A Victoria Cross

It is a sad irony that the first one hundred years of the Department of Biochemistry coincided pretty well with the century in which human capacity for inflicting horror and misery on ourselves reached its zenith. A remarkable feature, however, of two world wars, numerous lesser ones, monstrous dictatorships and extreme religious bigotry is a recurring theme that the most ghastly circumstances also bring forth the best qualities that characterize mankind. Those of us fortunate enough to have avoided being tested to extremes can but admire and wonder at the deeds of men and women who managed to retain their humanity when civilization was collapsing about them, and who showed a willingness to give everything for what they believed to be right. These heroic figures, who would never think of themselves in such terms, have come forth from every nationality, race and creed and from all walks of life. In Britain the two world wars in particular saw virtually every community and organization make a human contribution and the Department of Biochemistry was no exception.

Marjory Stephenson[1] was mentioned in despatches and awarded an MBE for her work in Salonika between 1916 and 1918 with the British Red Cross Society. As a student at Newnham College, Cambridge before the war, she had been inspired by Frederick Gowland Hopkins and in 1919 she joined his department, over the next 20 years pioneering the study of bacterial metabolism. Captain Peters, later Sir Rudolf Peters[2], was awarded the Military Cross and bar for his service on the Western Front as a medical officer with the King's Royal Rifle Corps and he was also mentioned in dispatches. Before the war he had published four papers as a research student in the Physiological Laboratory (then home to Hopkins' group) – most notably defining the stoichiometry by which oxygen combines with haemoglobin. After the war Peters helped Hopkins to set up new quarters for the 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). After the war, he turned to metabolism, showing that fluoroacetate is far less toxic than its metabolite fluorocitrate and coining the term "lethal synthesis". In this company we might also mention the remarkable Hermann Lehmann[3] who, born in Halle, came to the department as a refugee in 1936 and during the Second World War attained the rank of Lieutenant Colonel in the Royal Army Medical Corps whilst laying the foundations of medical genetics as Assistant Director of Pathology. In 1967 he became the first Professor of Clinical Biochemistry.

These were stirring deeds by members of the department and they represent many others who merely did what they perceived to be their duty and who, if asked, would in all probability simply have described themselves as 'a biochemist.' However, there is one extraordinary individual whose story has been somewhat neglected in the annals of the department – a regrettable omission for, in this context, he stands alone.

Harold Ackroyd

Harold Ackroyd was born in Southport, Lancashire on the 18th of July 1877. He attended Shrewsbury School before gaining admission to Gonville and Caius College, Cambridge. He graduated in 1899 and spent one year in the research group of Gowland Hopkins before continuing his medical studies at Guys Hospital, London, obtaining his BC in

1903, MB in 1904 and an M.D. in 1910. He became a houseman at Guy's in 1904/5 and therafter held positions at the Queens Hospital Birmingham and the David Lewis Northern Hospital in Liverpool in 1905-06. In 1908 he was awarded an "Ordinary Research Scholarship" by the British Medical Association and moved to Cambridge. He worked initially at the Strangeways Research Hospital where he met his future wife, Mabel Robina Smythe, who was a Matron at the hospital. They married on August 1st 1908 in All Saints Church, Southport, and they were to have three children, Ursula, Stephen and Anthony. They lived first in Great Shelford and then moved to 46, Kneesworth Street in Royston, a small town some 14 miles from Cambridge on the railway line to London.

Harold Ackroyd and his daughter Ursula on the steps of their Royston home

He renewed his research scholarship in 1910 by which time he was working in the Pharmacological Laboratory with Walter E Dixon who was a Lecturer in Pharmacology from 1909 to 1919 and then Reader in Pharmacology from 1919 until his death in 1931. Ackroyd also appears to have collaborated with the extraordinarily colourful figure of Siegfried Ruhemann who, as a member of the Chemical Laboratory discovered ninhydrin. Ackroyd's last three papers were published from the Institute for the Study of Animal Nutrition and it is in this period that he joined forces with Hopkins. Whether Hopkins had a hand in recruiting Ackroyd to work in Cambridge is not known but over the years FGH had a considerable record of attracting outstanding medics to biochemistry. Most notable of these was Joseph Needham[4], the polymath who made seminal contributions to embryology and morphogenesis in the 1930s and who, from 1942 to 1946, 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 in the 27 volumes of *Science and Civilisation in China*.

