BIOGRAPHICAL MEMOIRS OF FELLOWS OF THE ROYAL SOCIETY

Walter Laing Macdonald Perry KT OBE, Baron Perry of Walton. 21 June 1921 – 17 July 2003 : Elected F.R.S. 1985

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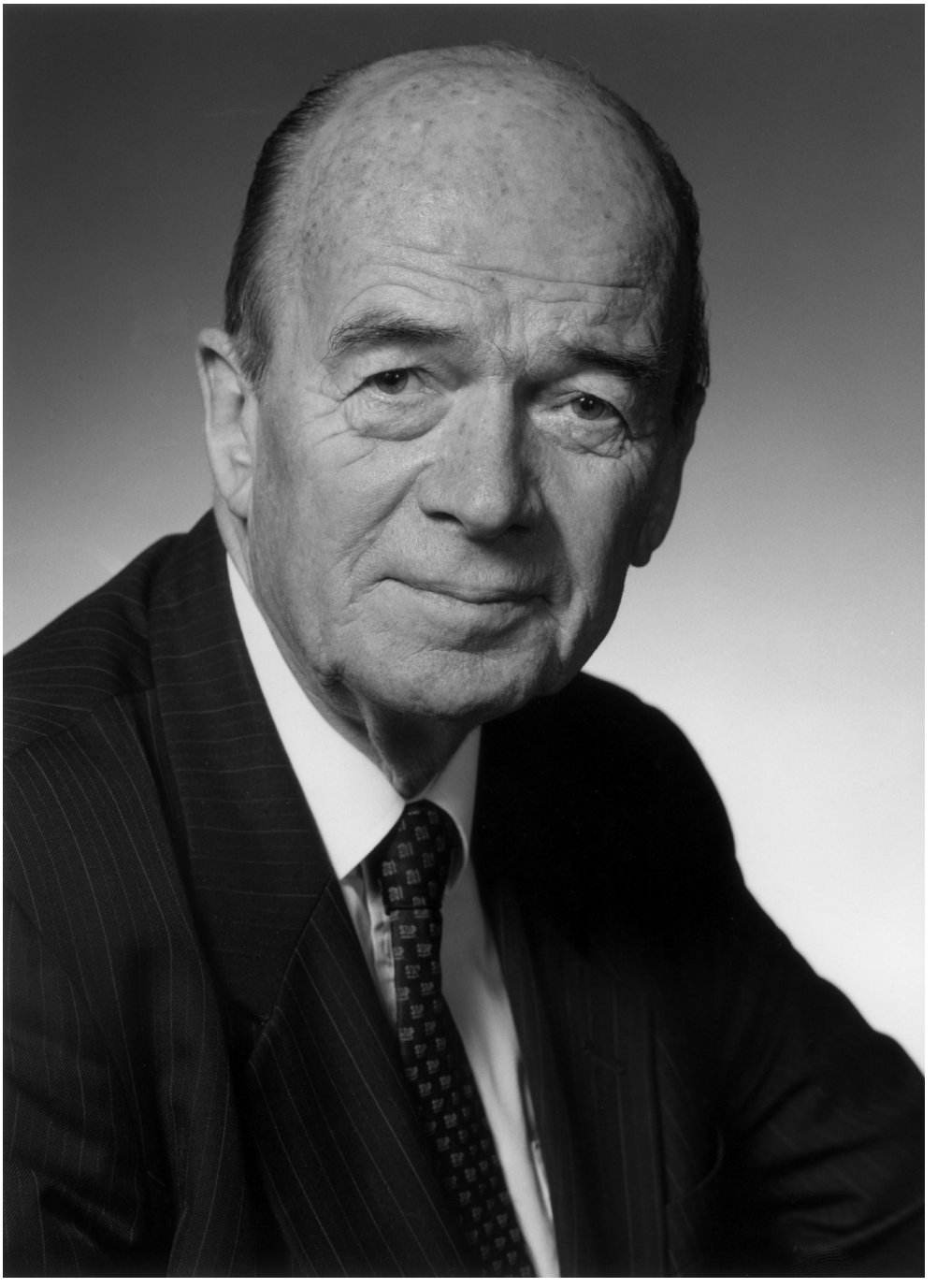

WALTER LAING MACDONALD PERRY KT OBE, BARON PERRY OF WALTON

21 June 1921 — 17 July 2003

Elected FRS 1985

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OVERVIEW

Lord Perry of Walton died suddenly on 17 July 2003, at the age of 82 years. Walter Laing Macdonald Perry was a native of Dundee, educated at Morgan Academy Dundee, Ayr Academy, Dundee High School and St Andrews University (MB ChB, MD and DSc), winning the Rutherford Silver Medal for his MD thesis and the Sykes Gold Medal for his DSc thesis. After Casualty Officer and House Surgeon posts in 1943–44, he served as a Medical Officer in the Colonial Medical Service in Nigeria in 1944–46, then briefly as a Medical Officer in the RAF, 1946–47, before embarking on a scientific career on the staff of the Medical Research Council at the National Institute for Medical Research from 1947 to 1958, serving as Director of the Department of Biological Standards from 1952 to 1958. Professionally, he achieved MRCP (Ed) in 1963 and was elected FRCPE in 1967, FRCP in 1978, FRSE in 1960 and FRS in 1985.

In 1958 he came to Edinburgh as Professor of Pharmacology, holding the Chair from 1958 to 1968. During this time he also served as Dean of the Faculty of Medicine (1965–67) and Vice-Principal of the University (1967–68) before leaving to become the inaugural Vice-Chancellor of the Open University in 1968, a post he held until 1980. During this period at the Open University he developed a second distinguished career as a university administrator and a promoter and facilitator of open and distance learning, in which fields he later performed extensive work on behalf of the United Nations. A third career, in politics and public life, began with his ennoblement to a life peerage in 1979, taking the title of Walton in the County

of Buckinghamshire, the initial base of the Open University. Latterly Walter sat as a Liberal Democrat, having twice been Social Democratic Party deputy leader in the Lords in the 1980s. He took an active role in the Lords' Select Committee on Science and Technology and held interests in and spoke on many areas of public policy, including fisheries policy.

Recognition of his distinguished careers came with a succession of honours; OBE in 1957, Knight Bachelor in 1974 and Baron in 1979; 10 honorary degrees from UK, North American, Indian and Australian universities and Fellowships of the Open University and University College London; the Wellcome Gold Medal in 1993 and Inaugural Royal Medal of the Royal Society of Edinburgh in 2000. He was Chairman, President or member of numerous commercial, educational, public interest and scientific bodies. Lord Perry's publications included sole or part authorship of approximately 90 books, research papers and abstracts.

Shining through Walter Perry's careers are strengths of commitment and sheer hard work, rigorous analysis of scientific, educational and organizational problems, experimentation and pursuit of clear objectives. Against scepticism, elitism and ill-informed criticism he drove through the establishment of the Open University. It is today respected internationally, is by some orders of magnitude our largest university in terms of student enrolment and is a demonstrably successful outcome from an experiment initiated 40 years ago. It represents a fine monument to Walter Perry.

