TJ Robinson, A Life of Scientific Achievement

Terence James Robinson was born on 14th July (Bastille Day) 1919 in Reading, Berkshire, UK, and died in Bathurst, NSW, Australia on Friday 3rd September 2004. Sandwiched in between was a life of a remarkable man, a life of great achievement, particularly in his chosen field of animal reproduction. The story of his life extends beyond the bare facts, impressive as they are in themselves. The influence he had on the world of animal husbandry and the legacy he leaves are inestimable, and are certainly not fully recognized by those not involved in the field.

Terry left England with his family at an early age and was raised in Western Australia. He took a Bachelor’s degree in Agricultural Science at The University of Western Australia (UWA). One of his influential professors was Eric Underwood, but it was one of Underwood’s overseas colleagues, Sir John Hammond (Cambridge) that would influence the young man the most. Terry met the great Hammond on a visit to UWA in 1938, and thereupon resolved to work with him. The war years intervened and, after Terry had graduated, he joined the Royal Australian Navy and trained as an anti-submarine officer. He joined the corvette Tamworth and sailed from Fremantle on 8th August 1942, accompanying merchant convoys in the Indian Ocean and Persian Gulf. In all, the Tamworth accompanied 56 convoys of more than 400 ships and lost only 3 to German submarines, rescuing 130 seamen in the process. He returned to Fremantle in May 1944, and spent a short term of duty in Darwin before demobilization at the end of the war.

Between 1945 and July 1947 Terry returned to the University of Western Australian, where he worked with Underwood, developing a bioassay for phytooestrogens that were found in the clovers there, and this furthered his interest in reproductive biology. Eventually he obtained a prestigious Hackett Scholarship which enabled him to realize his ambition to work with Hammond in Cambridge. The Cambridge years were defining. Terry’s PhD working out-of-season breeding was a seminal work in itself, but it was during this time that he absorbed the Hammond philosophy that became the Robinson style henceforth. Both men were interested in applying science to practical agricultural problems. Both would guide their students without directing, and would contribute ideas and provide support, but would allow self-expression. Robinson’s appreciation of Hammond is made clear in the transcript of his lecture `The Magic of Hammond’ delivered to the British Society for Study of Fertility (Robinson TJ, J. Reprod. Fert. 66, 397-410, 1982). During his work with Hammond, Robinson was among the first to quantify physiological data, and RA Fisher was certainly influential in his development. At Cambridge, Terry did not spend all his time in the laboratory. An active sportsman, he was Captain of Boats at Downing College, though the achievements of the crew are somewhat lost in the sands of time.

Terry took his PhD and, on Hammond’s advice to gain some out-breeding, headed off to the University of California at Davis where he worked with Harold Cole and George Hart for the year of 1950. There he gained an appreciation for the `American way of doing things’ and an enormous respect for the American university system. He furthered his interest in the effects of oestrogen on oestrous behaviour before, in 1951, returning to Australia to the University of Melbourne as a Senior Lecturer. Progesterone was becoming available at this time and Robinson was among the first to test its efficacy as a priming agent to allow expression of oestrus in out-of-season ewes stimulated with PMSG. Hence, a life-long affair with the basic hormones controlling the reproductive cycles of sheep had begun, an affair that led to the development of a practicable method of synchronizing oestrus and ovulation in livestock that is in use today.

