

The Brown Animal Sanatory Institution

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CHAPTER 11. THE SUPERINTENDENTS

As mentioned in Chapter 1, the Brown Institution was staffed by a remarkable series of Superintendents, seven out of eight of whom were, or became, Fellows of the Royal Society. Much of the research work they undertook has already been referred to in preceding chapters, but it seems only fitting that something should be said about their personalities and careers. In preparing the short accounts that follow, I am greatly indebted to obituary notices in the various scientific journals, especially those in the *Proceedings of the Royal Society*; to the pen sketches given by Professor Sharpey-Schafer (1927) in his *History of the Physiological Society*; and to the Memoirs in book form of Sir John Burdon-Sanderson by his wife (1911) and of Sir Victor Horsley by Sir Stephen Paget (1919).

Sir John Burdon-Sanderson (1829–1905)

John Scott Burdon-Sanderson was born at Jesmond, Newcastle upon Tyne, on 21 December 1829 and died on 23 November 1905, aged 75. He was the second son of a Northumberland squire, and passed his early life in country pursuits – hunting, shooting and fishing. His father became ‘converted’ while John was very young, and joined a small exclusive set of nonconformists known as the Plymouth Brethren. Though he himself had been to Oxford University, his conscience would not allow him to send his son there on account of the religious tests then imposed; instead, John proceeded, at the age of 19, to the University of Edinburgh. Incidentally, Michael Foster was prevented from entering Cambridge as an undergraduate for a similar reason.

His father wanted John to join the legal profession. The law was very much in the family. John’s grandfather, for example, was Lord Chancellor Eldon; his nephew was Lord Haldane, who was twice Lord Chancellor; and his wife’s brother, Lord Herschell, was Lord Chancellor during one of Gladstone’s administrations. Law, however, did not appeal to John; in place of it he chose medicine. At Edinburgh he came under the influence of the Professors of Botany (J. H. Balfour), of Anatomy (John Goodsir), and of Physiology (Hughes Bennett). After graduating in 1851 he went to Paris, where he spent several months going the rounds of the hospitals. He studied Chemistry with Gerhardt and Wurtz, Embryology with Coste, and Physiology with Claude Bernard, whom he regarded as ‘the most inspiring teacher, the most profound thinker, and the most remarkable experimentalist he had ever known’ (Gotch 1907).

In 1853 John married Ghetal, daughter of the Reverend Ridley H. Herschell, a

converted Jew from Germany, whose wife, Helen Mowbray, was a woman of great culture. Ghetal's brothers were exceptionally gifted; one, Farrer, later Lord Herschell, became, as already mentioned, Lord Chancellor of England.

John took his Membership of the Royal College of Physicians in 1854, and joined the staff of St Mary's Hospital as a Lecturer in Botany. In 1856 he was appointed Medical Officer of Health for Paddington. While occupying this post, he carried out with Dr Bernays, the Lecturer in Chemistry at St Mary's Hospital, investigations into the adulteration of milk with water, and of bread with alum. He analysed air in the town and country; and pressed for the use of quantitative methods in the study of ventilation. In 1859 he made observations on epidemics of diphtheria in different parts of England, but failed to discover any close relation between the prevalence of the disease and the local geological formation or sanitary conditions. In 1865 he accepted an invitation to go to Danzig to study cerebrospinal fever. In the same year he turned his attention to cattle plague (Rinderpest), which was occurring in epizootic form in England, and showed that the blood of sick animals was infectious, and able to convey the disease when inoculated into normal cattle. He also found that the causative agent was incapable of passing through an animal membrane.

In 1867 he resigned the posts of Medical Officer of Health, and Assistant Physician to the Middlesex Hospital, and was elected to the Fellowship of the Royal Society. Later he left the staff of the Brompton Hospital. In 1870 he hired a room over a stable in Howland Street and converted it into a pathological laboratory; brought Emanuel Klein, a histologist, over from Vienna; and worked with him, Lauder Brunton (later Sir Lauder), David Ferrier (later Sir David) and Edward Sharpey (later Sir Edward Sharpey-Schafer) on pathological problems. In the same year he was appointed to the Chair of Practical Physiology at University College, London; and, when Professor Sharpey retired in 1874, to the Jodrell Chair of Physiology – a post he held till 1882.

From about 1870 onwards Burdon-Sanderson left the fields of clinical medicine and public health in order to devote himself mainly to physiology, microbiology, and the infectious diseases of man and animals. His need for a suitable laboratory in which to carry out his experiments led him to accept, in 1871, the offer of a post as the first Superintendent of the Brown Animal Sanatory Institution. He started work there on 1 January 1872, and continued till his resignation in 1878.

Burdon-Sanderson's observations with Mr Duguid on the immunity following the inoculation of bovine animals with a non-fatal dose of blood from rodents infected with anthrax have already been referred to in Chapter 7; his partly successful attempt to immunize cattle against pleuropneumonia in Chapter 9; and his direction of Dr Buchanan Baxter's study of disinfectants in Chapter 10. Many of the inquiries he made, such as those into diphtheria, cerebrospinal fever, vaccination against smallpox, rabies, cholera and cattle plague, were carried out at the request of Sir John Simon, who provided the necessary funds from the Privy Council.

While at the Brown Institution, Burdon-Sanderson published his *Handbook of Practical Physiology and Histology*. He was instrumental in founding the Physio-

logical Society in 1876 and the Clinical Society of London, both of which were born at his house in Queen Anne Street.