The formative years, 1921–47

Early family life and medical school, 1921–44

Walter Perry was born (on 21 June 1921) and raised in Dundee by Fletcher and Flora Perry. Fletcher was Head of Customs and Excise in Scotland; he taught singing in his spare time and sang lead baritone in local opera and oratorio. Flora was medically qualified, as were five of her eight brothers and sisters, Walter and his sister. At the age of 16 years he finished his schooling and entered St Andrews University to read medicine, graduating in 1943 aged 21 years. At that time most of the students who enrolled in St Andrews completed their clinical training in Dundee Royal Infirmary. In Walter's year there were only 35 students and teaching in the clinics was on an almost a one-to-one basis. There were very few specific remedies and epidemics of diphtheria and polio were commonplace. After graduation he completed his house jobs in Dundee Royal Infirmary and then joined the Colonial Medical Service. In 1944, after a three-week crash course at the London School of Hygiene and Tropical Medicine, he was posted to Nigeria.

Colonial service in Nigeria, 1944–46

Although Walter writes about his time in Nigeria with some amusement, he was in reality thrown in at the deep end. Within a week of his arrival in Kaduna, 400 miles north of the Niger delta, to replace the resident on leave, he operated successfully on the wife of the dispenser for a ruptured ectopic pregnancy. When the resident returned six months later, Walter was transferred to Igboni near Lagos, as it turned out to supervise the building and equipping of a rehabilitation hospital to provide for members of the Royal West African Frontier Force fighting in North Africa. He spent six months in Lagos ordering materials and equipment and committing what appeared to him to be large sums of money but never saw the hospital. His next posting was to Makurdi, the capital of Benue, 200 miles north of the Niger delta. There he was the only doctor in a region of about half a million souls. The hospital beds had 120 beds with

never fewer than 200 occupants. His day started with an outpatient clinic for about 100 before breakfast. In addition to the hospital, Walter was supposed to supervise the activities of nine outlying dispensaries. Much of his work consisted of treating parasitic diseases and the surgical treatment of serious accident victims, yet the central medical stores in Lagos on one occasion managed to run out of both Leishmann's stain and scalpel blades. These and other deficiencies persuaded Perry that his future lay elsewhere.

Royal Air Force, 1946–47

On returning to the UK he was called up to serve briefly in the RAF; after a few weeks he was posted to the RAF College at Cranwell, the school for cadets who were to make their career in the service. Again, Walter had amusing tales about dining-in nights and dealing with nothing more serious than broken collarbones.

Sir Frederick Warner FRS, a friend of Walter's for 56 years, writes of Perry:

> In 1947 he joined a group which had survived through the war in monthly meetings at The Rising Sun in Tottenham Court Road, continuing what had started at University College London through Sir Jack Drummond. It provided a place to talk, among other things, about scientific developments and medicine, including health problems in the continuing war in the East.

National Institute For Medical Research, 1947–58

Department of Parasitology

Before joining the RAF, Perry had briefly returned to Dundee to discuss his future with the Dean of Medicine. The Dean drew his attention to a vacancy in the Department of Tropical Medicine in the Medical Research Council's National Institute for Medical Research (NIMR), to work with Frank Hawking. Unknown to Walter, Hawking had applied for a 'B' release for Walter, which allowed Walter to leave the RAF early to take a specific civilian job, and Walter's commitment to research was sealed. Together they worked on a *Plasmodium* species that causes malaria in monkeys in an attempt to find the tissue in which the parasites resided during the incubation period of the disease (1, 2, 5, 9)*. Unfortunately, their work was brought to an end when Shortt and Garnham published a short note in *Nature* showing that the exo-erythrocytic cycle of the parasite takes place in the liver (Shortt & Garnham 1948). Perry, and presumably Hawking before him, working with high-powered microscopes using an oil-immersion lens, had missed the large clumps of parasites in the liver, which could be identified with a hand lens. Although disappointed by this loss of priority, Walter was clearly hooked on research and later wrote, 'I learned a lot from this early experience and always carried out my researches in the future on the basis that I was taking part in the only really organised game for adults' (68).

In another series of experiments with Hawking, Perry showed that the addition of paludrine to cultures was ineffective as an inhibitor of the maturation and spread of the parasites to additional cells until it had been exposed to liver extract (3, 4). Later workers at ICI isolated the active metabolite produced in the liver from the parent compound.

Walter, like all the other research workers at NIMR, was also expected to do some work for the Department of Biological Standards (DBS). Although, initially, Walter regarded this as rather a chore it was to herald another career change that saw him become Director of that

* Numbers in this form refer to the bibliography at the end of the text.

department only a few years later. The DBS was contracted to the Ministry of Health (MOH) to advise on the implementation of the Therapeutic Substances Act, which defined the accepted toxicity and potency of batches of drugs that could not be controlled by physico-chemical means and therefore required bioassay. At that time neoarsphenamine was still widely used to treat syphilis, and every batch had to be assayed for toxicity and potency against a standard preparation of the drug stored in the department. Because the human form of the organism responsible for syphilis, *Treponema pallidum*, could not be cultured in the laboratory, the potency was tested on an easily grown trypanosome (6, 7). He submitted the work for an MD in June 1948 (8); it was not only commended but awarded the Rutherford Silver Medal.

Although the laboratory work on neoarsphenamine was easy and the protocol controlled almost by statute, the analyses of the results by statistical methods were always, perhaps even to this day, under debate and Perry ,who could not resist an argument, was committed even more firmly to a career in research. Under the tutelage of Cliff Emmens, a part-time statistical advisor to the Institute and an author of a book on the subject, Perry began to train for the rarest of specialties, statistical methods applied to bioassay.

In an appreciation prepared for the Board of the National Institute for Biological Standards and Control (NIBSC), Derek Bangham (see Bangham 1999) gives an insider's account of Perry's contribution to the work of the board. He draws attention to Perry's earliest statistical work on bioassay in which he improved the bioassay for insulin on mice, developed by J. H. (later Sir John) Gaddum (FRS 1945) about 40 years earlier. Perry modified Gaddum's method, which was based on the number of animals that survived an injection of insulin (LD_{50}), to one in which the survival time of each animal was used. This not only reduced the number of animals required for each assay but allowed the results to be analysed by a technique known as a parallel line assay, giving a much more precise estimate of potency (21, 28).

Perry, who had never quite hit it off with Hawking, and having published the work on neoarsphenamine in *Nature* and concluded his MD, was looking for a new interest and even considered going into general practice. By another happy coincidence Emmens accepted a chair in Australia and as he was leaving advised the Director of NIMR, Sir Charles Harington FRS, that Walter was the only one in the Institute who had shown any interest in statistics. So a deal was struck: Walter would take over as statistics advisor provided he could transfer out of tropical pharmacology into pharmacology in the Department of Physiology, headed by G. L. (later Sir George) Brown FRS. Thus, in 1948 Perry came to work part-time in physiology while he was studying statistics two days a week under Sir Bradford Hill FRS at the London School of Hygiene and Tropical Medicine and E. S. Pearson (FRS 1966) at University College. Almost immediately he was called on to carry out statistical work for all the staff at NIMR and in particular the DBS under Ashley (later Sir Ashley) Miles (FRS 1961). With Miles, Walter began to attend meetings of the Expert Committee on Biological Standardisation of the World Health Organisation (WHO) in Geneva, where he learned a lot more about making and holding the International Standard preparations for hormones, antibiotics, vaccines and antitoxins (12, 13, 18, 25, 26, 30, 31, 36, 37, 39, 41, 43, 45, 47, 50, 51, 55–57). As we shall see later, by 1952 Perry's expertise and reputation in this field was such that he was appointed to be Director of the DBS when Miles left to head the newly formed Lister Institute.

