

## F.J. Hewitt (1919–2007)

Francis John Hewitt, brilliant scientist and administrator, former deputy president of the CSIR, died in Kelowna, British Columbia, Canada, on 22 December 2007 at the age of 88.

Born in Grahamstown in 1919, he matriculated at St Andrews College and, aged 19, graduated from Rhodes University having obtained the degrees of B.Sc. and M.Sc. in the same year. Frank was awarded a scholarship to Cambridge University, but, as it was wartime, joined the South African Air Force and was assigned to the Special Signals Services, a unit headed by B.F.J. Schonland and charged with developing radar. They built their radars and then operated them in various theatres of war. The unit served in Kenya, Sinai, West Africa and along the coast of South Africa. Towards the end of the war, Hewitt was appointed as South African radar liaison officer and served on a committee with Robert Watson-Watt and Sir Stafford Cripps (of whom Churchill had said: 'There, but for the grace of God, goes God.')

At the end of hostilities, Basil Schonland founded the South African Council for Scientific and Industrial Research and appointed Hewitt as principal research officer of the Telecommunications Research Laboratory (TRL), which was based in the Department of Electrical Engineering at the University of the Witwatersrand (Wits) in Johannesburg. This lab was staffed in part by nine former members of the Special Signals Services. While Hewitt himself used radar to study inter-stroke processes in lightning, for which he was awarded his Ph.D. degree, staff member Trevor Wadley developed a new ionosphere sounder, used for observing the behaviour of the various layers of the ionosphere. Wadley also studied radio propagation through rock and developed a revolutionary new radio receiver, which was stable and accurately determined radio frequencies. As the Racal RA17, it became the standard receiver of the British armed services. He developed also a new signal generator and the Tellurometer, a device for accurately measuring distances as long as 60 km (accuracies of 5 cm were obtained). Hewitt played a pivotal role in promoting these devices and arranging for their manufacture and patent rights. The Tellurometer revolutionized surveying practice throughout the world and initiated a major industry in South Africa.

After the launch of the Russian Sputnik I, staff at the TRL observed and tracked this first-ever artificial satellite and improvised a technique to measure the Doppler shift on the signal as it passed overhead. Jules Fejer used these data to predict correctly the lifetime of that satellite. (Russian, British and American predictions were



not nearly as accurate.) A team at the TRL designed and built a large radar installation, named JB51, for use by the SAAF. Another, headed by Hewitt's sister, Joyce, provided an ionospheric prediction service so necessary for radio communications in those days. In 1960, the TRL was upgraded to the National Institute of Telecommunications Research, which was housed in a new building on the Wits campus and Hewitt was appointed its director. Here, Dick Hölscher developed an infrared version of the Tellurometer with sufficient accuracy for cadastral use. At Hewitt's suggestion, a revolutionary new radio system was developed by David Proctor to obtain time-resolved, three-dimensional images of lightning flashes otherwise hidden by cloud and rain. For the first time, lightning flashes could be seen in their entirety, and the behaviour of lightning could be studied in detail. Hewitt also set up a project to study thunderstorms by radar. The radar group developed a commercially viable parametric amplifier for use with the JB51.

With the advent of the space age, the TRL was approached in 1957 by the U.S. Naval Research Laboratory to operate a Minitrack Facility, set up at Esselen Park, to track artificial satellites which the U.S. planned to launch as its contribution to the International Geophysical Year in 1958. Later that year, the American space agency NASA was established to operate the US civilian space programme and proposed that a 'Deep Space Instrumentation Facility' be established in South Africa for tracking spacecraft launched to the Moon and distant regions of the solar system. Hewitt and his men scoured the countryside for a suitable location that would shield the receiving antenna from man-made radio disturbances. They found the ideal site at Hartebeesthoek, west of Pretoria, where the 85-foot-diameter dish was installed in a deep valley in 1961. The Minitrack station, managed by Willem Botha, was moved and upgraded to a satellite tracking and data acquisition facility on an adjacent hilltop. Hewitt skilfully handled all the negotiations and the necessary interface with NASA.

In 1964, Hewitt was appointed a vice-president of the CSIR and promoted to deputy president in 1969. In these positions he presided over many of its technical and scientific functions, tasks that he carried out with skill and aplomb.

It was then that he negotiated with the Science Research Council of the U.K. to form a joint venture that established the South African Astronomical Observatory (SAAO) near Sutherland in the Cape Province (now the Northern Cape). This merged the former Royal Observatory in Cape Town and the Republic Observatory in Johannesburg into a world-class astronomical institution with headquarters at Observatory in Cape Town.

In 1973, political considerations forced NASA to close their Deep Space Station. Hewitt arranged for the abandoned hardware to be converted to a radioastronomy observatory headed by George Nicolson. When the STADAF station closed two years later, it was converted to the Satellite Remote Sensing Centre under Willem Botha. Hewitt played a pivotal role in securing local funding for these two facilities, which have both expanded and continue to operate.

Frank Hewitt was a true internationalist in the field of science. His position as South African radar liaison officer at the end of World War II brought him into contact with many of the future leaders in the growing field of radio science. He represented South Africa at General Assemblies of the International Scientific Radio Union (URSI) and the Committee on Space Research (COSPAR). He established a National Committee for the International Astronomical Union (IAU) to bring astronomers together at a critical time when various foreign-funded observatories in South Africa were closing their facilities, prior to the establishment of the SAAO. He constantly strove to promote South African interests in international scientific activities and was well respected among his international peers.

He was a past-president of the South African Institute of Electrical Engineers, and was awarded honorary doctorates by Rhodes University and by the University of the Witwatersrand. The South African Association for the Advancement of Science awarded him the South Africa Medal in 1987.

Hewitt was endowed with both theoretical and manual skills. He had been a 'hands-on' scientist and his brilliant and analytical mind was an inspiration to others. Ever the gentleman, he was kind and polite, and it was a pleasure to serve him. He is survived by his wife Betty, whom he married in 1946, two sons, a daughter, four grandchildren and one great-grandchild, and his sister.

David Proctor, George Nicolson and  
Willem Botha