OBITUARY

John Malcolm ('Jim') Hirst, D.S.C., B.Sc., Ph.D., F.I.Biol., C.Biol., F.R.S., 1921–1997: an appreciation

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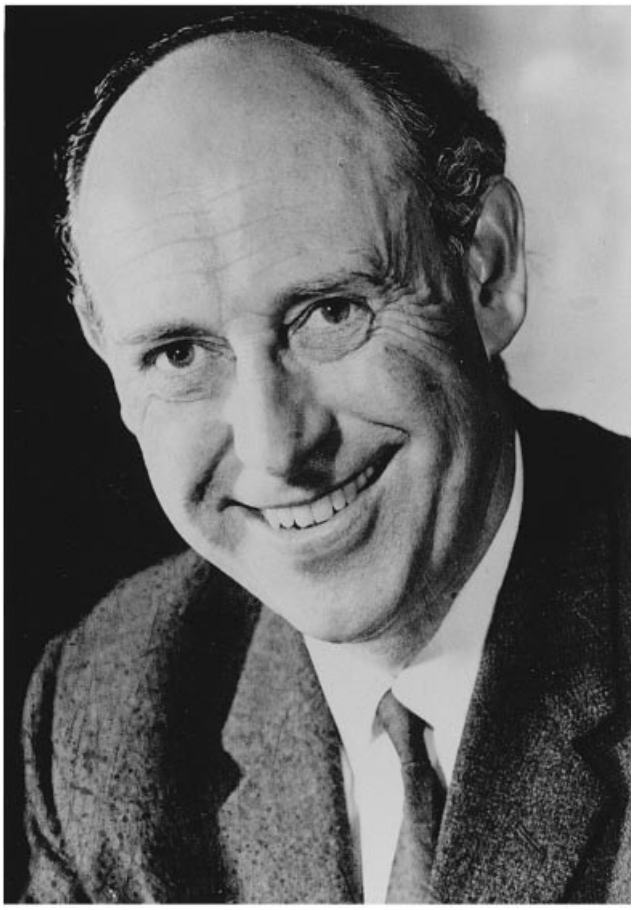
At a Commemoration of Jim Hirst's life on 4 April 1998, his contemporary at Rothamsted Experimental Station, Professor Fred Last, said in his tribute that in his mind there have been four 'great names' in Aerobiology: Antonie van Leeuwenhoek, Louis Pasteur (for his work on the air spora of Paris), Philip Gregory and Jim Hirst. Few will disagree.

'Jim', as he came to be known, was born on 20 April 1921 in Marston Green, then a small village near Birmingham. He duly went to Solihull School, where disappointingly he was downgraded from the 'A' stream to the 'B' and thence to the 'C', probably as a result of a lack of motivation. In his otherwise mediocre School Certificate results, he significantly obtained a Credit in Handicraft. In 1939 he did poorly in the Higher School Certificate, which he took again in 1940. In the intervening year he had some private tuition and a year's farming experience, where he learned much of men, animals and plants, and which gave him the motivation he needed. In 1940 his results were good and won him a County Major Scholarship.

Largely because of a love of the sea and ships, acquired during family holidays in Norfolk, he joined the wartime Royal Navy in 1941. Initially he served as an ordinary rating on the dangerous North Atlantic convoys; then he was commissioned and served in Coastal Forces in the Mediterranean, where the Allies were invading Sicily, Italy and Elba. In the course of many hazardous duties Jim, now in command of Motor Launch ML 480, found himself third in line for clearing the way through extensively mined waters into the port of Trieste, in the northern Adriatic. The first ML hit a mine and the second went to its aid, so that ML 480 took over as leader. Jim and his small crew safely cleared a way to the coast and he found next day that he had smoked some 60 cigarettes in doing so! For the Trieste exploit, he was awarded the Distinguished Service Cross (D.S.C.), a high British naval honour.