Department of Physiology

The Physiology Department at NIMR had a worldwide reputation. Sir Henry Dale had retired just two years earlier and the department had been the scene of his work with Gaddum,

W. S. Feldberg, M. L. Vogt and Brown. All were Fellows of The Royal Society. Dale was a Nobel laureate, holder of the Order of Merit and a past President of the Society (1940–45). Perry joined an equally distinguished group of younger men, F. C. MacIntosh (FRS 1954), W. D. M. (later Sir William) Paton (FRS 1956), J. A. B. (later Sir John) Gray (FRS 1972), B. D. Burns (FRS 1968) and J. L. Malcolm under the direction of Brown, who continued Dale and Gaddum's work on synaptic transmission. Much of the work was devoted to proving that transmission in the peripheral and central system was chemical and that acetylcholine was the major transmitter.

On the basis of his previous experience with Hawking, who had directed his work fairly tightly, Perry was surprised when Brown told him to talk to the members of the laboratory and find himself a project that interested him. This he found particularly difficult. His clinical experience was of little value, as was his training with Hawking. His earlier training in physiology and pharmacology in St Andrews in wartime Britain was virtually useless. Indeed, one suspects that the possibility of chemical transmission occurring outside the slowing of the heart by the vagus nerve was only mentioned in passing, if at all. However, he was lucky enough to start work with MacIntosh, who taught him to perfuse sympathetic ganglia and assay the effluent of potassium released by nerve stimulation, which they published together (10, 11, 13, 24). Not only did Perry's friendship with MacIntosh and the others last a lifetime but this feature seemed to extend to anyone that had worked with Perry. (In my own experience, I spent three very happy years in MacIntosh's department in McGill. The others, in particular Paton, always greeted me on first name terms and treated me as if I were an equal.—J.S.K.)

Over the next two or three years Perry worked on the mechanisms of transmission in automatic ganglia (11, 19–21, 32–35, 40–42, 45, 48, 49, 53) and on the actions on transmission there and at the neuromuscular junction (15). The work was technically extremely difficult and the extracellular electrical recording methods were crude and probably already surpassed elsewhere. Perry must have been an able pupil, and published several papers using both gut bath assays and electrophysiological techniques to show that acetylcholine was also the transmitter at sympathetic and parasympathetic ganglia. (As an honours student in Edinburgh I saw him perfuse both these ganglia as class demonstrations. This is no mean feat and compares in difficulty with complex eye surgery. Amazingly the experiment worked in spite of the high concentrations of nicotine exhaled by the experimenter and inhaled by the animal.—J.S.K.). Thus, Perry working part-time in the department published a comprehensive number of papers in a variety of prestigious journals. Perhaps more importantly he wrote the work up for a St Andrews DSc on synaptic transmission (59) and published three highly influential reviews in *Pharmacology Reviews* (38), *Annual Review of Physiology* (54) and *British Medical Bulletin* (58).

Director of the Department of Biological Standards, 1952–58

As Director of the DBS, Perry was responsible to the Department of Health for implementing regulations for the production of all substances controlled under the Therapeutic Substances Act and to the WHO as custodian of all the International Standard Preparations other than those for vaccines, antisera and antitoxins held by the State Serum Institute in Copenhagen. Virtually automatically, at the age of 31 years, he became a member of the British Pharmacopoeia Commission and of the Expert Committee on Biological Standardisation of the WHO.

When stocks of one of the International Standard Preparations ran low, the DBS had to supervise the preparation of the replacement batch and to organize bioassays performed by several laboratories in different countries. It is vital, for instance, that the potency of a known volume of insulin used by a diabetic remains constant. Thus each new batch of insulin was assayed by the manufacturer against a sample of the International Standard for insulin obtained from Perry's department. The preparation of a new Standard involved the determination of the precise weight of the new material required to match the potency of the previous Standard (21).

The DBS was responsible for supervising the assays performed by the manufacturers. In the main this involved inspection of the manufacturer's protocols and occasional visits to a manufacturer's premises. However, the DBS had to be capable of following up spot-checks by re-assaying the manufacturer's material. All of this involved a fair amount of administration but Perry, like his predecessor, managed to continue to be involved in the departmental research, working with W. E. Brocklehurst, H. Reinert, D. A. Long, J. H. Humphrey (FRS 1963), R. L. Rowland and others on modulators of the immune response (16, 17, 44) and the toxicity of drugs containing mercury (14, 22–24). In his note of appreciation for the Board of the NIBSC, Derek Bangham also draws attention to Perry's development of assays to detect the deterioration of biological materials during storage. Today, corticotropin (ACTH, adrenocorticotrophic hormone) is used mainly in a biochemical test of adrenal gland insufficiency, which requires the injection of an accurately predetermined dose and the assay of hydrocortisone in the patient's plasma. However, before the widespread introduction of glucocorticoids such as dexamethasone, it was used to treat pituitary insufficiency and to increase the release of endogenous corticosteroids in the treatment of inflammation and immunosuppression. Manufacturers bought up huge supplies of ox and pig pituitaries to make crude clinical preparations of modest potency. Although a simple improvement in the manufacturing led to a much purer and more potent preparation, the potency of individual doses proved completely unpredictable in the clinic. The bioassay of the International Standard required the preparation of large batches of uniform young rats whose pituitary had been surgically removed. After their recovery they were killed and their adrenals assayed for ascorbate following the injection of the ACTH preparation. The release of glucocorticoids is followed by a predictable reduction in ascorbic acid. After a considerable amount of work Perry discovered that the problem was twofold: the instability of the International Standard distributed to manufacturers and the degradation of the material distributed in ampoules to clinicians. The remedy involved the production of 48 000 freeze-dried ampoules that were distributed throughout the world as the International Standard for the next 20 years. Perry was responsible for developing and running a facility for producing and freeze-drying 4000 ampoules at a time. Together with Nils Jerne, the Head of Biological Standards in Copenhagen mentioned above, Perry wrote the seminal paper on assays for determining the stability of biological materials (50). The degradation of the samples was shown to be accelerated by heat, and their rate of inactivation in good storage conditions was predictable with the Arrhenius equation. Thus, Perry and Jerne produced the earliest WHO requirements for the manufacture of biologically active material. Later, Nils Jerne won the Nobel Prize for his work in immunology. In his 1954 report to the Council of the Medical Research Council (MRC), Perry highlighted the expanding need for the laboratory control of biologicals and interestingly insisted that such work should be directly funded by the MOH and performed by specialized staff, not MRC staff funded to do research. However, he felt that the maintenance of the International Standards should remain with the

research staff of the DBS. This led eventually to the formation of the Division of Immunological Control, which together with the greatly enlarged DBS combined in 1972 to become the NIBSC (Bangham 2002).

Unfortunately, his involvement in the research he enjoyed was effectively brought to an end by the introduction in the USA of the Salk vaccine for poliomyelitis. The vaccine had been made possible by the demonstration by Enders, Weller and Robbins (Weller *et al.* 1952; Robbins *et al.* 1952) that the virus could be grown in tissue culture. The Salk vaccine was produced by growing the virus on cultured monkey kidney cells, harvesting the virus from monkey kidney tissue and killing the virus with formalin (Salk 1977; Salk & Salk 1977). This was a delicate business, because too much formalin destroyed the antigenicity and too little failed to kill all of the viruses. Most virologists were extremely sceptical and advised waiting until attenuated strains (Sabin 1965, 1969) were available that could be used as an alternative to the Salk vaccine. However, this advice was ignored and Salk, with funding from the March of Dimes, mounted a trial of his new vaccine in several thousand children in the USA.

