Frederick Gowland Hopkins was born in Eastbourne, Sussex and studied at the University of London and Guy’s Medical School. He published his first scientific paper, on the Bombardier Beetle, in The Entomologist at the age of 17.

Shortly after his arrival in Cambridge, Hopkins, working with Sydney Cole, isolated the amino acid tryptophan and his 1907 study with Walter Fletcher of the connection between lactic acid and muscle contraction was one of the central achievements of his work on the biochemistry of the cell.

In 1912 Hopkins showed that "accessory factors of the diet" that were not carbohydrates, proteins or fats were essential for the growth of rats. This led to the award of the Nobel Prize for Physiology or Medicine in 1929, jointly with Christian Eijkman, for the discovery of vitamins – a significant step towards greater public understanding of the importance of balanced nutrition and the control of diseases such as rickets.

Rudolf Peters, M.C., M.D., F.R.S. had published four papers in the period 1912 to 1914 as a research student in the Physiological Laboratory – most notably defining the stoichiometry by which oxygen combines with haemoglobin.

When the First World War broke out he completed his degree in medicine at St. Bartholomew’s Hospital and became the medical officer in the 6th Rifles. He served with them at Delville Wood, Vimy Ridge and Beaumont Hamel, winning a Military Cross and Bar and being mentioned in dispatches. He was recalled from the front in 1917 to work at Porton Down on chemical warfare. After the war Peters helped Hopkins to set up new quarters for the rapidly expanding group in a converted chapel in Downing Place that became known as the Balfour Laboratory. In 1923 he took the position of Whitley Professor of Biochemistry at Oxford where, during World War II, he tackled the problem of finding antidotes for poison gases such as lewisite (2-chlorovinyldichloroarsine), developing dithioglycerol (British anti-lewisite).

One of his colleagues was Victor Whittaker who was to become the Sir William Dunn Reader at Cambridge from 1966 to 1973. After the war he turned to metabolism, showing that fluoracetate is far less toxic than its metabolite fluorocitrate and coining the term "lethal synthesis". He returned to Cambridge in 1954.

Captain T.S. Hele, M.D., R.A.M.C.

"Timmy" Hele joined Hopkins in 1911. During the war he served in the Royal Army Medical Corps, notably in Macedonia working on malaria that severely afflicted the troops in that theatre as well as in Palestine, Mesopotamia and Italy.

He returned after the war and worked extensively on sulphur metabolism with Bill Pirie and Herbert Coombs. Thomas Hele was Master of Emmanuel College from 1935 to his retirement in 1951. The photograph (left) shows Hele in a mobile bacteriological unit in 1915.

Captain Harold Ackroyd, V.C., M.C., M.D., R.A.M.C. (1877 – 1917)

Harold Ackroyd was born in Southport, Lancashire and attended Shrewsbury School before gaining admission to Gonville and Caius College, Cambridge to read medicine. He graduated in 1899, proceeding to Guys Hospital, London, where he obtained his M.D. In 1908 he was awarded a British Medical Association research scholarship and moved to Cambridge to work with Hopkins. The six research papers published by Ackroyd, the last co-authored with Hopkins, are mainly concerned with purine catabolism.

When the First World War began in 1914 Ackroyd was already 37 but, despite his age and occupation, he joined up and was commissioned in the Royal Army Medical Corps attached to the 6th Battalion of the Royal Berkshire Regiment (Princess Charlotte of Wales’s, part of the 53rd Brigade, 18th (Eastern) Division.

During the Battle of the Somme in July 1916 his unit was involved in desperate fighting at Delville Wood and Ackroyd’s bravery in treating the wounded in no man’s land was such that he was recommended eleven times for the award of the Victoria Cross. He was in fact awarded the Military Cross. His quite extraordinary bravery was again in evidence in July 1917 in The Battle of Passchendaele and on the first day there were twenty-three separate recommendations of his name for the Victoria Cross. Seven days later Ackroyd, once more treating the injured whilst under fire, was killed by a sniper.

In 1898 Sir Michael Foster – a chemical physiologist in the Physiological Laboratory – invited Frederick Gowland Hopkins to come to Cambridge to develop research and teaching in the chemical side of physiology. The university was unwilling to fund this position and Hopkins’ stipend was initially provided by the Physiological Laboratory.
Hopkins was a staunch supporter of women in education and research and, most unusually at the time, employed many female scientists in his laboratories. Amongst his most famous female researchers are Muriel Wheldale, Marjory Stephenson and Dorothy Needham.

Muriel Wheldale (1880 – 1932)

Muriel Wheldale was educated at King Edward VI High School, Birmingham before taking First Class Honours in the Natural Sciences Tripos, although she was unable to receive a Cambridge degree as these were not awarded to women until 1948.