His subsequent career can only be touched on. He left University College in 1882 to take up the Waynefleete Professorship of Physiology at Oxford – a post he held till he succeeded Sir Henry Acland as Regius Professor of Medicine in 1895. He served on the Royal Commission appointed in 1890 to inquire into the effect of food derived from tuberculous animals on human health. In its report in 1895 the Commission laid particular stress on the danger of raw milk from cows suffering from tuberculosis, and showed how boiling the milk rendered it safe for human consumption. He was created a baronet in 1899, was three times Croonian Lecturer to the Royal Society, and was President of the British Association at its meeting in Nottingham in 1893. Unlike many of the famous men of the last century who were brought up in strict evangelical homes, he maintained his religious beliefs to the end, and in 1872 delivered an address to the Students' Christian Union at University College on the essence of religion, and the difference between the religion of Christians and the morality of the agnostics and humanists. He died in 1905.

Burdon-Sanderson had a striking appearance and personality. He was somewhat gaunt, but with a clean intellectual face, and a striking gentleness of manner, which must have disappointed the antivivisectionists who opposed him at Oxford. He was not an impressive lecturer, nor did he have the same power of instigating research as his Cambridge colleague, Sir Michael Foster. But he was one of the outstanding men of his generation, acquainted with many branches of science; and, apart from his other achievements, must be remembered for launching the Brown Institution and for guiding it along the right course from the beginning.

(For obituary notices, see *British Medical Journal* (1905), ii, 1471, 1481–92; *Lancet* (1905), ii, 1652; Sharpey-Schafer (1927).

William Smith Greenfield (1846–1919)

W. S. Greenfield was born at Salisbury in 1846, and died at Juniper Green near Edinburgh, on 12 August 1919, aged 73. As an undergraduate he studied at University College, London, and at University College Hospital. He qualified M.B., B.S. in 1872, proceeded M.D. in 1874, and was elected to the Fellowship of the Royal College of Physicians in 1879. He served as Medical Registrar for two years at St Thomas's Hospital and demonstrated in Morbid Anatomy and Pathology in the Medical School. After holding the posts of Assistant Physician and Physician for Diseases of the Throat at St Thomas's Hospital, he was appointed in 1878 to the directorship of the Brown Institution in succession to Burdon-Sanderson.

There he took up the study of anthrax, septicaemia and pyaemia, and was able to confirm the view held by Dr Bell (1880) of Bradford that woolsorters' disease was a form of anthrax (Editorial, 1879; Annotation, 1880*a*, *b*). Greenfield's own experiments (see Annotation 1880*b*) led him to conclude that woolsorters' disease in man was the same as splenic fever in cattle. Following up the preliminary observations of Burdon-Sanderson and Duguid (see p. 89) he succeeded in attenuating the virulence of the anthrax bacillus, and in preparing a vaccine that protected cattle and sheep against the disease. This work was completed before

the corresponding observations of Toussaint and of Pasteur in France; but Greenfield, as pointed out in Chapter 7, received no credit for it. Its importance was not recognized by his colleagues; and he was the only one of the eight Superintendents of the Brown Institution who was not elected to the Fellowship of the Royal Society.

Greenfield left the Brown Institution in 1881 to take up the Chair of Pathology at the Medical School of Edinburgh University. For this post he was eminently qualified. He was able to combine the teaching of pathology and morbid histology in the Medical School with the practice of clinical medicine in the Infirmary, and thus, like Sir William Osler at McGill University, to provide students with a solid pathological basis for their future careers. Greenfield retired in 1912 after 31 years' service to the University.

At St Thomas's Hospital Greenfield laid the foundation of a great career in Pathology; and in his work at Edinburgh he set an example that was copied by other Universities, and established Edinburgh as the centre of pathological teaching in Great Britain.

Apart from his 'Pathology of the Kidney' which he contributed to the New Sydenham Society's *Atlas of Pathology*, and which was 'one of the most accurate pieces of pathological work in the English language', Greenfield wrote little. He was hypercritical of himself, and the recording of his vast pathological experience never reached the stage of publication. His pupils, however, such as Robert Muir (later Sir Robert), Sims Woodhead (later Sir German), and Lorrain Smith, imbibed much of his learning and, apart from becoming professors themselves, provided in their turn trained pupils who later occupied most of the pathological chairs in England.

Greenfield was a man of deep religious conviction, and associated himself with Professor Henry Drummond in his work for the welfare of students. His closest assistants were drawn to him, not only as a great pathologist, but as a lovable man whose friendship was deeply appreciated. During his later years his health gave way. He suffered from vertigo, and eventually complete deafness.

Professor Lorrain Smith, who contributed to his obituary notice, regarded Greenfield as a sound and extremely critical pathologist, a great clinical teacher, and an enthusiastic demonstrator who trained many men for chairs in both pathology and clinical medicine.

(For obituary notices, see *British Medical Journal* (1919), ii, 255; *Lancet* (1919), ii, 351; *Edinburgh Medical Journal* (1919), 23, 258.)