To fulfil the foreseen need for the new vaccine several large pharmaceutical companies in the USA and Britain began preparations for manufacturing the vaccine. In anticipation of the role of his department in testing the new vaccine for both efficacy and safety, Perry persuaded the MRC to build a new animal house to hold hundreds of monkeys and provide funding to allow him to recruit a virologist. When the American trial proved successful, two British companies, Burroughs Wellcome and Glaxo, began to prepare batches of vaccine to be trialled on children in Britain the following year. The laboratory tests took several months. The absence of live virus was assayed with tissue cultures of monkey kidney, and the antigenicity by measuring the level of antibody raised in live monkeys.

All the tests had to be developed from scratch. Up until this time viruses had been cultured in eggs; cultured mammalian cell substrates were completely novel. In the USA, the National Institutes of Health were also struggling to devise tests, and the work in the UK on the Salk and Sabin live virus had to go ahead without their help. An additional requirement was for an assay of neurovirulence using rhesus monkeys. The monkeys were treated with ACTH to diminish their immunological response, and sample doses of the vaccine were injected directly into their spinal cord. Some days later the spinal cord was examined histologically for evidence of cell damage. Perry was supported by a specially assembled MRC committee of the country's leading virologists. However, he took total responsibility for the laboratory work, its evaluation, its administration and dealing with the MOH and the manufacturers.

Just as the UK trial was about to go ahead the news broke that in the USA there had been a tragic accident and more than 100 children had been infected by the vaccine from one of the companies, Cutter Laboratories, and 12 had died. There was no doubt that Cutter had performed all the required testing and an infected batch of vaccine had slipped through the screen. The injection campaign in the USA continued and the annual epidemic of polio was much reduced.

The trial in the UK showed that the British vaccine worked, and plans were made for a campaign in the UK (52). However, it was clear that the British production would be inadequate and millions of doses were purchased from the USA. Perry insisted on retesting the first batch of vaccine imported from the USA. However, the Government, which had promised to protect all children at risk, bought many more doses and distributed these without waiting for Perry's certification. As chance would have it, a particular batch, from the same manufacturer as the uncertified material used during the campaign, proved one or two months later to contain live

virus. By bypassing Perry, the Government had taken an appalling risk in order to appease the public.

In spite of his misgivings, Perry proved an effective diplomat in the USA and organized the additional purchases from the US manufacturers. Once the trials and campaign got under way he was in continuous demand for press conferences, radio and television interviews and endless press telephone calls. The constant political and public pressure associated with the ongoing polio vaccine campaign effectively ended Walter's research activity and he began to look for a career change. Although he was tempted by a generous offer from industry he was persuaded at a meeting of the British Pharmacopoeia Commission by Sir Derrick Dunlop to consider the Chair of Materia Medica in the Department of Pharmacology at Edinburgh, which he accepted. Gaddum, the previous holder of the chair, had accepted an appointment to become the Director of the Agricultural Research Council's laboratories in Babraham, near Cambridge. Gaddum's work with Dale has already been mentioned in connection with Perry's move to the Department of Physiology at NIMR.

University of Edinburgh, 1958–68

Department of Pharmacology

The Chair and Department of Materia Medica in Edinburgh had a distinguished history dating from 1768. Perry was only the tenth Professor in 200 years (65) (Gaddum 1962) and his immediate successors were, in order, Sir Robert Christison, Sir Thomas Fraser FRS, A. R. Cushny, A. J. Clark and Gaddum, charting rather nicely the foundations of modern pharmacology in the UK. Perry's appointment in 1958 in many ways reflected the University of Edinburgh Medical School's policy at that time, of filling chairs with graduates from all over the UK and focusing on excellence rather than hiring its own graduates. There is no doubt Perry had 'a hard act to follow'; doubly so because Gaddum and his colleagues, who included Vogt, M. L. Holzbauer and D. F. Sharman, had 'owned' a considerable amount of the equipment in the department and had either taken it with them to Babraham when they moved or planned to do so. (I doubt if this troubled Perry because the move gave him an opportunity to ask the university for funding to recruit new staff and buy more suitable equipment.—J.S.K.). Perry wrote:

> Gaddum was such a good experimentalist that he could make significant studies using as equipment little more than a smoke drum, an organ bath, string and sealing wax. My research work called for electronic recording equipment. The only way of stimulating a nerve was to use an induction coil. I don't think there was a thermionic valve in the department.

Perry persuaded Bernard Ginsborg to join the department, bringing his detailed knowledge of the biophysics of the neuromuscular junction and more importantly the design and building of electronic equipment. (I can still remember when working with equipment inherited by Bernard Ginsborg when David Whitteridge FRS retired to Oxford, changing the gain of the amplifier by stretching into its innards through a cowling that resembled the nose of a Spitfire and exchanging a pentode valve.—J.S.K.)

Henry Adam, Tom Crawford, Dick Barlow and R. P. Stephenson continued their own research programmes. These, in many ways, followed the Gaddum approach to both science and equipment. With his knowledge of bioassay and his work with Paton on drugs that mod-

ified synaptic transmission, there is no doubt that Perry made a major contribution to their work. He also introduced a new area of research into the mediators of the inflammatory response by recruiting Brocklehurst from NIMR (60, 62) and David Colquhoun from Leeds. Even as a PhD student Colquhoun added significantly to Walter's expertise in statistics and, many departments later, he is now a Fellow of The Royal Society and an authority on the mathematical treatment of drug receptor interactions at the single ion channel level.

Underlying Perry's work with Paton and others on drugs attenuating synaptic transmission in the peripheral nervous system (32, 34) there was an unshakable belief that the same principles could be used to unravel the workings of the brain (21, 27, 29, 33). Under Gaddum, Vogt, Adam and Crawford had established a number of bioassays and physico-chemical methods for assaying amines and some of their metabolites in the brain and cerebrospinal fluid of large mammals. Elsewhere, Carlsson (Carlsson *et al.* 1957) had suggested changes in brain amine levels could modify animal behaviour, and Hornykiewicz (Ehringer & Hornykiewicz 1960; Ehringer *et al.* 1960) had shown at post-mortem that the brains of patients with Parkinson's disease are depleted of dopamine. Others had suggested that the urine and cerebrospinal fluid of patients with schizophrenia contained abnormal and unidentified materials. Against this background Perry persuaded the MRC to establish, in the department, one of its flagship external multidisciplinary laboratories, the Brain Metabolism Unit. Perry (68) writes, 'I had always believed that mental diseases would be found to have a biochemical deficit as their main cause; and I wanted to compare changes in the composition of cerebrospinal fluid obtained from patients by lumbar puncture [(64)] with experimental fluid obtained from the experimental animals.' This required not only laboratory facilities but access to beds in an active psychiatric unit. Perry appointed a clinician, George Ashcroft, to run the Unit and adopted the title of Honorary Director. Although he claimed that his role was entirely passive, Perry made a huge contribution to the infrastructure required for the work and was responsible for promoting it throughout the UK. He found the funds to rehouse the department and the Unit together in a new building with state-of-the-art laboratories and complete with an animal house capable of looking after mammals with indwelling catheters. The earliest work of the Unit was very encouraging, and some of this early work remains of interest today. In today's rather materialistic language the Unit was the nucleus of a huge injection of cash for research, infrastructure and funds for new buildings into the Medical School. The Unit's enthusiasm for careful state-of-the-art research attracted many scientists to Edinburgh to work not only in the Unit but alongside it. Many of those at the cutting edge of the development of genetics and imaging in psychiatry today spent their formative years in the department and the Unit. (My own return to Edinburgh in 1985 was based almost entirely on the ethos of the Unit's presence in the department. The closure of the Unit in 1999 was a great disappointment to me.—J.S.K.)