Terry Robinson’s major contributions occurred while at The University of Sydney. He was appointed Foundation Professor of Animal Husbandry in 1956. He built up the Department of Animal Husbandry from scratch, acquiring farms and facilities at Camden, overseeing the construction of new laboratories and offices, and left a thriving department of 18 academics and numerous other support staff upon his retirement in 1984. He had appointed specialists, and fostered team-building, focusing on the then major areas of nutrition, reproduction and quantitative genetics. Drawing on his American influences, he had set up the Dairy Husbandry Research Foundation and Poultry Husbandry Research Foundation in 1959 in order to involve producers more directly in supporting research and development in their own industries. He had personally supervised 32 postgraduate students, and authored more than 100 papers and reviews that were published in reputable journals. He took pride in editing `Hammond’s Farm Animals’, a definitive text of Animal Husbandry in its time, originally authored by his mentor. He became the founding editor of a new international journal of animal reproduction, Animal Reproduction Science, in 1978. Along the way he had established enduring scientific links with France, during periods of sabbatical leave at INRA Jouy-en-Josas and Nouzilly in the early 1970’s, and was the pioneer along a path of scientific collaboration that has been much trodden by many other French and Australian scientists in each direction in subsequent years. He had also, at various times, represented Australia on the Standing Committee of the International Congress on Animal Reproduction (1966-82), to the International Planned Parenthood Federation in the UK (1974), to the Food and Agriculture Organisation conference in Rome (1963), chaired the Animal Science Division of the Pacific Science Association for seven years and organized the Pacific Science Congress in Hawaii in 1960. He organised and taught in a postgraduate course in Animal Husbandry in Indonesia and was an advisor on establishment of Animal Husbandry courses at Serdang University in Malaysia.

All this factual information tells little about the man and his scientific and personal influence on his students and colleagues. To quote one of his French colleagues in a recent testimonial “Robinson and Thibault were the two scientists who built up (founded) modern reproductive physiology”. Whereas this would be a contentious argument in some circles, it has some validity. It certainly illustrates the international esteem in which Robinson was held. His work formed the basis of the whole world of artificial reproductive technology. He devised in the 1960s a system of controlling the breeding of sheep that has been used, virtually unmodified, for the last 4 decades. This system is the basis of artificial insemination programs throughout the world and it is no exaggeration to say that artificial insemination in sheep, which is now used routinely throughout the world, would not have been possible without his contribution.

As a world-recognised endocrinologist studying the hormonal control of reproduction in sheep in the 1950s he carefully elucidated for the first time the way in which hormones control the sheep’s breeding activity. This opened the means for making subtle but effective changes in the hormone regime to manipulate the timing of breeding which has enormous practical significance in the sheep industry. First, it meant that sheep could be bred “out-of-season”, or at a time of the year when they did not breed naturally. Second, it allowed farmers and veterinarians to synchronise the timing of ovulation in large numbers of animals to provide the means of artificially inseminating them successfully in a single session. This effectively made the technique of artificially insemination an economic reality and, in turn, opened the way for breeders to capitalise on the genetic advantages of using this technique in their breeding programs. Today, not only Australia but every advanced country in the world uses Robinson’s technique to breed millions of animals.

The brilliance of his discovery is illustrated in a brief analysis of the scientific and practical hurdles that he had to overcome to bring the procedure to fruition.

* First, he had to elucidate the complex hormonal system in sheep that regulates their breeding
* Second he had to find a way of tapping into that system delicately and in a manner that allowed it to be controlled without unbalancing it and causing infertility.
* Third, for logistical reasons, he had to find a synthetic hormone that could replace the natural hormone, progesterone, and be used in much lower quantities.
* Fourth, he had to invent a practical delivery system that would ensure a continuous supply of hormone without the breeder having to muster sheep daily.
* Fifth, he had to put the whole package together so that it could be used simply and reliably by farmers and technicians.

He and the team he led at Sydney University overcame each of these obstacles successfully and logically during a period of about ten years. It is a testimony to the quality and thoroughness of the work that there have been no substantial changes to the system in the 35-40 years since it was first put in place.

It is interesting that the discoverers of a parallel breakthrough in human reproductive medicine made in the same era and involving the same endocrine factors, the fertility pill, received world recognition and kudos while, relatively, Robinson’s contribution has gone unsung. It was a source of disappointment to Robinson that he and his team rarely received appropriate acknowledgement for their underlying contribution to the modern field of in vitro fertilisation in humans through their work on control of oestrus, ovulation and fertilisation in sheep. Robinson and his first postgraduate student Neil Moore had performed much of their early work on sheep at the McCaughy Institute at Jerilderie in southern NSW, where Carl Wood, who was seeking ways to bring about IVF in humans, and heard about their work and sought their help. In turn, Moore’s student Alan Trounson eventually teamed up with Wood to develop human IVF systems which became the envy of the world.