Charles Smart Roy (1854–1897)

Charles Smart Roy, the third Superintendent of the Brown Institution, was born at Arbroath in 1854 and died prematurely in Cambridge at the age of 43. His early education was at St Andrews and his professional at Edinburgh. After qualification he acted as a resident physician at the Royal Infirmary in the wards of Dr Balfour, who was an authority on valvular lesions of the heart. He then worked for a time at the Brown Institution on the pathological anatomy of epizootic bovine pleuropneumonia, but left to act as a Surgeon-Major in the Turkish army during the Serbian War in 1876. He resumed his investigations at

the Brown before proceeding to Berlin to study under Professor du Bois Reymond in the Physiological Institute and under Professor Virchow in the Pathological Department of the University. In 1879 he moved on to Strassburg, where he spent a year as Assistant to Professor Goltz in the Physiological Institute. Finally, he stayed nearly a year at Leipzig, collaborating with Professor Cohnheim on problems of the renal circulation. For this work he invented the oncometer – an instrument for measuring variations in the bloodflow through the kidney, spleen, and other organs. He returned to England in 1880 to take up the first of the Studentships that had been founded by George Eliot in memory of George Henry Lewes (see Smith, 1976). During his tenure of this award he worked in Professor Michael Foster's laboratory at Cambridge, and published a paper on the physiology and pathology of the spleen.

In 1881 Roy was appointed Superintendent of the Brown Institution. Most of the three years he spent in this capacity were devoted to his major study, namely that on the action of the mammalian heart. It was interrupted for a short time by a visit to South America to investigate an epizootic disease of cattle, which turned out to be anthrax.

In 1884 he left the Brown to take up his appointment to the newly established Chair of Pathology at Cambridge. In the same year he was elected a member of the Royal Society. In 1885 he visited Spain, together with Sherrington and Graham Brown, to investigate an outbreak of cholera. While there, this small team confirmed Robert Koch's findings on the cholera vibrio.

At Cambridge he continued to work on the action of the mammalian heart. He was instrumental in securing the foundation of the J. Lucas Walker Studentships, and was mainly responsible for selecting the recipients. In this way he gathered round him such gifted men as J. G. Adami, William Hunter, Alfred Kanthack, Lorrain Smith, W. Westbrook, and Louis Cobbett. The Department was cramped for space; but this hindrance was largely removed when in 1889 new premises were made available by transforming and refitting the vacated Chemistry School of the University. Roy's students carried out numerous investigations on a variety of subjects, chiefly concerned with the circulation. For this work Roy invented the plethysmograph and the cardiomyograph; and published with Professor Adami in 1892 the results of a long series of experiments on the mammalian heart in which these instruments had been used. With Sherrington he performed a brilliant investigation into the circulation in the brain.

Roy's work was mainly physiological, but at heart he was a pathologist with strong clinical leanings. He was a philosophic teacher, a most able investigator, and a skilful operator, who had a great power of mechanical invention. He had little patience with the morbid anatomists, whom he accused of wasting their time studying anatomical changes with hair-splitting minuteness; and he regretted the excessive number of hours spent by medical students in the dissecting room – a task that closed their minds to the broad problems of medicine. His rather bluff manners and abrupt address were merely the outward signs of a sterling and generous nature. Throughout his life he remained strongly under the influence of Cohnheim, with whom he had co-operated at Leipzig in his postgraduate years.

Roy was of middle height, strongly built, with a ruddy complexion. He was naturally very resistant to fatigue – an endowment that enabled him to become a great traveller, an enthusiastic mountaineer, and a keen sailor. In 1889 he married Violet, daughter of the late Regius Professor of Physic. His last three years were clouded by a nervous breakdown, probably the result of his addiction to morphine (see Smith 1976). After giving the same lecture three times in succession, he had to be displaced. He went prematurely grey and died suddenly in a fit on 4 October 1897.

(For obituary notices, see *Journal of Pathology and Bacteriology* (1898), 5, 143; *Lancet* (1897), ii, 954; *British Medical Journal* (1897), ii, 1031; *Proceedings of the Royal Society* (1905), 75, 131).

Sir Victor Horsley (1857–1916)

Victor Alexander Haden Horsley was born in London on 14 April 1857 and died of heat stroke in Mesopotamia on 16 July 1916. He was the son of John Callcott Horsley, R.A., and came from a family long distinguished for ability in natural science and the arts. He was born on the same day as Princess Beatrice; and Queen Victoria, who took an interest in the family, asked his father that he should be called by her own name, Victoria; hence the unusual, but most apposite, Christian name of Victor. Much of his childhood he spent at a country house his father had bought at Willesley, near Cranbrook, Kent; and it was at Cranbrook School that he received his early education. From there he passed in 1873 to University College, London, where he came under the influence of Sir John Burdon-Sanderson; and thence to University College Hospital. He graduated MB., B.S. in 1881, was admitted to the Fellowship of the Royal College of Surgeons in 1883 and in 1885 was appointed to the surgical staff of University College Hospital. In 1884 he joined the Physiological Society, and in the same year was chosen to be the Superintendent of the Brown Institution – ‘a post much coveted by physiologists’.

His work on cerebral localization at the Brown led to his being appointed Surgeon to the National Hospital for Epilepsy and Nervous Diseases in 1886.

He succeeded Dr Charlton Bastian as Professor of Pathology at University College in 1887, holding this chair at the same time as the directorship of the Brown Institution. In 1886 he was elected to the Fellowship of the Royal Society in recognition of his work at the Brown, and in 1894 received a Royal Medal. He served from 1891 to 1898 as Fullerian Professor at the Royal Institution; and was made Professor of Clinical Surgery at University College Hospital in 1899. This last post, together with the Professorship of Pathology at the College, he gave up in 1906 to devote himself to public and political causes, among them temperance and female suffrage. His scientific interests, however, were not wholly abandoned; he kept on his laboratory till 1913, and set aside one day every week on which to continue his researches. He was knighted in 1902.