Teaching at Edinburgh

The department had a long tradition of taking teaching seriously. Both Gaddum and Clark had played a key role in the teaching of pharmacology to medical students in Edinburgh and elsewhere. Cushny, Clark and Gaddum had all written single-author textbooks which they revised regularly and which, in one form or another, still exist today. (However, the existence of an excellent and even witty text written by the Head of Department was not, in my experience in Edinburgh, a sure-fire recipe for memorable lectures. Pharmacology was no exception.—J.S.K.) Thus, Perry's account of his great success as a lecturer to medical students—'I was greeted by cheering and stamping'—was undoubtedly correct. He was well aware of the poor

standard of lecturing in the department and writes, 'I also persuaded my colleagues that one or two of then should attend my lectures and criticize them; and that this habit should apply to all teachers.' However, even at this point in his career, Perry doubted the value of whole-class lectures as a teaching tool. He also questioned the value of formal end-of-term exams that involved the entire staff of the department marking three or four scripts from each student in a class in excess of 200. This led him to an experiment in which 50% of the class were banned from the formal lectures but still attended the fairly comprehensive practical classes, live demonstrations and tutorials. At the end of the year the first multiple-choice questions (MCQs) ever used in Edinburgh were added to the normal of diet of essay-style exam questions. The essays were marked externally and internally and the results were compared with the outcome of the MCQ exam. The results were very gratifying: the group of students banned from the formal lectures did rather better than the other half of the class. On a single-student basis the results of the MCQ correlated almost perfectly with the essay results and, one suspects, their university entrance qualifications (61, 63, 66).

Perry, with the aid of Stephenson, maintained an extensive collection of MCQs, each scored for their ability to identify the students' rank order in the class against their average marks in a number of essay-type examinations held during the first four years of the medical course. The genie was out of the bottle, and the Edinburgh Faculty of Medicine authorized MCQ examinations as a reliable examination technique. Interestingly, the new medical curriculum for the twenty-first century is still based on a substantial number of formal lectures. Ironically, one of the most bitter and long-lasting arguments in the College of Medicine has been about the small number of lecture slots allocated to clinical pharmacology.

Perry's interest in education led to his appointment to the Faculty Curriculum Committee charged with reviewing the medical curriculum. The great debate, which continues to this day, was about the balance between teaching medical science and teaching the study of patients. On this occasion the teaching of science was reinforced and a preliminary degree of Bachelor of Medical Science after three years' study was introduced. This enhanced the status of the Intercalated BSc honours courses in which the more able students could take a year out of the medical course to study a scientific subject in depth. At the beginning of this period, recruitment to the Honours courses was limited to 10% of the class; today the norm is between 70% and 80% of the class. Perry's argument was that most of Edinburgh's graduates at that time were destined to be consultants rather than general practitioners and would hold honorary senior lecturer appointments in medical schools. Perry was included in a three-man team sent to tour the medical schools of the USA. He describes his trip with Sir Derrick Dunlop and Sir John Bruce as 'a bit of a Rakes' progress. Hard work during the day followed by "a little refreshment"'.

In 1949, Walter had joined the British Pharmacological Society and when in Edinburgh served the Society well during a fairly crucial time in its development, first as Secretary (1957–61), then as Foreign Secretary (1959–60), and a member of the committee (1961–63) and was editor of the Society's journal from 1955 to 1960. In 1993 the Society awarded him the Wellcome Gold Medal.

University administration

Perry describes his first entry into university administration in the early 1960s as an attempt to understand the distribution of money by the University Grants Committee (UGC). Although the UGC gave no indication as to how they arrived at the amount awarded to each university,

Perry developed a formula that seemed to describe the resource allocation model used by the UGC. Over a range of universities he weighted the student numbers by cost per student on the bases that veterinary and medical cost three times as much as an arts student and showed that there was a linear relationship between the amount awarded to each university and the weighted number of students. In an article in the *Glasgow Herald* he drew attention to the fact that only Glasgow and Edinburgh University were not on the line and that Edinburgh was allocated £1 million below the amount predicted by the line. Although the UGC denied the use of a formula or the discrepancy highlighted by Perry, Edinburgh's next quinquennial grant was sizeably increased.

In 1965, Perry was appointed the preclinical Dean responsible, in particular, for the admission system and the records of student performance kept in the Faculty office. Perry drew attention to the high drop-out rate of about 15% and attributed this to the policy of admitting the sons and daughters of graduates and doctors, many of whom performed poorly. This had entailed a great deal of work in sorting through each cohort of students. Perry reorganized the record-keeping so that a similar analysis would be more efficient in the future.

When Sir Edward Appleton, the Principal and Vice-Chancellor of the university, died suddenly, Michael (later Lord) Swann FRS succeeded him and decided to appoint two part-time Vice-Principals, one of whom was Perry. His main function was to deal with resource allocation and postgraduate studies. He quickly discovered that because of the seniority of most of the staff at the university, a very large fraction of any new money went to pay annual salary increments to the senior staff. The answer was simple; any new appointments had to be at the lowest level on the incremental scale and, if not, any difference in the cost was deducted from that Faculty's share of any new money. This incurred the wrath of the medical faculty, who felt they were obliged to make appointments at a relatively senior level in part in fulfilment of their commitment to the clinical departments in the hospital.

In the spring of 1968, Perry's attention was drawn by his son to an advertisement for the first Vice-Chancellor of the Open University. Although at first sceptical, he was persuaded that the Planning Committee was serious. In the application he was asked to write a short note on what he thought the Open University could accomplish. According to his own account he wrote:

> I was all too aware of the poor quality of much university teaching. It struck me that if courses could be prepared that would be of high quality and would be available on TV and radio and in bookshops, teachers in conventional universities might be shamed, or pressured by their students, to do rather better.

When he accepted the appointment most of Perry's colleagues told him he was mad. Michael Swann, who like everyone else was sceptical about the survival of the new university, complimented him by saying that if anyone could make it work, it was Perry.

The Open University, 1968–80

The early history

Many people lay claim to the basic idea of an open university. But there can be no argument that Walter Perry was the man who built the UK's Open University (OU) from scratch in 1969 to a university of nearly 100 000 students by the time of his retirement in 1980—one with high academic standards and offering a wide range of courses, including mathematics, science and technology.

Following Harold Wilson's proposal for 'a university of the air' in 1963, the idea had a chequered history over the next few years, becoming something of a political football. After Labour's election victory in October 1964, Wilson gave Jennie Lee the responsibility for taking the concept forward in March 1965. But there was still some opposition within the Government until it was included in the Labour manifesto for the 1966 election, which Labour won again. Jennie Lee remained the driving force for the new university, against opposition from the Conservatives—Iain Macleod described it as 'blithering nonsense'—and from many people in the conventional university and adult education worlds. The crucial decision to go ahead was coupled with the appointment of a Planning Committee in September 1967.

