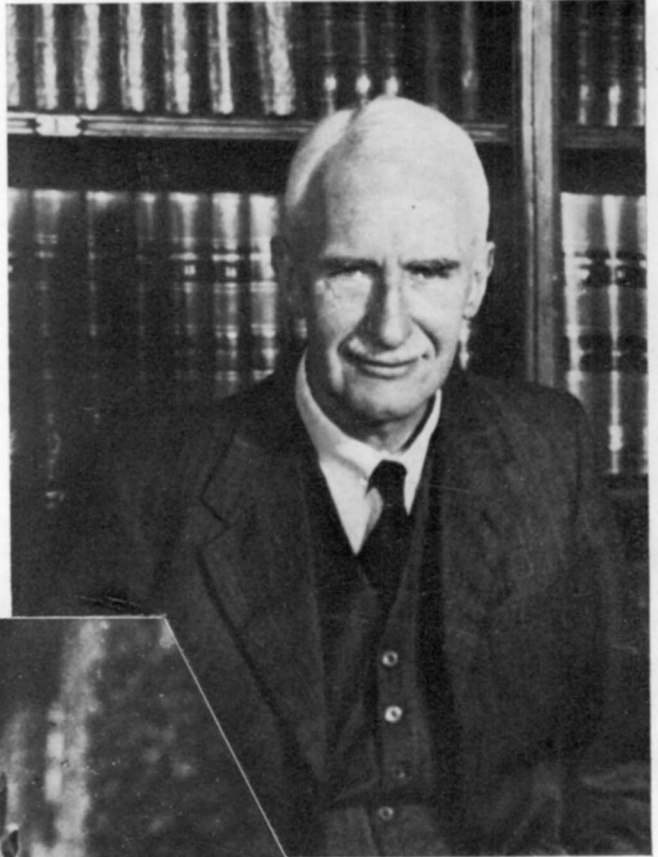


Royal Society
Library, 1946



Whale Island,
Portsmouth, 1918

A. V. Hill

(Facing p. 545)

OBITUARY

PROFESSOR A. V. HILL, C.H., Sc.D., LL.D., F.R.S., 1886–1977

Soon after Lord Salisbury had succeeded Gladstone as Prime Minister, at a time when the British Empire was still growing and the newly formed Marine Biological Association of the U.K. was building a laboratory on Citadel Hill in Plymouth, Archibald Vivian Hill was born in Bristol on 26 September 1886. He died in Cambridge on 3 June 1977 and shortly before his death, he was tempted to agree with a friend that 'we are witnessing something like the decline and fall of the Roman Empire compressed into ten years instead of four hundred'. This was uncharacteristic pessimism for, to the end of his life, he was unfailingly cheerful and always encouraging to younger people and viewed with optimism the future of the Marine Biological Association to which he had devoted so much thought and effort.

A. V. Hill showed great early ability as a mathematician, taking, from Blundell's School in Tiverton, a Major Mathematical Scholarship to Trinity College, Cambridge. There he became 3rd Wrangler in 1907 and was persuaded by W. M. Fletcher to become a physiologist and to join an outstanding group which, with Fletcher, included Joseph Barcroft, Keith Lucas, J. N. Langley and F. Gowland Hopkins. They all worked in the Physiological Laboratory where, as A. V. said later, the concentration of talent was made even higher because the floor area was so very small. Hill soon chose to study muscle as a thermodynamic machine and it was on various aspects of this that he worked for most of his life. He had outstanding skill in designing instruments and doing difficult experiments, making great advances by his analyses of the physical and chemical manifestation of the activity of excitable tissues. He was surprisingly unwilling to speculate on muscle and nerve mechanism. In an engaging passage he wrote about the second law of thermodynamics 'This law – which I do not profess to understand – has always had a peculiar attraction for me. . . . There is always – in my mind at any rate – a lurking feeling that there is something weak and immoral about this delight in evading the mechanism: it is like profiteering, like evading the law, like going up a hill the easiest way, like taking a warm bath before breakfast. Still if the attraction be there it is no good denying it, and most people will agree it is pleasant sometimes to be quite certain of the answer without knowing precisely why'.

A. V. married Margaret Keynes in 1913. She was also exceptionally gifted and, like A. V., had a generous heart which found its expression in practical ways. Realizing what tragedies old age can bring to both the young and old members of families she founded the Hill Homes for old people in Highgate. Their happy partnership lasted for almost 60 years.

In 1914 he joined the Cambridgeshire Regiment and he was put in charge of a 'strange party' in the Ministry of Munitions to investigate anti-aircraft gunnery. By 1916 he had graduated from '303' bullets to high angle, 3-inch, 20-cwt guns. His strange party at first had to work surreptitiously but they soon showed that existing gunsights were hopelessly wrong. Their crime was confessed: they asked not for forgiveness but for more

ammunition and they got quite a lot. Three years of 'hard work and good fellowship' followed and, when the first ever operational research group broke up (they travelled round the Armies in the field), they left behind, not only a classical paper in the *Philosophical Transactions of the Royal Society*, but also a text book of 1100 pages on *Anti-aircraft Gunnery*.