At the Brown Institution during the most productive period of his life, Horsley studied three main subjects: the functions of the cerebral cortex together with the localization of the motor impulses; the functions of the thyroid gland; and the

diagnosis and prevention of rabies. A brief account of his researches has been given in Chapter 8, and there is no call to recapitulate what has there been said.

At the time he started his work, little was known of the functions of the central nervous system; and his report on three cases of brain surgery at the meeting of the British Medical Association at Brighton in 1886 is said to have electrified the profession. His removal the following year of a spinal tumor, the localization of which had been made by Sir William Gowers, not only constituted the first successful operation of laminectomy, but marked the beginning of a phase of notable activity in brain surgery – in fact a landmark in its history.

In commenting on this work Sir Wilfred Trotter remarked that it was the happy combination of scientific ability and natural aptitude and training that made Horsley a practical surgeon of altogether exceptional capacity, and enabled him to enlarge the scope of surgical neurology so quickly. In similar vein Sir William Osler wrote: 'Better than any man of his generation Victor Horsley upheld a great tradition, for he combined the experimental physiologist and the practical surgeon in a degree unequalled since John Hunter.' And he asked: 'What demon drove a man of this type into the muddy pool of politics?' He was a born reformer and could not resist it.

His laboratory at University College was a Mecca for visitors from all over the world, who came to work under his inspiration and guidance. He was famous not only at home but also abroad. Halle made him an M. D., Paris elected him a Fellow of the Académie de Médecine; and numerous other honours were heaped upon him. No British worker in his field, it has been said, was admired so much on the Continent as Horsley. His charming voice and infectious laugh, coupled with a deep and tender humanity, appealed to all who knew him. Nevertheless, he was a man of exceptionally strong character. 'Fearless, dogmatic and assertive, once in a contest no manna-dropping words came from his tongue' was how Sir William Osler described him. He was a 'hard hitter, and always with a fanatical conviction of the justice of his cause'. Qualities such as these unfitted him for politics. He stood for Parliament in the Liberal interest as a candidate for London University, but was unsuccessful. It was probably just as well. Though he had wide interests in housing, land reform, and archaeology, was an advocate of radical changes in the system of education, and looked forward to the universal teaching of scientific method, and to the extension to each individual of opportunities for training and knowledge, he understood very little of the art of compromise, which is so necessary for a politician who strives to get things done. He had all the aggressive instincts of a pioneer, and could not have subscribed, as one correspondent remarked, to Macaulay's dictum never to 'remove an anomaly simply because it was an anomaly'.

He criticized the Pathological Society of Great Britain and Ireland for its concentration on morbid anatomy, its neglect of progress in physiological and chemical research, and its failure to engage in experimental pathology. After one meeting, at which he had given a demonstration of pathogenic bacteria, he was reproved by the Secretary, who hinted that micro-organisms were not the domain of a Society devoted to morbid anatomy. According to Sir John Bland-Sutton,

this so infuriated Horsley that he went straight off to establish a new Society called the Medical Research Club, the chief purpose of which, apart from the social aspect, was to concentrate on unpublished experimental original work, and to refuse any communications that were commonplace or third rate.

Together with his brother-in-law, Professor Gotch, he gave the Croonian lecture in 1891 on an electrical method of determining the functions of the mammalian nervous system and their localization; and in 1909 the Linacre lecture on the function of the so-called motor area of the brain. This lecture is generally considered the most philosophical of all Horsley's contributions, enriched as it was by 23 years' unrivalled experience of a physiologist, pathologist and surgeon. Compared with the breadth of his experience, Horsley's publications were few. He was so occupied with practical work in the laboratory and the operating theatre that he had little time for writing. Hence it is that there are no published records of many of his operative procedures.

He married in 1887 the daughter of Sir Frederick Bramwell, and had two sons and a daughter.

The last years of his life were spent in the Army. Before the First World War he was a member of the Territorial Army. He was called up in August 1914, served for a short time in British hospitals, and then, at his own request for foreign service he was given charge of No. 21 General Hospital and embarked for Egypt in May 1915. At Alexandria, where he was stationed, he was appointed surgical consultant to the Mediterranean Expeditionary Force with the rank of Colonel A.M.S. In this capacity he visited the various theatres of conflict and was made a C.B. Though most men would have been content with such a position, his conscience drove him in March 1916 to volunteer for service in Mesopotamia, where the state of medical care was appalling. There he continued the admirable work that had vivified the wards of the hospital in Alexandria, but now he was faced with the challenge of defective transport, shortage of food and supplies, and with climatic conditions of the most trying kind. Though he was urged time and again to curb his extraordinary energy and not to put too severe a strain on his physique, he paid little attention to such caution, and underestimated the seriousness of the risks to which he voluntarily exposed himself. The climate, however, proved too much for him; and one day on which the shade temperature reached 120 °F, after walking some distance over the sand to visit a patient, he collapsed, and died of heat stroke the following evening – Sunday the 16th of July – aged 59. His funeral was on the 17th.

(For his biography, see Paget 1919; and for obituary notices *Proceedings of the Royal Society B*, (1920), **91**, xlv; *British Medical Journal* (1916), ii, 162, 343, 510; *Lancet* (1916), ii, 200; *Nature* (1916), **97**, 447.)