On demobilization, Jim took up a Further Education and Training Scholarship, specially designed for ex-servicemen and more helpful than the earlier County one. Now greatly motivated by his farming and naval experiences, he studied Agricultural Botany at the University of Reading. Here he met Barbara – they married in 1957 and had two daughters. Part of one summer vacation was a most fruitful experience, spent at Rothamsted Experimental Station under Professor Philip Gregory. After being awarded a First Class Honours Degree at Reading, he was offered, and accepted, a post as Scientific Officer at Rothamsted, starting on 1 August 1950, the same day as Fred Last and thenceforth they were known there as 'First and Last'.

At Rothamsted Jim started on a project on potato late blight (caused by *Phytophthora infestans*) and needed to trap the airborne sporangia of this important pathogen. The



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efficiency of the usual trapping methods then available – vaselined slides or hollow cylinders – was known to be variable in the field, because the performance of each was much affected by wind speed, in opposite ways. Therefore, with his early aptitude for handicraft and a flair for invention, he designed and made the Spore Trap that bears his name. The trap was a clever modification of the second stage of a Cascade Impactor designed by K. R. May in 1945 for sampling coarse aerosols. An electrically operated pump sucks a constant stream of air through a slit and on to a vaselined glass slide, itself slowly moved by clockwork past the slit. Subsequent modifications by the Burkard Manufacturing Company have obviated the need for a mains electricity supply and for daily slide changing.

During his time at Rothamsted he also designed a simulated Leaf Wetness Recorder and an improved Wind Tunnel (to study spore deposition), but the Automatic Volumetric Spore Trap was his masterpiece. It opened a formerly closed 'Mycological Window' on the air spora and its relation to micro-climate – whether in a potato field trapping sporangia, in an orchard catching *Venturia inaequalis* ascospores, mounted on a Meteor jet aircraft at 3000 m trapping *Puccinia graminis* or demonstrating an early morning peak in the unexpectedly large numbers of hyaline basidiospores. Moreover, because of the large volume of air sampled, many more genera were recognized in the air spora. Included among these was the first British record of *Pithomyces chartarum*, the cause of facial eczema of sheep in New Zealand. The initial paper describing the trap (*Annals of Applied Biology* **39**, 257–265, 1952) is a 'Classic Citation'.

Using the trap, Jim was able to make significant contributions to the epidemiology and control of potato blight and especially to the study of apple scab (caused by *V. inaequalis*). Modern computerised scab management systems are largely based on the trapping of ascospores released from pseudothecia in the spring. On over 20 pages of W. E. McHardy's comprehensive book on Apple Scab there are references to the work of Hirst (and his loyal and most proficient colleague, John Stedman).

Although primarily designed for use with plant pathogens, even greater use has been made of the Spore Trap in the study of allergens, including pollen grains, spores of *Serpula lacrymans* and other basidiomycetes, and several thermophilic actinomycetes. Modified versions of the Hirst Spore Trap are still used for pollen count warnings, 46 years after its invention.

Jim, with John Stedman, also worked on the complex and important topic of splash dispersal of spores, demonstrating, *inter alia*, downwind lateral movement of splash droplets as far as 16 m from a source 1 m above ground. Jim also studied skin spot of potato (caused by *Polyscytalina pustulans*, syn. *Oospora pustulans*), which was causing much damage to seed tubers. Effective 'chitting' often gave satisfactory control, as did tuber dusting with systemic fungicides.

As a consequence of the Spore Trap and his major contributions to Plant Pathology and Aerobiology, Jim received many honours. Foremost was election to Fellowship of the Royal Society (1970); this was followed by Presidency of the British Mycological Society (BMS) (1972), the Association of Applied Biologists (1977–78) and the British Aerobiology Federation (1991–94). He became an Honorary Member of the International Aerobiological Association (1986), of the British Society for Plant Pathology (1988), of the Indian Aerobiological Association (1991), of the Association of Applied Biologists (1992) and of the British Aerobiology Federation (1995). He was the first recipient (at the IXth International Botanical Congress, Montreal) of the Jacob Eriksson Gold Medal (1959) and a recipient of the Research Medal of the Royal Agricultural Society of England (1970). His BMS Presidential Address, 'A trapper's line' (*Transactions of the British Mycological Society* **61**, 205–213, 1973) was a masterly and wide ranging overview of the problems and achievements in the trapping of airborne spores.