Needham joined Hopkins in the new biochemistry building on Tennis Court Road, opened in 1924, but in 1908 Ackroyd had to squeeze into the space that the Physiological Laboratory had made available to accommodate the new science of chemical biology. He must have been attracted by Hopkins' vision that there had to be a unity in the biochemical processes that sustain the living world. By 1908 Hopkins (to be knighted in 1925 and to share the 1929 Nobel Prize in Physiology or Medicine for the discovery of vitamins) had discovered the amino acid tryptophan and was laying the foundations of metabolism.

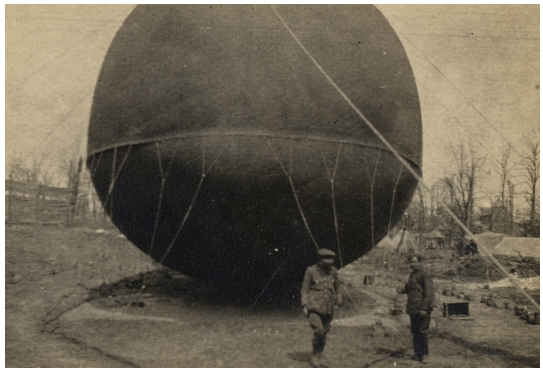
The six research papers published by Ackroyd, the last co-authored with Hopkins, are

mainly concerned with purine catabolism. It is heartening to note that two of these were last cited within the past five years, one being his paper on allantoin (a diureide of glyoxylic acid made by most mammals except humans and higher apes as a product of the oxidation of uric acid by purine catabolism). On account of its widespread use in skin creams, allantoin was the subject of a safety assessment in 2010 that invoked Ackroyd's work. The joint paper with Hopkins is referred to in a 2014 study of chronic renal failure in rats which mentioned their finding that the exclusion of arginine and histidine from the diet decreased allantoin excretion. Ackroyd and Hopkins concluded that these amino acids *'play a special part in purine metabolism.'* Histidine and arginine are now known not to be involved directly in purine synthesis but their 1916 report hinted at the notion that metabolic intermediates might be involved in more than one pathway, such cross-talk between pathways being a critical feature of homeostasis.

In a footnote to the joint paper Hopkins wrote: *Several of the experiments described in this paper were made in 1914, the rest in 1915. My colleague has long been at the front, and in writing this paper I have been unable to consult him. He has had moreover no opportunity of reviewing the experimental results as a whole. If therefore it be held that the conclusions are not warranted by the facts I am alone responsible.*

Harold Ackroyd from an oil painting by J. Hicks

The 6th Battalion of the Royal Berkshire Regiment, (Princess Charlotte of Wales's) in France



Ackroyd and barrage balloon

The Battle of the Somme

When the First World War began in 1914 Ackroyd was already 37 but, despite his age and occupation, he joined up and in early 1915 was commissioned a Temporary Lieutenant in the Royal Army Medical Corps (RAMC) attached to the 6th Battalion of the Royal Berkshire Regiment, (Princess Charlotte of Wales's), part of the 53rd Brigade, 18th (Eastern) Division. By August 1915 the Division was on the Somme front and it was fated to be heavily involved in the Battle of the Somme that began on 1st July 1916 to the extent that the Battle of Delville Wood became the graveyard of the 53rd Brigade as originally constituted. Delville Wood, launched on 15th July, was but one engagement, albeit spread over six weeks, in the Battle of the Somme, itself just one phase of the war. Some 23,000 allied casualties were incurred in securing a spit of land a few miles deep in fighting that featured every type of weaponry: stupefying artillery bombardment, machine gun, mortar and rifle fire, gas and flamethrowers and hand-to-hand fighting with bayonets and knives.