Charles Sherrington (1857–1952)

Charles Sherrington was born in London on 27 November 1857, the son of James Sherrington of Yarmouth. His father died while Charles was still young, and he and his two brothers were brought up in the home of their stepfather, Dr Caleb Rose of Ipswich. Charles was educated at Ipswich Grammar School, where

he learnt little but classics. These, however, served him well, and his enjoyment of Latin literature remained with him all his life. At school, too he was greatly influenced by one of the masters, Thomas Ashe, a poet of no mean distinction.

His stepfather inspired him with an interest in archaeology and geology; and from the fine collection of paintings in his home Charles came to appreciate art. After a short stay at Edinburgh as a medical student, he transferred in 1881 to Cambridge to join one of his brothers at Gonville and Caius College. Here, under the stimulating tutelage of Sir Michael Foster, he began to study physiology. He rapidly became engrossed in research, and even before graduation he read with Langley a paper before the Royal Society. He received his clinical training at St Thomas's Hospital, London. After taking his M.B. degree at Cambridge in 1885, he was sent by the Royal Society, together with C. S. Roy and J. J. Graham Brown, to study the outbreak of cholera in Spain. The following year he went to Italy for a similar purpose. In Spain he made the acquaintance of Ramón y Cajal, the neurohistologist who, like Gaskell at Cambridge, had a profound effect on his future career. Cajal had propounded the neurone theory, which postulated that separate neurones each communicated impulses to the next neurone across the synaptic space. This appeared to Sherrington to be 'something so much clearer and so other than it had been as to be a system almost new, and one immensely more intelligible'.

In 1886 he visited Germany, where he spent two months in Rudolph Virchow's laboratory at Berlin, nearly the whole of 1887 in Robert Koch's laboratory at Berlin, and finally a short time in Goltz's laboratory at Strassburg.

In 1887 he returned to England as Lecturer in Systematic Physiology at St Thomas's Hospital, London, and as a Fellow of Gonville and Caius College, Cambridge.

When Victor Horsley resigned in 1890, Sherrington was made Superintendent of the Brown Institution. During the years 1891–5 that he occupied this position he turned his attention from pathology to neurophysiology, and began that long series of researches which made him outstanding as a worker in this field (see Chapter 8) and earned for him, as early as 1893, the Fellowship of the Royal Society. He moved to the Holt Chair of Physiology at Liverpool in 1895. Here he reorganized the University's Thompson Yates laboratory, saw it housed in new buildings, helped to start Departments of Psychophysiology and Veterinary Medicine, introduced a course on school hygiene, and proved himself not only a scientist but also an able administrator. His laboratory studies were mainly on decerebrate rigidity in which he worked out the neurone connexions in the spinal cord and brain stem that subserve the normal maintenance of muscle tone; and the maintenance postures or reflex movements in the limbs, as in walking. He described the reciprocal innervation that automatically relaxes antagonistic muscles; and, amplifying Victor Horsley's work, he mapped out the keyboard of the cerebral cortex.

In 1913 he was appointed to the Waynflete Chair of Physiology at Oxford, and was elected a Fellow of Magdalen College. At Oxford he took up the more detailed study of individual reflexes. This work was soon interrupted by the outbreak of

the First World War, and was not resumed till after it was over. During the war he served on various Government Committees; and during vacation worked for three months in a munitions factory making 3-inch shrapnel shells, and analysing the problem of industrial fatigue for the War Office – a task that fitted him for the chairmanship of the Industrial Fatigue Research Board in 1918. During the years 1914–17 he was Fullerian Professor at the Royal Institution.

In 1919 he published his book *Mammalian Physiology*. From then on he continued to revise and expand the scientific knowledge of reflexes, cortical localization, and discharge mechanisms of the nervous impulses. Much of this work was described in the 'Reflex Activity of the Spinal Cord' which, written jointly with his collaborators, J. C. Eccles, E. G. T. Liddell, D. Denny-Brown, and R. S. Creed, appeared in book form in 1932. He retired from his chair in 1936 at the age of 79, but remained mentally very active, publishing in 1946 an excellent account of an early French physiologist under the title *The Endeavour of Jean Fernel*. Before his retirement he gave, among others, the Silliman Lectures at Yale in 1909, which were later published as *The Integrative Action of the Nervous System*; the Croonian Lecture at the Royal College of Physicians of London in 1913; the Hughlings Jackson Lecture in 1931 on the reflex activity of the spinal cord; and the Rede Lecture at Cambridge in 1933, in which he revealed himself at once as a biologist, philosopher, and poet.

In 1936–8 he gave the Gifford Lectures at Edinburgh, which were published in 1940 as *Man on His Nature*. In these he considered the place of mind in the universe. Mind and Nature, he held, were different. Mind knew the world of chemistry and physics, but could not explain mind itself (see Liddell, 1952). Mind remained apart, 'supreme and untouched, invisible, intangible; and yet all that counted in life – desire, zest, truth, love, knowledge, "values" – naked mind'. 'We have to regard', he said, 'the relation of mind to brain as still not merely unsolved but still devoid of a basis for its very beginning' (see Penfield, 1971). For him, said Professor Eccles, the ultimate reality was the soul of man.

The honours heaped upon him included the Presidency of the Royal Society 1920–25, the G. B. E. in 1922, the O. M. in 1924, the Nobel Prize shared with Adrian in 1932, Royal and Copley medals of the Royal Society, and degrees from 22 universities.

He married Miss Ethel Wright in 1892, but his wife died in 1933. His last years of failing health were spent at Eastbourne, where he died suddenly of heart failure at the age of 94.