After the First World War, Hill returned to his main work in Physiology. He did not, however, lose his interest in the armed forces and he had a special affection for the Royal Navy gained during his work on Whale Island, Portsmouth: nor were his qualities and experience forgotten. When the Second World War threatened he was invited to join the Tizard Committee. This Committee made the vital and correct decision to support work on the radio location of attacking aircraft rather than trying to detect the heat produced by their engines. At this time A. V. was the Biological Secretary of the Royal Society and, with A. C. Egerton, the Physical Secretary, he took on the task of compiling a register of scientific persons (The Central Register of Scientific and Technical Personnel) to make sure that scientific and technical manpower was properly employed in the war that loomed ahead. Since it was evident that compiling such a register was only a first step, the Royal Society planned the machinery for using the Register. Realising the importance of having disinterested scientific advice available to the Government at a high level of policy making, Hill and Egerton, strongly supported by the President (Sir William Bragg), finally 'like an importunate widow' persuaded the Government to appoint a Scientific Advisory Committee to the War Cabinet. Hill was a member of this Committee which undertook a number of important tasks, e.g. advising the Government on the warlike development of nuclear fission. A. V. Hill's work for national security, although only a small part of his total achievement, would of course have been enough to satisfy most men's ambitions and certainly enough to satisfy society's claims on him. He was during the whole of this period a Member of Parliament for Cambridge University.

Returning to Hill's career of scientific research, this was one of great distinction worthily recognized by a Nobel Prize in 1922, a Royal Medal and the Copley Medal from the Royal Society and by many other awards. In 1920 he went to Manchester University as Professor of Physiology. He stayed there only a few years and then moved to University College London, first as Jodrell Professor (1923-5) and then as Foulerton Professor of the Royal Society (1926-51). This was a period of great scientific achievement when he inspired scientists from many disciplines and many countries with the possibilities offered by the growing subject of biophysics. It was Hill, more than anyone else, who laid the foundation for the splendid biophysical successes of British physiology, exemplified in the work of such people as B. Katz, A. V.'s successor at University College, and A. L. Hodgkin, A. F. Huxley and R. D. Keynes of Cambridge University.

Generally A. V. worked with a small international group of scientists of high quality and dedicated to research who had come to England to work with him. If one of their number wished to study a special problem of his own choice he would be encouraged to do this. If he found it hard to choose a problem Hill would help him to find one. He had a marvellous ability to devote all of his thoughts to other people's problems, to give his advice clearly, and then to accept calmly their decision as to what should be done. In

the period between the wars and that which followed the Second World War, A. V. did relatively little undergraduate teaching. Neither did he write textbooks. He said it was much better to have your lectures published since these represented what you had thought when they were given; you were not, therefore, required to revise them and it would even be wrong to do so.

In addition to his scientific research and the great contributions which he and his pupils made to Biophysics and Physiology, A. V. undertook a formidable range of duties for the scientific community both in Britain and in the world at large. He believed very strongly that ‘nationalism like love of family is a good thing when tempered with reason’ and that ‘to make your town and community happier, wiser or more prosperous is a decent and worthy ideal’. But he entirely rejected, on the one hand, the violence and hatred which nationalism can produce and, on the other, the idea that internationalism need be flabby and without character. He wrote ‘One needs not to have a low opinion of one’s own country to appreciate the virtues of others.’ Thus he felt it worthy to maintain the traditional hospitality of England to those who are persecuted for causes other than crime and this feeling was characteristically given practical application in his reaction to the Nazi tyranny. As early as 1934, when many were prepared to compromise with Hitler, A. V. Hill spoke out strongly against Hitler’s racial policies. He also played a leading role in the work of the Academic Assistance Council which became the Society for the Protection of Science and Learning. This Society, of which he became Chairman, played a vital part in helping eminent scholars and men of science, who had been obliged to relinquish their posts in Nazi Germany, to find employment in Britain. Typically he had a bust of Hitler on his desk as ‘the man who sends all his best physiologists to me’. Strongly as A. V. felt about tyranny he was always anxious to build goodwill between scientific men whenever this was possible and he steadily refused to extend to individuals, or scientific societies abroad, blame for the actions of their governments. He took pride in the fact that, after the First World War, British physiologists generally declared that if the Germans were not invited to the International Congress of Physiology in 1923 they themselves did not propose to attend. He also persuaded the Soviet Academy of Sciences to affiliate itself to ICSU (The International Council of Scientific Unions) with very great mutual advantage ‘not by boycott or bombs but by friendly leg pulling’.

It is tiring even to contemplate the volume of A. V.’s work and chastening (to me at least) to remember how much fun he had in doing it. He served every human group to which he belonged with loyalty and distinction and all profited from his exceptional gift for administration, his foresight and his capacity to inspire and encourage. For no group was this more true than for the Marine Biological Association.

