See video

Drawings by Diana Orpen, Antony Wallace Archive; Reference number: BAPRAS/D891–D893.