Sherrington was an altogether exceptional man deserving the highest eulogies from his scientific colleagues. Writing on the occasion of Sherrington's 90th birthday, Professor J. F. Fulton of Yale described him as 'the most profound student of the nervous system the world has yet known'. He virtually founded our modern knowledge of the working of the brain and spinal cord by unravelling the mechanism responsible for integrating the individual units of the nervous system. Professor Adrian (later Lord Adrian) (1952) described his humility, humanity, and friendliness. In an obituary notice he said: 'He had a mastery of all the techniques of mammalian experiment, so that no laboratory in the world

could vie with the standard he set at Liverpool and Oxford, and he was an acute observer who could see all that was happening outside the immediate range of his experiments'. He discovered the sensory apparatus of the muscles; showed that the inhibition of the muscles which opposed a movement was as important as the excitation of those which promoted it; and gave a picture of the spinal mechanism in terms of neurones and synapses that remains the basis of all current research. Professor Walshe (later Sir Francis) (1952) wrote: 'It would be difficult to overestimate the inspiration he has been to clinical neurology, or the influence his work and genius have had upon neurological thought throughout the world'. Of him it has been said that he achieved for the nervous system what William Harvey achieved for the circulation.

It may be added that Sherrington was in physical structure short, but well knit and alert. In spite of his short-sightedness he was a mountaineer, a pioneer of winter sports in Switzerland, and an ardent sailor. He played Rugby for St Thomas's Hospital and for Caius College, and rowed for his College. He had a wide acquaintance with literature, painting, and architecture; was a lover of music and drama, a brilliant conversationalist, and what astonished many of those who did not know him personally, he had a gift for poetry, as displayed in *The Assaying of Brabantius*, which was published in 1925.

(For obituary notices, see *British Medical Journal* (1952), i, 589, 606; *Lancet* (1952), i, 569; *Nature* (1952), 169, 688; Liddell, *Obituary Notices of Fellows of the Royal Society, London*, 1952-3, 8, 241; *Munk's Roll, Royal College of Physicians, London* (1955), 4, 523; *Dictionary of National Biography* (1971), Oxford University Press).

John Rose Bradford (1863-1935)

John Rose Bradford was born in London in 1863, the only son of Abraham Rose Bradford, deputy inspector-general of hospitals, R.N. He was educated at University College School, and subsequently spent a year at Bruges. He entered University College, London, took his B.Sc. in 1883, worked with Professor Bayliss in 1884 on electrical charges in secreting glands, and qualified in medicine in 1886. With the award of the George Henry Lewes Studentship in 1888, he carried on his physiological work, and took his D.Sc. in the same year. He was appointed Assistant Physician to University College Hospital in 1889 and to the National Hospital for the Paralysed and Epileptic in 1893. In the following year, at the early age of 31, he was elected to the Fellowship of the Royal Society on the basis of his work on electrical phenomena accompanying secretion, the action of drugs on the circulation and the secretion of the kidney, and the innervation of various blood vessels.

His appointment as Superintendent of the Brown Institution dated from the 1st February 1896 and lasted till 1903. During his tenure of this office he carried on the work on nephritis that he had begun at University College in 1891. By successive removal of part of one kidney in a healthy dog, and then of the remaining kidney, he found that the animal could survive easily till a limiting value of 2 grams of kidney for each kilogram of body weight was reached. Further reduction

led to the dog's death from emaciation, intense polyuria, and a great accumulation of urea in all its tissues. His summary was: 'When the amount of available kidney substance is greatly reduced, the tissues of the body, and more especially the muscles, rapidly break down and liberate urea. I have no observations to show whether this is dependent upon the cessation of the action of an internal secretion supplied normally by the kidney'. This was a striking suggestion, since at that time hormones were unknown, and the only analogy for it lay in diabetes mellitus. His *Clinical Lectures on Nephritis* were published in 1898, one year after his appointment as full physician to University College Hospital. In 1900 he tendered his resignation as Superintendent of the Brown Institution, but agreed to carry on till his successor was appointed, which was not till the beginning of 1903.

After leaving the Brown, Rose Bradford abandoned further research work, and spent the remainder of his life in what we should regard as administration. He was associated in an organizing capacity with all manner of medical and scientific institutions, committees and projects. With Sir Kingston Fowler he promoted the creation of the Beit Trust Fellowships in 1909; was Secretary of the Royal Society from 1908 to 1915; was Chairman of the Lister Institute from 1912 to 1914; and acted as Senior Medical Adviser to the Colonial Office for the twelve years 1912–24. He gave the Croonian Lecture on Bright's disease in 1904, and the Harveian Oration in 1926. He held the Presidency of the Royal College of Physicians for the five years 1926–31. During the First World War he held the office of Consulting Physician to the British Expeditionary Force in France from 1914 to 1919 with the rank of Major-General. His honours included the K.C.M.G. in 1911, the C.B. in 1915, the C.B.E. in 1919, and a Baronetcy in 1931.

He is said to have had a marvellous memory and to have been an ideal chairman. Sir Humphrey Rolleston (1935) wrote of him as being such a capable man of affairs that he was chairman of innumerable committees and an adviser on medical and scientific problems to bodies with various objectives. He was a general physician of both a scientific and practical type, a man of the highest ideals and character; and, added Sir Arthur MacNalty (1935), 'the most unassuming of men'. In another obituary he is described, rather unkindly, as having lacked imagination and intuition, but to have had a retentive memory and a powerful brain.