In 1903 she joined the geneticist William Bateson in the Balfour Biological Laboratory for Women, a research facility shared by the female students and staff of Newnham and Girton colleges, where she studied the inheritance of flower colour in the common snapdragon Antirrhinum majus. Her isolation and characterization of the anthocyanins of snapdragons prompted a move to the biochemistry lab of Gowland Hopkins and by 1916 she had compiled her knowledge of the genetics of pigment inheritance and the biochemistry of anthocyanins in *The Anthocyanin Pigments of Plants*. In this way she became one of the first biochemical geneticists. J.B.S. Haldane used her research to conclude that genes controlled the formation of large molecules, such as pigment molecules, and her work paved the way for the seminal studies of Edward Tatum and George Beadle.

In 1919 she married the New Zealander Huia Onslow who was also a biochemist (see below).

In 1920 Wheldale Onslow published *Practical Plant Biochemistry* and in 1925 she released a second edition of *The Anthocyanin Pigments of Plants*, revised extensively to include information on advances in the understanding of anthocyanins. In 1926 she was appointed a university lecturer in biochemistry, becoming one of the first women to hold such a position at Cambridge. The first volume of *Principles of Plant Biochemistry*, a textbook on the chemical compounds of plants and plant physiology, was published in 1931.

Hua Onslow (1890 – 1922)

Hua Onslow was the second son of the 4th Earl of Onslow. He was paralysed from the waist down following a diving accident and had his house in Selwyn Gardens, Cambridge adapted for scientific experimentation. His interest was the inheritance of pigmentation.

He was married to the plant biochemist Muriel Wheldale and was regarded as an honorary member of the department.

Joseph and Dorothy Needham shortly after their marriage in the mid 1920's


Dorothy Needham, F.R.S. (1896 – 1987)

With a prescience remarkable even by Hopkins’ standards, back in the 1920s he persuaded a young student to give up medicine to work in biochemistry.

The student was Joseph Needham and by 1931 he had published his three-volume work *Chemical Embryology*. In 1924 Needham married Dorothy Moyle who had been recruited by Hopkins in 1919 to work on muscle biochemistry and substrate-level phosphorylation. When she was elected an FRS in 1948 they became the first husband and wife to work in biochemistry. When three Chinese scientists came to work with Needham in 1933 he fell in love with one of them, Lu Gwei-djen, which event prompted him to master Classical Chinese to the extent that from 1942 to 1946 he was Director of the Sino-British Science Co-operation Office in Chongqing. Needham essentially devoted the rest of his life to revealing the history of Chinese science in all its aspects, compiled in the 27 volumes of *Science and Civilisation in China*.

Lu Gwei-djen (1904 – 1991)

Lu Gwei-djen, was the gifted daughter of an apothecary who, through the fortunate chance of being born in the city of Nanjing, had attended Gining College, the first university in China to award degrees to women. After training as a chemical pathologist she applied to Hopkins as a postgraduate student and he asked Dorothy Needham to look after her.

Within two years, she had published a highly influential set of papers on metabolism in the *Biochemical Journal*. Altogether, Lu published only eight research papers, the last in 1941. However, five further papers written jointly with Joseph Needham in the period 1963–1988 reflect the fact that she became Needham’s muse and essentially devoted the rest of her life to him and to the realization of the incredible series of 27 books that comprise *Science and Civilisation in China* to date.

A fuller account of her life is given in *‘Marjory Stephenson ScD FRS (1885-1948)’ on the history of Cambridge Biochemistry website* ([http://www.bioc.cam.ac.uk/about/history](http://www.bioc.cam.ac.uk/about/history)).

Marjory Stephenson, FRS (1885-1948)

Marjory Stephenson was born in Burwell, just outside Cambridge. As a student at Newnham College, Cambridge before the war she had been inspired by Frederick Gowland Hopkins. Between 1916 and 1918 she worked in Salonika with the British Red Cross Society and was mentioned in dispatches and awarded an MBE.

In 1919 she joined Hopkins’ department and over the next 30 years she pioneered the study of bacterial metabolism. She was awarded the degree of Doctor of Science by the University of Cambridge in 1936. The MRC Microbiological Unit was established under her leadership and, when the Chair of Chemical Microbiology was created in 1960, Ernest Gale, whom she had recruited in 1936 after his graduation from the Part II biochemistry class, became its first incumbent and remained in that position until his retirement in 1981.

In 1945 Stephenson became, with Kathleen Lonsdale, one of the first two women to be elected to the Fellowship of the Royal Society.