In retrospect it seems natural that A. V. should be ‘associated with the Association’. He was deeply attached to the West Country, having lived and been to school at Tiverton: as a boy, he had sometimes walked up Exeter Hill, above the town, and admired the wonderful prospect to the south and south-west and determined to visit Dartmoor which ‘looked like magic or wonderland’. The links between the Physiological Laboratory, Cambridge, and the Plymouth Laboratory had always been strong. Physiologists had played a leading part in founding the Association and a major reason for building the Laboratory had been a recognition of the importance of the researches to be made on

the physiology of the invertebrate animals found in the sea. Many of the founders of the Physiological Society (A.V.'s elders) had served also on the Association's first Councils. A.V. had quite early been convinced by Keith Lucas and by G. R. Mines that Plymouth could provide wonderful material for his experiments but somehow he did not come here until after the First World War. Later he was to regret this, for he realised that he would have been successful in 1912 rather than 1925 in measuring the tiny amounts of heat produced by nerves during activity if he had used crabs instead of frogs. Still, by 1925, he had spent holidays in Devon and made reconnaissances of the M.B.A.'s Laboratory and it was in the winter of that year that he worked here for the first time, studying the properties of smooth muscle. He came again in the spring of 1926 and yet again in the autumn with E. H. Starling 'to learn some zoology' when both attended the Laboratory's 'Advanced Course in Comparative Physiology and Experimental Biology' given by C. F. A. Pantin. It was during 1926 that A.V. joined the Association. He also made an excursion to Dartmoor and determined that his family would camp at a spot at New Waste near Cornwood as soon as possible. The next year they did this and discovered and bought a house, 'Three Corners', being built 2.7 miles SW of Western Beacon, for which A.V.'s wife, Margaret, designed a splendid sun-room. It was to this house and to the Plymouth Laboratory that he came, accompanied by the other 'Five Hills' year by year until the war in 1939. When he was old he expressed his feelings about 'Three Corners' by a verse from Kipling:

God gave all men all earth to love
But since our hearts are small
Ordained for each one spot should prove
Beloved over all.

'Three Corners' was a blessing which A.V. and Margaret Hill generously shared. Thus, for example, when I was a junior research student at University College and ill, A.V. and Margaret sent me there with my wife for one of the best and most timely holidays of our lives. By 1940 there were 500 entries in the Visitors Book!

After 1925 the connexion between A.V. and the Association steadily strengthened. One of his sons, David, worked in Plymouth from 1948–9 as the Laboratory's physiologist. The other, Maurice, having had a taste of the sea aboard the Association's boats, became a distinguished oceanographer doing a good deal of his early work from R.V. 'Sarsia'. To A.V.'s delight both David and Maurice were elected to the Fellowship of the Royal Society.

A.V. himself served as an elected Council Member between 1927 and 1941, later representing the Royal Society from 1944 to 1955, Cambridge University from 1960 to 1961 and the Physiological Society from 1964 to 1967. He was elected a Vice-President in 1948 and was President from 1955 to 1960. He was made an Honorary Member in 1971. Sir Frederick Russell, who was Director of the Plymouth Laboratory during the term of A.V.'s Presidency of the M.B.A., says 'At a time when so much scientific development and extension to the laboratory buildings was in progress A.V. was an ideal President. Always kindly and full of sound advice, he was a staunch support. With his wide experience in so many fields he knew whom to turn to if the need arose, and above

all he was so businesslike, always answering letters by return. The Laboratory owes much to him.'

Young physiologists and physicists coming to A.V. at University College were very soon sent to Plymouth 'to learn some biology through the skin'. I was sent here, for this purpose, with B. C. Abbott, J. M. Ritchie and D. R. Wilkie for six weeks in 1946, a visit that certainly changed the courses of the lives of Abbott and myself. He also brought a series of distinguished collaborators to the Laboratory. But, best of all, he enriched the Laboratory by his enthusiasm and certainty that scientific work was both important and amusing.

When writing of A.V. it is tempting to quote continuously from his work since he wrote so well. It is also easy to remember him for he was a very handsome man with a commanding presence and a fine voice. He had a strong sense of fun it would perhaps be appropriate to end with an anecdote. He had been, when young, a very good shot and a fine middle distance runner and on most mornings for most of his life he ran a mile. Since he enjoyed making measurements (all the instruments in his car were calibrated) he always timed himself carefully. When well over 60 he came to the Laboratory one day and said 'according to my calculations I ran a mile in less than four minutes this morning'. Everyone else said this seemed very creditable. 'Yes', said A.V., 'I thought so too and I've given my watch away'.

A.V. was very athletic, very handsome and very intelligent and it was sometimes hard not to envy his splendid gifts. But it was *impossible* not to admire the use which he made of them and we were all proud of his friendship. He was in every way a great benefactor to the Association and its Laboratory – effectively promoting its interests, protecting its independence and encouraging its science. Those of us who were privileged to know A.V. will treasure our memories of him.

E. J. DENTON