He married in 1899 Mary Roberts, O.B.E., an able botanist, daughter of Thomas Ffoulkes Roberts, one time Mayor of Manchester, and niece of the well-known physician and authority on renal disease, Sir William Roberts. His hobbies were travelling, natural history, shooting and fishing. He enjoyed entertaining his friends on his wife's estate at Bryn. He died in London after a long illness in 1935. Like Sir Edward Sharpey-Schafer, who died a few days before him, he was a pioneer of the view that all scientific research which is allied and ancillary to medicine should be brought into association with clinical practice. His devotion to University College Hospital was such that he remained chairman of its executive committee up to within a few days of his death.

(For obituary notices, see *British Medical Journal* (1935), i, 805; *Lancet* (1935), i, 906; *Nature* (1935), 135, 781; *Obituary Notices of Fellows of the Royal Society*,

London (1932–5), 1, 527; *Munk's Roll, Royal College of Physicians, London* (1955), 4, 391; *Dictionary of National Biography* (1931–40), p. 96.

Thomas Gregor Brodie (1866–1916)

Thomas Brodie, the second son of the Rev. A. Brodie, vicar of Gainsborough, was born at Northampton in 1866 and died of a heart attack at the age of 50. He was educated at King's College School and St John's College, Cambridge, and went for his medical training to King's College and King's College Hospital, London. After qualification he became in 1890 a demonstrator in physiology at King's College under Professor Halliburton. Later, he was appointed Senior Demonstrator in Physiology at the London Hospital, Lecturer in Physiology at St Thomas's Hospital, and then Director of the Conjoint Research Laboratories of the Royal Colleges of Physicians and Surgeons on the Embankment. When these laboratories were closed on grounds of economy, he was, in 1903, appointed Professor of Physiology at the Royal Veterinary College, Lecturer on Physiology at the London School of Medicine for Women, and Superintendent of the Brown Institution. All three appointments were held simultaneously, because each of them was so badly paid that the aggregate of the three stipends was only just enough to provide a living wage. While at the Conjoint Laboratories, he gathered round him a band of workers whom he inspired with his energy and contagious enthusiasm; and the research work issuing from his laboratory was 'not only large in quantity but of the highest quality and value'. Even when holding his triple appointments he continued his researches, and in 1904 was elected a Fellow of the Royal Society.

In 1908 he moved to Toronto to become Professor of Physiology – an appointment he held till his death. Relieved of shortage of money and equipment, he organized his laboratory so that it became one of the best known in the world. It was replete with all modern apparatus, for which no expense was spared. Writing in 1920 Professor Halliburton said: his laboratory still lives as a monument to his wise use of public money'.

Every long vacation he returned to London where, for the education of his sons, he had kept on his house at Hampstead. In these spells of freedom from teaching and administrative routine, he carried out some of his best research work. Part of this, entitled 'A new conception of the glomerular activity', he chose as the subject of his Croonian lecture to the Royal Society in 1911.

During the First World War he joined the Canadian Army Medical Corps and, with the rank of Major, was attached to No. 4 Canadian General Hospital. In this capacity he investigated, first in London and later at Ramsgate Military Hospital, the physiological aspects of lesions produced by gas. He also helped to re-educate maimed men to lead a useful life again – a function that assumed great prominence in and after the Second World War. His sudden death in 1916 came without warning. He was accorded a military funeral – on 23 August at Hampstead – which was attended by large numbers of persons representing both the military and the civil population.

Brodie left a long list of published papers embracing nearly every branch of

physiological science. His outstanding work was on the kidney and the functions of the glomerulus; and the studies he conducted on the gaseous metabolism of animal tissues and organs proved of great value in furthering the progress of physiology. His handbook for students on the 'Essentials of Experimental Physiology' was one of the very best manuals on the subject.

Brodie was a skilful operator, a man of great originality and resourcefulness, an inventor of numerous pieces of useful apparatus, and 'a friend worth having, loyal, affectionate, bright, and delightful in every sense'. He was an athlete, a student of literature, and a collector of books. At the end of the obituary notice he wrote for him, Professor Halliburton (1920) regretfully felt bound to add: 'These few lines tell briefly the story of a man with exceptional powers and brilliant gifts who was unable, nevertheless, to obtain in his native land a position and a competence worthy of his greatness.'

(For obituary notices, see *British Medical Journal* (1916), ii, 342; *Lancet* (1916), ii, 449, 499; *Nature* (1916), 98, 9; *Canadian Medical Association Journal* (1916), N.S. 6, 935; *Proceedings of the Royal Society B* (1920), 91, xxviii.)

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CHAPTER 12. THE LAST SUPERINTENDENT

Frederick William Twort (1877–1950)

Frederick William Twort was born at Camberley in Surrey on 22 October 1877. He was the eldest son of Dr William Henry Twort, and he spent the whole of his life at Camberley in the same house as that in which he was born. Following in his father's footsteps, he studied medicine at St Thomas's Hospital, and qualified M.R.C.S., L.R.C.P. in 1900. He stayed on at St Thomas's Hospital, and in 1901 was appointed assistant to Dr Louis Jenner, the Director of the Clinical Laboratory. After a year's experience in pathology, he transferred to the London Hospital where, under Dr William Bulloch, he was entrusted with the entire diagnostic work of the hospital. Here he became a master of bacteriological technique, and displayed an original and unusual approach to microbiology by his interest in the so-called wild non-pathogenic species of bacteria. These, of course, were far more numerous than those of clinical importance. In 1909 Twort accepted the post of Superintendent of the Brown Institution, and remained there for the rest of his professional career, retiring, under protest, in 1945 at the age of 67.