Sir William Dunn (1833 – 1912)

Sir William Dunn was a banker, merchant and philanthropist. Born in Paisley, he made his fortune in South Africa and, having no natural heirs, placed much of his inheritance in the hands of trustees, in part “to alleviate human suffering, to encourage education and promote emigration”. The Chairman of the Dunn Trustees was Sir Jeremiah Colman, developer of the family mustard business. Together with Sir William Hardy, secretary of The Royal Society, and Sir Walter Fletcher of the Medical Research Committee, the decision was taken to promote research in biochemistry and pathology.

A fuller account of his life is given in ‘Sir William Dunn 1833-1912’ on the history of Cambridge Biochemistry website ([http://www.bioc.cam.ac.uk/about/history](http://www.bioc.cam.ac.uk/about/history)).

The Hopkins Laboratory, 1916.

In 1920 funds were allocated to the University of Cambridge for the purpose of establishing a School of Biochemistry, providing for both a Chair of Biochemistry and a building to house the new Department. In 1922 the Dunn Trustees endowed the Sir William Dunn Readership, a position first held by the legendary J.B.S. Haldane and the new Dunn Institute was opened in 1924 by Lord Balfour.


Haldane’s father and various others of his family were physiologists but he read Mathematics and Greats at Oxford. As a student he mastered Greek, Latin, French and German, he fought with manic bravery in the First World War and became a popular science writer and broadcaster (in 1923 he pointed out that we would run out of coal as a source of power and should build a network of hydrogen-generating windmills). He joined the Communist Party in 1940 and was on the editorial board of the Daily Worker before leaving in 1950 in protest over Lysenkoism.

No less a figure than Sir Peter Medawar described him as ‘the cleverest man I ever met’ and he made contributions to the study of enzymes and the field of genetics that are influential to this day.

Self-experimentation was something of a hobby and this photo (left) shows J.B.S. locked in a spasm after having injected himself with tetanus to “see what would happen”.

Sir William Dunn Institute, Tennis Court Road, opened in 1924.

The photograph below shows the building on the Downing site before the Wellcome wing was added in the 1960’s.

The original Institute building is now called the Hopkins Building.

Hopkins’ awareness of the political scene, especially in Germany, together with the fact that he had read the original German paper in which Hans Krebs and Kurt Henseleit revealed the urea cycle (and described it to the Royal Society in December 1932) led him to offer Krebs a position in the department in April 1933, just three months after the election of January 1933 that brought Hitler to power. Krebs was placed on “leave of absence” later that month (he was, of course, Jewish). His position was “terminated” in June but, thanks to Hopkins, he was able to leave Germany immediately for Cambridge and he became a University Demonstrator the following year. Perceiving that Krebs was not a lone figure, Hopkins together with J.B.S. Haldane, Ernest Rutherford, Lord Rayleigh, William Bragg and A.V. Hill, set up the Academic Assistance Council as a charitable organization to help persecuted academics which was to provide a conduit for many to come to Britain in the years leading up to 1939.

In addition to Krebs the extraordinarily gifted scientists who fled Europe for Cambridge under Hopkins’ auspices included Rudolf Lemberg (porphyrins), Ernst Chain (penicillin), Hans Weil-Malherbe (metabolism), Stefan Bach (amino acids/cancer) and Hermann Lehmann (abnormal haemoglobins). The reception they received is perhaps best conveyed by the words of Krebs himself:

“For the first time I was living in a society virtually free from prejudice and permeated by a spirit of mutual respect and kindness... In the laboratory at Cambridge there was intense mutual interest in one another’s research; ideas, difficulties and results were openly and frankly discussed. There was also much light-hearted gaiety, wit and humour.... What struck me, in particular contrast to the German scene, was the strong ‘social conscience’ of Hopkins and his school, their deep concerns for the affairs of the world at large.”

Hans Krebs,
Reminiscences and Reflections, OUP, 1981

Jeremiah Colman (1859 - 1942)


In 1927 The Dunn Nutritional Laboratory was set up as an offshoot of Biochemistry.


The remarkable Hermann Lehmann was born in Halle and came to the department as a refugee in 1936.

From 1936 to 1940 he worked mainly on carbohydrate metabolism but in May 1940 he was interned at Huyton, together with a number of other luminaries including Max Perutz.


Using his contacts FGH managed to get him released in October, whereupon Lehmann started work in the Emergency Medical Service. In 1943, with the support of Sir Charles Sherrington, he received a commission in the RAMC, was posted to India, became Assistant Director of Pathology and rose to the rank of Lieutenant Colonel. After the war he became the leading authority on abnormal haemoglobins and was University Biochemist at Addenbrooke’s from 1963 and Professor of Clinical Biochemistry from 1967.