Writing in 1976, Perry (67) describes how he came first to think about the OU. He had developed an interest in distance teaching at Edinburgh, giving some students a reading list coupled with organized seminars; as mentioned earlier, he found that these students did just as well as if not better than those taught traditionally in formal lectures. He also introduced computer marking of multiple-choice questions in examinations. To quote Sir John Crofton, then Dean of the Medical School at Edinburgh, Perry 'drew conclusions which were important later at the OU, that distance learning could not simply be left to reading, but had to include videos and other modern equipment to take the place of lectures.'

After a successful term of office as Vice-Principal at Edinburgh, Perry was thinking in terms of a possible vice-chancellorship in a conventional university. But seeing the advertisement for the new post of OU Vice-Chancellor he began to think seriously about it. After consulting the Labour MPs Tam Dalyell and Jennie Lee, he decided to apply.

Founding Vice-Chancellor

Perry was appointed in May 1968, and the OU was formally established at a charter ceremony at The Royal Society in July 1969. The first Chancellor, Lord Crowther, memorably described the OU as a university 'open as to people, open as to place, open as to methods, open as to ideas'. Coupled with Jennie Lee's insistence that 'nothing but the best would do', this was very much the philosophy of Walter Perry.

The magnitude of the task involved in setting up the OU could have been daunting for many people, but not to Perry. He led from the front in appointing academic and administrative staff, establishing the university structure and regional offices, initiating the operational side of course production, liaising with the Planning Committee and putting in place the partnership with the BBC. In all this work he was greatly helped by his new University Secretary, 'Chris' Christodoulou. As Tyrell Burgess (Burgess 2003) has said, 'together they were unstoppable'. His style was essentially hands-on and informal. He was at his happiest in leading from the front and doing things, or having things done, preferably his way.

But not the least important role of the new Vice-Chancellor was the political one, remaining in close touch with the Wilson Government and the Department of Education and Science (DES). This was a different relationship from the one that Perry had known at Edinburgh, which, like all the conventional universities, was funded through the UGC, somewhat remote from Government.

Not so for the OU, directly funded by the DES. Towards the end of the Wilson Government, Roy Jenkins and the Treasury had come to view the OU as something of a Harold Wilson gimmick and wanted to restrict the expenditure and size of the OU. But with support from Edward Short, the Secretary of State, and Jennie Lee, Perry obtained agreement in 1969 to admit 25 000 students to the OU in 1971. After the change in Government in 1970 he was faced with

similar opposition again from the Treasury—Iain Macleod was Edward Heath's first Chancellor of the Exchequer—and Perry was worried about survival. But he stuck to his guns, and Macleod's successor, Anthony Barber, gave it a reprieve; Perry wrote (67) that he had earlier blunted the opposition of Margaret Thatcher (later Baroness Thatcher; FRS 1983), the new Secretary of State for Education, and that this was crucial in the negotiations of 1970. Sir Frederick Warner FRS (Warner 2003) confirms this:

> Lord Crowther, as Chairman of Forte, had an apartment in Grosvenor House where he invited Margaret Thatcher to dine with the OU Officers while she was in Opposition. She gave all the arguments against it [the OU] but fought for it against McLeod when Minister of Education in the 1970 Conservative Government.

In all these matters Perry had the active support of Sir Peter Venables, who had chaired the Planning Committee and who had by now become his Chairman of Council. Venables insisted that the university should assert its independence of Government. In his account of the university (67), Perry acknowledged his respect for Venables and described him as 'one of the two best Chairmen I have ever known'.

Policy decisions

There were several major policy decisions that he was instrumental in making in the early days of the OU. The first was that although there was to be open entry—school examination qualifications not being required—there would be no compromise on standards. The OU degree was to be comparable and equivalent to that offered by conventional universities in Scotland. Perry also put in place for the first time in the UK a coherent policy for the transfer of credit to the university for higher education successfully completed elsewhere (not least for the many tens of thousands of certificated teachers who wanted to upgrade their qualification to a full degree).

The second was to teach in a variety of media, through written textual material circulated to all students, through radio and television, through regular submission of assignments, backup tutorials and summer schools (organized by the regional offices), and through home experimental kits. This rich mix of excellent instruction remains the reason for the success of OU teaching. Perry realized that to justify the high development costs of quality learning materials, scale was essential in order to achieve cost effectiveness, because those costs were much the same whether the course was subsequently studied by, say, 500 or 25 000 students.

A third major decision was to design a wide range of courses that could be studied as part of a flexible credit-based system for the single first degree of BA. Faculties of Arts, Mathematics, Science and Social Science were established initially and, later, Faculties of Educational Studies and Technology were added.

Lord Perry himself always thought the concept of the course team was 'the most important single contribution of the OU to teaching practice at tertiary level'. Into each team were drawn the academic course designers and writers, educational technologists and BBC production staff. Administrators, publication and regional staff provided help and advice; and most crucially, external advisers and assessors became involved at later stages in the approval process for the course. Thus an OU course became a joint responsibility, not belonging to any one professor or lecturer, although authorship of the individual units of a course was stated, if the Faculty so decided.

Science and technology

It was a brave decision to teach science and technology at a distance. There were strong objections that these were practical subjects and needed laboratory instruction. These arguments were countered by some classic illustrations of experiments on television, the introduction of summer schools where some supervised laboratory or field experience could be gained, and by home experimental kits designed and made specially by the OU and dispatched to students directly. Some of these experiments were brilliantly innovational and the whole operation was exciting and a massive achievement in logistics. Perry vividly describes in his book how virtually the whole of the OU staff, from porters to professors and including families and friends, packed the first home experimental kits in the university car park during the Christmas holidays of 1970, before the new students were admitted in 1971. Subsequently, a large warehouse operation was established to deal with dispatching the kits, receiving them on return from the students, and then maintaining and repairing them in preparation for their use the following year.

Criticism could still be made that students were not subjected to the full rigours of a normal university laboratory course and it was accepted that this might be true in heavy engineering subjects such as civil engineering. But the students were undoubtedly challenged intellectually by the OU's practical instruction.

Other subjects

Perhaps as interesting as the list of subjects that Perry initiated were those that he decided not to attempt to teach—languages, law, and medicine, although the first two are now included in the courses that the university offers. For medicine the inability to provide extensive practical instruction must have been the prime reason, but Perry subsequently argued that it could have been done in short initial first-degree preclinical courses followed by updating in continuing education throughout a later professional career.

Research

Perry was insistent that research should figure strongly within the university, and he appointed several professors with strong research records. However, it was accepted that in the early years the emphasis would be on the preparation of teaching materials, and staff would need support to keep their research going. Perry therefore used university funds to provide supporting research staff and students, and on the basis of this special university support he persuaded the Research Councils that applications for grants from OU staff would be considered on the same basis as those emanating from conventional universities. This was no small achievement and demonstrated Perry's strong commitment to research.

Restrictions on building meant that it did not prove possible to establish substantial research laboratories in all subjects. In some areas where large laboratories were not required, research schools did develop—in psychology and mathematics for example. Perry also stressed the openings for interdisciplinary research, and some such groups, for example an energy research group, not requiring laboratory space were set up. But good research laboratories were built in some particular disciplines, notably in biology and Earth sciences. (Walter Perry would have been delighted with the entrepreneurial Beagle 2 venture of Colin Pillinger—a Fellow of The Royal Society with his own swash-buckling style.)