In 1967 Jim was promoted Head of the large Rothamsted Plant Pathology Department. In notes now written for the BMS Archives by each Past President, he commented that he had always been a believer in 'applied research' and that his plant pathology had never seemed complete unless it was taken to some practical outcome. These comments make it easy to understand his rather less enthusiastic attitude, at Rothamsted and subsequently, to 'strategic' aspects of Agricultural Research which, by definition, carry little prospect of early benefit to the farmer or grower. The Department flourished under his leadership and he was able to continue some collaborative research as well as dealing with the big administrative load.

In 1975 Jim Hirst was appointed Professor of Agricultural and Horticultural Science at the University of Bristol and Director of Long Ashton Research Station. He was given the very considerable task of changing the Station's remit from fruit to arable crops, a challenge he readily accepted and to which he became totally committed. His Directorship was characterized by strong leadership, and a determination to reap the full benefit of fruit work in progress. He also continued one of his naval traditions in his respect for, and rapport with, the support staff, whether typists, telephonists, plantation/farm staff or cleaners. The early years went smoothly, despite frustrating delays in establishing the Divisional structure he wanted: in the 1979 Annual Report of the Station he wrote that its interest was no longer predominantly devoted to fruit crops, as the pace of research on cereals quickened.

However, troubled waters lay ahead. In 1981 the wisdom of successive post-war governments in generously supporting scientific research was set aside. In December the then Agricultural Research Council (A.R.C.) summarily, and without consultation, announced the early closure of two of the Station's four Divisions. Jim responded forcefully and courageously, again in the best naval tradition, commenting publicly that the Station had been 'judged without trial and wrongfully "convicted"'. In the ensuing confrontation staunch support came from many quarters and in particular from the Governing Body and its current respective Chairmen, and from the University. Nevertheless, there were others in high places whose support he might have expected, but from whom it was not forthcoming. Jim, by his 'rearguard action', was able somewhat to delay the Divisional closures, so enabling the work to be sensibly 'wound up'.

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The financial pressures on the A.R.C. increased further and, by 1983, there was even the threat of the Station's closure. Much helped by his most senior staff, Jim fought on relentlessly: the Station was reprieved. As with ML 480, he had brought his 'ship' safely to the shore. He retired in 1984, with the status of Emeritus Professor.

Even before his period of Directorship ended, Jim Hirst was involved in consultative work as a Crop Scientist in World Agriculture, and retirement gave him time to pursue it fully. His prestige as a scientist, coupled with a 9-year Directorship of a Crop Research Institute, fitted him admirably for the assessment of the needs, capabilities and financial requirements of research stations overseas. Fortunately he enjoyed travel: altogether he made about 100 visits to some 60 countries.

To cite three examples: from 1979 to 83 he was a Member (and Vice-Chairman in 1981–82) of the influential Technical Advisory Committee of the Consultative Group on International Agricultural Research; he was much involved with the International Centre for Agricultural Research in Dry Areas ('ICARDA') and its programmes, especially enjoying helping (in 1987–88) to develop a Strategic Plan for Future Research; and in 1986–87 he was a Consultant to the World Bank Sub-Saharan Africa Agricultural Research Reviews and co-author of a section on tree crops in Southern and Eastern Africa. More details of his overseas work are available from the BMS Archives. The benefits to World Agriculture of his assessments and recommendations are incalculable.

Although his work was an integral part of his personality, Jim was devoted to family and home. He loved simple countryside pleasures, such as attending Agricultural Shows and making and drinking sloe gin!

Jim Hirst will be remembered, not only for his Spore Trap and his great contributions to Mycology, Plant Pathology and Aerobiology, but also as the epitome of courage, commitment and integrity. To illustrate the last-named, and bearing in mind that he received no civil honour, let Jim himself have the final words, from his notes for the BMS Archives: 'From school onward (occasionally even in the Royal Navy) I have suffered from an unwillingness to accept the "party line" of the establishment if I thought it to be wrong. This has quite often caused me to be unpopular with the "establishment" but I am sure I would do the same again were there the opportunity. Although it probably did my career considerable harm at some stages, I am sure that it helped wonderfully to clarify my conscience.'

Grateful thanks are due to Professor Fred Last, for permission to quote from his tribute.