A German officer's account conveys something of the awfulness[5]:

Delville Wood had disintegrated into a shattered wasteland of shattered trees, charred and burning stumps, craters thick with mud and blood, and corpses, corpses everywhere. In places they were piled four deep. Worst of all was the lowing of the wounded. It sounded like a cattle ring at the spring fair...

By that time Ackroyd had been promoted to Temporary Captain and it was in this capacity during particularly fierce fighting for possession of the wood on 19th July that he was to perform with almost miraculous bravery. An account is given by Captain G.H.F. Nicholls in his history of the 18th Division[6]:

The fighting was so confused and the wood so hard to search that the difficulties in evacuating the wounded seemed insuperable but Ackroyd, bespectacled and stooping, was so cool and purposeful and methodical that he cleared the whole wood of wounded British and Boche as well.

Ackroyd's bravery was such that he was recommended eleven times for the award of the Victoria Cross. He was in fact awarded the Military Cross and the citation that appeared in *The London Gazette*[7] on the 20th October 1916 reads:

Temporary Captain Harold Ackroyd, M.D., Royal Army Medical Corps.

For conspicuous gallantry and devotion to duty during operations. He attended the wounded under heavy fire, and finally, when he had seen that all our wounded from behind the line had got in, he went out beyond the front line and brought in both our own and enemy wounded, although continually sniped at.

Among the wounded treated by Ackroyd were many from the 1st Infantry Brigade (South Africa) for whom Delville Wood was their initiation in battle. In remembrance of his efforts for the lads who were pitched into that maelstrom, thousands of miles from home, there is a memorial to Ackroyd in the Delville Wood room at Fort Beaumont Historical Museum in the Eastern Cape.

Ackroyd suffered some kind of injury at Delville Wood for which he was given six

weeks' leave. Although its precise nature is not clear, Nichols comments that *'his nerves gave way'* – which would not be surprising. However, by September he felt he had recovered and, as so often seems to happen with men caught up in war, he felt his life now belonged to his comrades, commenting *'I would hate the Battalion to go into action without me'* and, with the assurance of his profession, in a letter to his brother Edward on 4th September 1916 he condemned the Army Medical Board as *'a bunch of old fossils'* for delaying his return. He eventually rejoined his regiment in November 1916.

The Third Battle of Ypres

Once again the 18th Division found itself in an unfortunate position for by July 1917 it was readying itself for the Third Battle of Ypres, known as The Battle of Passchendaele, that began on the 31st. It ended in November by which time allied battle casualties had reached 300,000. For the 18th disaster struck at the outset. Following a heavy bombardment during the night of the 30th/31st July the British attack overran the enemy's front and support lines, the plan being to advance along a line between two copses, Château Wood and Glencorse Wood, separated by about a mile. The latter was to have been captured by the 30th Division but, tragically, they attacked Château Wood by mistake. Behind them came 53rd Brigade of 18th Division, moving forward into ground they believed to have been already taken. Nicholls observes that *'.. the Berks went gaily towards Glencorse Wood shouting and cheering ...'* until suddenly they were met by intense machine gun fire from positions thought to be in British hands. The day became a desperate struggle under hurricane shelling and deadly machine-gun fire to edge towards Glencorse Wood a few yards at a time by means of sharp rushes from shell-hole to shell-hole, under cover of machine gun fire. By the end of the day the 53rd Brigade's ranks had been severely depleted and, despite gaining 1000 yards of ground, they were still some 200 yards short of Glencorse Wood.

Of Ackroyd's work Captain Nicholls gives this description[6]:

And in all that hellish turmoil, there had been one quiet figure, most heroic, most wonderful of all. Doctor Ackroyd, the 6th Berks medical officer, a stooping, grey-haired, bespectacled man, rose to the supremest heights that day. He seemed to be everywhere; he tended and bandaged scores of men ... But no wounded man was treated hurriedly or unskillfully. Ackroyd worked as stoically as if he were in the quiet of an operating theatre. Complete absorption in his work was probably his secret. When it was all over and the reports came in, it was found that there were twenty-three separate recommendations of his name for the Victoria Cross. Some of the recommendations came from units of the 8th Division. Ackroyd's own battalion, the 6th Royal Berks, were accustomed to the bravery always shown by this middle-aged man of science – and they did not ask for a Victoria Cross to be awarded him.