In some subjects it proved possible for staff to undertake first-class research with other universities and organizations—for example in physics with CERN in Switzerland—again with

central university funding assistance. Many members of staff in regional offices continued to conduct their research, sometimes through neighbouring universities. One regional director wrote a major authoritative book on Roman Britain, which has become one of the most widely read volumes on the subject.

Research students were accepted both on the central campus, and in remote locations in the regions, where they could be supervised jointly by an OU staff member and a colleague at another university or in industry. At present there are some 35 000 postgraduate students registered with the OU world-wide, in addition to the 150 000 undergraduates.

Academic freedom

Perry was always a strong advocate of academic freedom but he saw early on that such freedom might be in danger of being compromised by the course team concept, for both staff and students. There was an opportunity for biased views to be included in course material and circulated nationally, far beyond the confines of a lecture room in a conventional university. Theoretically, the OU could become a polemical instrument in itself, advocating support for a particular political line. Perry realized that constant vigilance was needed at university level, through a system of external monitoring and assessment in addition to the normal policy of external examiners for each course. This concern was to be confirmed later when the university encountered difficulties with accusations of academic bias, both during Perry's Vice-Chancellorship and later, after his retirement from the scene. The OU strongly and successfully defended its academic freedom on these occasions, although it needed substantial mobilization of support nationally on the latter occasion, in the 1980s.

Hard work followed by success

The early development of the OU required an enormous amount of work from the many people who joined Perry's band of inventors and explorers, and they were devoted to him. But the drive, enthusiasm and energy came from the top. Throughout 1969 and 1970 the new Vice-Chancellor worked 18 hours a day and seven days a week, apart from a weekly round of golf at the Woburn course in the new city of Milton Keynes, to which Perry had engineered the transfer of the OU from its original location in Belgrave Square. He suffered, but fully recovered from, a coronary thrombosis in December 1970. Sir Frederick Warner (Warner 2003) remembers this occasion:

> Perry [was given] a hard time by some OU leftists, particularly at a Planning Committee where he ended the day red and speechless from his first heart problem. Later at his son's wedding in Edinburgh he had a massive heart attack and was saved by a former colleague who had heroin in his doctor's bag.

The reward for him and his colleagues came in the remarkable response in applications when the OU opened its doors to students: 40 000 people applied in 1970 for the 25 000 places. It was a major logistical success for those new students to receive their course material and start on their new degree courses in January 1971. It set the pattern for all that was to follow; there was now a huge cohort of students demanding that new courses be available as quickly as possible so that they could complete their studies. The first of them graduated at the end of 1972, and the first national degree ceremony at Alexandra Palace in the summer of 1973 was a particularly proud moment for Perry.

Under Walter Perry's leadership the university continued to grow successfully throughout the 1970s, primarily in the undergraduate school. A small start was made in the delivery of

post-experience courses and Perry asked Peter Venables, who had now retired as Chairman of Council, to chair a committee to formulate a blueprint for the future development of a full programme of continuing education. But developments in continuing education at postgraduate level were not to follow until the 1980s. However, Perry initiated activities overseas, advising other countries on setting up open universities—well over a dozen must have received crucial guidance from him—and he also set up a commercial arm for the sale of OU material.

He much enjoyed travelling overseas to meet other distance teaching colleagues, but attempts to establish an American open university were not successful, much to his personal disappointment. He also undertook a limited number of personal outside activities—for example he joined the Board of the *Encyclopedia Britannica* and enjoyed transatlantic flights in Concorde to attend board meetings in Chicago.

But his main focus remained within the university he had established with such success. He was a great first Vice-Chancellor of a very special university, and on retirement in 1980 he left a Rolls-Royce machine, purring along after the great alarums and excitement of the early days.

The third career, 1981–2003

On his election to the House of Lords, Perry had taken up his new duties with his usual enthusiasm and energy. He had joined the Social Democratic Party and became its spokesman in the Lords on education, health and social security in the period 1983–91. But his major role was as a member of the Select Committee on Science and Technology (from 1985 to 1990 and from 2000 to 2001), including Sub-Committee II (Science and Society), from 1999 to 2000, and Sub-Committee IIA (Human Genetic Databases), from 2000 to 2001. He chaired the enquiry into the medical uses of cannabis, which in 1998 recommended that the Government allow doctors to prescribe cannabis—'though cannabis should remain a controlled drug, the law should be changed to allow doctors to prescribe an appropriate preparation of cannabis if they saw fit'. This was promptly rejected by the Government. However, the report marked a shift of opinion and in 2001 the committee recommended faster progress towards cannabis-based medicine.

He also took a keen interest in the welfare of seafarers and fishermen. His remarks in the House of Lords on overfishing in 1995 made a considerable impact on both sides of the Atlantic and as late as 2003 saw the publication of a paper (Eagle & Thompson 2003) entitled 'Answering Lord Perry's question: dissecting regulatory fishing'. Although he was not a member of the House of Lords Committee on Animal Experimentation, he attended every debate and committee meeting in the Lords that was relevant to animal research and took every opportunity to argue the case.

At the time of his death, Lord Perry was President of the Research Defence Society and had been for 10 years (1993–2003). He was also a past Chairman (1979–83) and had been a committed member for 40 years He was a tireless defender of the work of Huntingdon Life Sciences and delighted in confronting anti-vivisectionists by asking them whether, if they or one of their family were seriously ill, they would be prepared to benefit from the results of research that could not possibly have been carried out without the use of animals. The Research Defence Society will miss his active participation and leadership.

Concluding remarks

Perry the man [J.S.K.]

Perry was a man of great charm and charisma. He had the knack of putting people at their ease that was quite unusual, coupled with the capacity to insist, when it mattered, and in quite a tough way, that they must do what they ought to do. He enjoyed congenial company and was probably only comfortable and happy when he had it. Much of his university business in Edinburgh was accomplished in the university's staff club, either on the squash court or in the dining room and bar. He was master in his own habitat and was most at ease when surrounded by his colleagues and sure of their esteem. He had a very easy way with students and when meeting with them never gave the impression that he had better things to do elsewhere. However, his attempts to put them at their ease were sometimes a little gauche. He was not in any way an absent-minded professor but he had that kind of donnishness, although there was nothing bookish about him. He was an excellent host and his parties for the current year's honours students were an annual highlight for young members of the departmental staff. Rumour had it that Perry's takings at poker from the students more than paid for the drink consumed. In the evening after a day of scientific meetings he was a renowned musical performer and in his younger days had a remarkably clear and assured voice much suited to singing Schubert's Lieder. At the celebration of Perry's death in Edinburgh two of his sons, Alan and Rob, sang 'Say, Watchman, What of the Night?' with almost equal clarity but rather less assurance. He loved performing and was a keen member of the Savage Club and the Scottish Arts Club, and they provided modestly critical outlets for his talent. He loved melodramatic ballads, but the important thing for him was to guy or camp it up quite a lot; sense of humour was more important than musicality.