It might have been sufficient for some people to rest on the laurels of a major breakthrough in science, but Robinson was not content with merely devising a practical method of synchronising oestrus in sheep. He had to work out how it affected fertility of sheep and how it could be used in practical field situations, particularly in artificial insemination and embryo transfer. Through a series of postgraduate students, he investigated ways of using his progestagen pessary in conjunction with gonadotrophins to stimulate ovulation, and examined the effects on sperm transport. Two key departmental appointments extended the controlled breeding technology into important associated areas, namely Steven Salamon who devised practicable semen freezing and artificial insemination technology, and Neil Moore who developed embryo transfer techniques, and was responsible for the first successful sheep and cattle embryo freezing experiments a year or two in advance of the Cambridge team who received most of the plaudits.

Terry Robinson’s work was recognised by the award of a Doctor of Science degree at Cambridge (1973) and, belatedly, by the award of an AM through the Australian Honours System. His work lives on not only through the legacy of his scientific discoveries but also through the scientists he trained in the process and whose work he encouraged. He had a knack of finding and appointing talented students and colleagues, and instilling in them the Hammond-style approach to science. Most of his students would recall two of Robinson’s major doctrines in particular. The first was the use of statistics and his experimental designs, using multifactorial experiments to maximise the number of data that could be extracted from an experiment. The second was his adherence to proper use of English. His communication skills are apparent in his papers, written in clear, concise and unambiguous language, and all of his students became versed in classical grammar, some learning for the first time of split infinitives, the proper use of ‘however’, noun clusters, and hanging participles. On the other hand, most considered themselves fortunate that he did not often dwell too long in the laboratory where his skills were more limited! It sounds trite to sum up his mentoring skills in such terms because his great gift to his students was instilled almost by osmosis, namely the Robinson philosophy of science: scientific method and values, the need for scientific dialogue and interchange (‘outbreeding’), and the unbreakable nexus between research and teaching in the university environment. Of Robinson’s many students and staff appointments, a high proportion went on to become distinguished academics and administrators in their own right, proliferating the Hammond-Robinson philosophy through the extended academic family tree. The branches now extend through universities and research institutes throughout Australia and several other countries. Robinson took great pride in the achievements of his offspring, ‘ticking off’ each one of his former students as they were appointed to chairs. Most had had numerous heated discussions with him at various stages, but mutual respect never wavered and Robinson himself remained loyal to all his staff and students. He had always had a strong interest in the development of young scientists, and through a bequest to The University of Sydney this is commemorated through the TJ Robinson Travel Fellowship awarded to enable their participation at international conferences. His colleagues in the (Australian) Society for Reproductive Biology have established a similar fellowship in his honour.

TJ Robinson led a full life outside of the academic sphere. First and foremost he was a family man, a devoted husband of Helen, who passed away in late 2003. His three children embody his teachings, diversity of interests and belief in self-expression: Ann, the doctor with the scientific bent, Kate with the language skills working in publishing, and Peter the country boy and talented artist. Terry had in the early 1970’s acquired a rural property at Bathurst, a hobby farm which he gradually expanded into a fully commercial operation to which he retired and where he spent the last 15 years or so of his life. In the process he had renovated an old coaching inn, where he and Helen lived and entertained family and colleagues who passed by, including numerous of his erstwhile French colleagues. This proved to be an admirable, though very different, substitute to the house at Mosman, with the veranda overlooking Chinaman’s Beach, which his friends had grown fond of as they swapped tales over a glass or two of wine. For over 30 years, Terry had been a member of the Wine and Food Society of NSW, and had been an innovative Cheesemaster, introducing some little known or understood European cheeses to Australia, and President for 2 years during which time he used his considerable organisational skills to bring some much needed structure to the society.

It is a great feat for one man to have such an enormous impact on his science, colleagues and friends. Many young people have been unknowingly touched by his philosophies, handed down through generations. He will be missed as a friend, leader and mentor by his surviving colleagues and former students, but the spirit will endure.

Gareth Evans

David Lindsay