The citation that appeared in *The London Gazette*[8] dated the 4th September 1917 for the award of the Victoria Cross reads:

T./Capt. Harold Ackroyd, M.C., M.D., late R.A.M.C. (attd. R. Berks. R.).

For most conspicuous bravery.

During recent operations Capt. Ackroyd displayed the greatest gallantry and devotion to duty. Utterly regardless of danger, he worked continuously for many hours up and down in front of the line tending the wounded and saving the lives of officers and men. In so doing he had to move across the open under heavy machine gun, rifle and

shell fire. He carried a wounded officer to a place of safety under very heavy fire. On another occasion he went some way in front of our advanced line and brought in a wounded man under continuous sniping and machine gun fire.

His heroism was the means of saving many lives, and provided a magnificent example of courage, cheerfulness, and determination to the fighting men in whose midst he was carrying out his splendid work.

This gallant officer has since been killed in action.

Ackroyd was in fact killed eleven days later on 11th August in Jargon Trench on the western edge of Glencorse Wood, the victim of a sniper. His second in command Private Albert Scriven wrote to his widow Mabel describing what happened[7]:

I was acting orderly corporal and on hearing the news I took a party of stretcher bearers but on arrival found he was dead. There were six other poor fellows in the same shell hole who met the same fate, it was a perfect death trap. He was visiting each company about 150 yds ahead of us to see if there were any wounded to attend to and was shot in the head by a sniper.

Ackroyd's headstone in Birr Cross Roads Cemetery, Zillebeke, Ieper, Belgium

46, Kneesworth Street Royston is now owned by Mr. John Cross and is home to St. James's Place plc. It is in immaculate condition and bears a blue plaque on the front wall that reads: *Capt. Harold Ackroyd Royal Army Medical Corps, lived here, awarded Victoria Cross for rescuing wounded men under fire, killed at Ypres 11 August 1917.* In the reception area there is a framed picture of Ackroyd together with the citation for his Victoria Cross.

46, Kneesworth Street, Royston as it is today and the blue plaque commemorating Ackroyd

It's wonderful that there should be remembered in this way a man whose footsteps 100 years ago took him from that house not to the train for Cambridge and a part in the fantastic scientific revolution led by Hopkins that was the birth of biochemistry but in the opposite direction into an unimaginable world of chaos and horror in which he was to so distinguish himself.

The Medals of Captain Harold Ackroyd, V.C., M.C., M.D., R.A.M.C. 1877-1917 These medals were purchased by Lord Ashcroft in 2003 and can be seen in the Imperial War Museum. The proceeds permitted the endowment of a medical scholarship and an annual memorial lecture at Gonville & Caius College

Harold Ackroyd's Publications

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7. The London Gazette Publication date: 20 October 1916, Supplement: 29793, Page: 10174. https://www.thegazette.co.uk/London/issue/29793/supplement/10174

8. The London Gazette, Publication date: 4 September 1917, Supplement: 30272, Page: 9259. This issue included a fifth supplement, No. 30272, p. 9259 dated Thursday 6th September that reported the approval of the award of the VC by King George V.

9. http://www.thewardrobe.org.uk/research/contact-us/support-us/the-collection/detail/21927

See http://www.bioc.cam.ac.uk/about/history for an on-line version of this story and other accounts of the history of Cambridge Biochemistry.

Acknowledgement

All the photographs in this article (apart from that of 46, Kneesworth Street, Royston as it is today and the plaque thereon) are reproduced by kind permission of Ned Malet de

Carteret, author of *My Family in the Great War*, Reveille Press 2014, who is the grandson of Ackroyd's daughter Ursula.

This account was written by Robin Hesketh, a member of the Department of Biochemistry, University of Cambridge, and author of the popular science book *Betrayed by Nature*.