Such was Walter's personality that several of the authors of his obituaries (Anon. 2003*a*; Anon. 2003*b*; Burgess 2003; Dalyell 2003) were tempted to describe this by making a direct link between his personal qualities and the effort that was required to establish the OU—tenacious, tactful and tough. Another portrayal (Harvie 2003), much nearer the mark, likens him to one of Frederick the Great's Generals: 'a rough Scots profile, with eyes that are second guessing the opposition, three or four moves ahead'. Although close this is still not quite correct because Walter, regardless of the opposition, whether it were Minister of the Crown, Dean of Medicine, stroppy senior lecturer, honours student or a very young daughter, had to win no matter the game and no matter the prize. This he did with such enthusiasm, grace, boyish charm and modesty that it was impossible for the loser not to join in the celebrations. Indeed, he was comfortable only if he could win gracefully. However, the loser was as often as not in for another surprise, as at the next airing of the issue Walter changed his game plan and adopted his opponent's argument as his own; of course, this is a pretty universal trait among games players, and he was a determined games player. It is said that he took the view that getting his colleagues to agree on anything was always difficult; however, it was seldom difficult to herd them in the direction he wanted them to go because they were usually totally oblivious to the concept of strategy and tactics. The implication was that it was easy for him to get his own way. As a card player he no doubt counted the votes, didn't hold votes unless he was confident of winning, and was capable of a little arm-twisting and horse-trading when the situation required it.

In the end I can think of no better testimony to Walter than that of one of his sons:

> I always thought of him, and still do, as one of the most civilised people I have ever known—because of the courteous way he dealt with people and the way he maintained evenness of tone and self-control and a genuine

> kindliness for absolutely everyone—a kindliness that was obviously a fundamental character-trait. Also I detected steel in him—and I was brought up Calvinistic enough to feel that it isn't civilised if you can't vigorously oppose what's wrong. He did do that, and I admired that.

Walter was working right up until he died in his sleep in his London club, still travelling weekly between London and Scotland. Whenever we met on the train I was amazed by his enthusiasm for all his committees and his anxiety to make an even greater contribution to his favourite causes. In June, in spite of his obvious failing health, he just could not wait for the summer recess to end and a new session to begin.

J.H.H. adds: Walter Perry gained great pleasure from his election as a Fellow of The Royal Society, for services to education and science. But he did not play a major direct role in the Society's affairs, preferring to make his scientific contributions in the Lords and in informal discussion meetings such as those of the Foundation for Science and Technology. He regularly attended the Society's dinner meetings at 6 Carlton House Terrace. Perry's warmth and enthusiasm remained unchanging in these later years, and he had strong views on current political and scientific developments. Paradoxically I was to get to know him more closely in the 1990s when I myself had retired; we spent many enjoyable evenings dining together, following our respective daily duties in Westminster and The Royal Society.

Perry the scientist [J.S.K.]

Perry's scientific career at NIMR lasted rather less than decade. During this short period he submitted two theses, one of which won a silver medal, and published approximately 80 papers, meeting abstracts and reviews and prepared himself for an exacting career in statistics. Although several of the papers and the reviews are single-authored the number of co-authors on the remaining papers is in excess of 50. Although he himself denigrates his first paper with Hawking in *The Lancet* (5), the paper is beautifully illustrated and gives a very convincing account of the work. His other work with Hawking was highly contemporary and gave him first-hand experience of mammalian tissue culture and the injection and management of monkeys that was to prove so vital in the testing of the killed polio vaccine. His work on the toxicity of arsenic must have proved more interesting than he suggested later, because he extended these studies when Director of Biological Standards to mercury, which was at that time and for at least the next decade the main ingredient of the most commonly used diuretic. As Director of Biological Standards his interest in hormones was particularly wide ranging and never too far from the cutting edge of clinical medicine. His interest in the standardization of ACTH also fed forward into the work on the safety of the polio vaccine in which the immune responses of the test monkeys were weakened so as to increase their sensitivity to any viable virus remaining in the vaccine.

His work in the Division of Physiology was also wide ranging. His knowledge of bioassay allowed him to become an expert on the bioassay of acetylcholine in a very short time. The value of this work is difficult to appreciate almost 50 years later. The battle to establish the chemical nature of synaptic transmission at sites other than the neuromuscular junction is now long over, but at that time the battle involving Sir Jack Eccles FRS and others was still pretty intense and partisan. Undoubtedly, the most interesting and innovative work completed by Perry was with Paton, in which they recorded the electrical activity of synaptic transmission through sympathetic and parasympathetic ganglia. In comparison with other work at the time, the evoked potentials from the ganglia were much more complicated than anyone would have predicted from contemporary views of their function and anatomy. Indeed, unravelling the

synaptic network within each of the ganglia remains a fertile area of research even today. Earlier, Paton, who was to become Professor of Pharmacology in Oxford, had used several custom-synthesized methonium compounds to show that the nicotinic receptors in the ganglia with which acetylcholine interacted were pharmacologically different from those at the neuromuscular junction. It is only during the past five or six years that it has become clear that the subunits that make up the nicotinic receptors at separate sites are genetically distinct. The pharmacological observations made by Paton and others in the UK had led to the introduction of new drugs that allowed the independent control of muscle tension and blood pressure during surgical anaesthesia. Hexamethonium, which blocked transmission through the sympathetic ganglia but had no effect on the muscle tension, was the mainstay of the treatment of severe hypertension for about a decade (69). Some of these compounds and their analogues are still in use today. However, it is now apparent that Perry was more interested in how this approach might lead to the discovery of new agents for the treatment of mental illness. One can well understand Perry's disappointment when the administrative duties associated with the importing of the Salk polio vaccine from the USA took him away from the research bench.

In Edinburgh, the academic facets of Perry's research at NIMR reappeared with his recruitment of Bernard Ginsborg to work on the ganglia and, indeed, the action of drugs at the neuromuscular junction. He also recruited Brocklehurst from NIMR to continue the Division of Biological Standardisation's interest in modulators of the response to an immunological challenge.

(As an honours student, in these early days in Edinburgh, Perry assigned me two laboratory projects; one to assay 5-hydroxytryptamine on a strip from the rat stomach and another to look at the actions of strychnine and picrotoxin on the rat spinal cord reflexes. Later, others showed strychnine to be a specific blocker of glycine-mediated inhibitory transmission, and pictrotoxin to a potent blocker of GABAergic transmission. His idea that this approach would pay dividends was a good one.)

Although it is clear that Perry had the intellect and manual dexterity to have continued in academic research I think one must come to the conclusion that he was first and foremost a pragmatist and at the same time never forgot his training and early experience as a doctor. I suspect that setting up the MRC Brain Metabolism Unit was not only an intellectual challenge and a continuation of his earlier academic interests but also a genuine desire to find new and better treatments for mental illness. As I write I cannot but wonder if he saw the development of the OU as another opportunity to improve the training or retraining of medical practitioners.

Perry the Vice-Chancellor [J.H.H.]

Walter Perry will be remembered as a distinguished university administrator and founding Vice-Chancellor of the OU. It was in that role that he demonstrated his outstanding qualities as a leader, innovator and practitioner. By bringing together academics and educational technologists, supported by professionals in broadcasting, publishing, logistics and administration, Perry was able to achieve a step function in teaching quality and at the same time a massive widening of access to higher education at costs lower than those found elsewhere—a truly remarkable achievement and a revolution in the economics of higher education at the time. It was Perry's desire to see improvements in the standards of university teaching everywhere that had motivated him to apply for the post of Vice-Chancellor of the OU in the first place. There is no doubt that the OU's course materials and its approach to teaching have had, and continue

to have, a significant influence on the quality of teaching at other universities in the UK and around the world.

Family

Perry was married in 1946 to Anne Elizabeth Grant, with whom he had three sons. He married his second wife, Cathie, in 1971, with whom he had two sons and a daughter. Cathie followed her own medical career but shared in Walter Perry's achievements at the OU and in setting up Wednesden House as the official residence of the Vice-Chancellor.

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