While at the London Hospital Twort published a paper in the *Proceedings of the Royal Society* (Twort, 1907) on the problematic subject of mutation. By the process of repeated subculture in a medium containing a sugar that was not fermented by a given organism, he found that a variant appeared that was able to ferment it. This, for the orthodox bacteriologist who believed in the fixity of species, was most irregular, and little attention was paid to it. It was not till about twenty-five years later that its significance was appreciated. As Sir Paul Fildes (1951) in his obituary notice says: 'To Twort himself, however, the idea of pathogenic organisms being derived from "wild" types existing in nature with different characters imposed on them by their environment became the skeleton upon which practically the whole of his subsequent work was built up.'

Twort's two main discoveries at the Brown have already been described in Chapter 7.

It is unnecessary to recapitulate them here, but it may be recalled that they were concerned with the need of an essential growth factor for the cultivation of certain organisms, and with the transmissible lytic agent, or bacteriophage, which gave rise to the so-called Twort–d'Herelle phenomenon.

Returning home from Salonika in the middle of the First World War, Twort resumed his duties at the Brown, and prepared a paper on dysentery bacilli. Publication was held up, however, because it criticized the War Office and the Medical Advisory Committee for failing to take the necessary precautions against outbreaks of dysentery at the front; and for maintaining that the outbreak which did occur was of amoebic origin when it was quite clear that it was of the bacterial type. His paper (Twort, 1920), describing researches on dysentery, recorded the finding of three morphological forms of the dysentery bacillus, ranging from granular to filamentous, and contained the prophetic suggestion that sexual multiplication might occur in bacteria – a suggestion that was proved correct by workers in the United States of America and Europe after the Second World War.

At the end of the war Twort embarked on the ambitious attempt to cultivate viruses, which he had started in 1913. The Medical Research Committee gave him a personal grant of £600, plus £50 for expenses, renewable from year to year. The intention was to get him to work on influenza – a disease that had caused a devastating pandemic during 1918 and 1919, and of which the causation was hotly disputed but still unknown. Twort made no progress in elucidating the genesis of this disease, but continued to work on viruses, studying vaccinia in particular. Other problems that occupied his attention were filter-passing lysins associated with bacteria, specific growth substances necessary for certain acid-fast bacilli, and the action of double dyes.

In 1930 he put forward a proposal to the Senate for a grant of £2000 to be spent over a period of four years on the effect of electromagnetic waves on ultra-microscopic viruses. The Senate agreed to this, as the finances of the Brown Institution were then in a favourable state, and Twort proceeded to collect the apparatus he needed. Some of this was bought, but most of it was made in a workshop he fitted up at the Brown. What experiments he carried out with it when the apparatus was complete is a little doubtful. His reports to the Medical Research Council were uninformative. Whatever they were, they yielded negative results, and the work was discontinued.

Meanwhile he had been trying to grow viruses on various media under the action of light of different wavelengths, including ultraviolet light and the sun's rays. For this last purpose he had created a sun house on the south wall of the Institution. Failure accompanied all these attempts, and the work was abandoned in November 1940, when the Institution was damaged by enemy action.

Under war-time conditions Twort found the daily journey from Camberley to London to be almost impossible. He therefore transferred such apparatus as he needed for his work to a laboratory in his own home.

After a report by a special committee appointed by the Senate it was resolved to close the Institution, which had sustained further war damage, and to terminate Twort's appointment on 30 September 1945. He was awarded a supplementary pension sufficient with the annuities due on his policies with the Federated Superannuation System for Universities (F.S.S.U.) to bring his income up to £350 a year – a sum equal to half that of his retiring salary. Twort protested strongly against the injustice of what he regarded as his forced dismissal, and took steps towards his reinstatement.

The sorry tale that has now to be told began in 1914 when Twort asked the Medical Research Committee for a grant of £1500 a year to carry out bacteriological investigations on tuberculosis. Sir Walter Fletcher replied, saying that £1500 was far beyond the scale of payment the Committee could contemplate, and suggested a payment of £250 for part-time work. This offer was declined.

As already mentioned, in February 1919, the Committee agreed to pay Twort £600 a year for him to work on influenza and possibly vaccinia, and for this purpose they arranged for his immediate demobilization.

Disturbed about Twort's progress, Fletcher wrote to him in March 1922, assuring him that the Medical Research Council, which it had now become, were

not dissatisfied with his lack of results, but were worried about his isolated position at the Brown, which rendered it difficult to bring him into touch with other workers. In reply, Twort sent an 8-page foolscap letter to Fletcher, describing his work and asking for an assistant. He pointed out the advantage of the independence he had at the Brown; and complained that, whenever he published his discoveries, other workers exploited them before he had time or assistance to follow them up himself. This was the first expression of a grievance against the Medical Research Council that was to grow stronger and stronger as the years passed by.

In 1931 there occurred a contretemps between the University and the Medical Research Council. The Principal, Edwin Deller (later Sir Edwin), wrote to Sir Walter Fletcher telling him that, in view of Twort's election in 1929 to the Fellowship of the Royal Society, the University had decided to raise his salary to £500 a year, and to include him in the Federated Superannuation System for Universities (F.S.S.U.) pension scheme. Furthermore they were thinking of conferring on him the title of Professor. Fletcher, in reply, said that he was embarrassed by the failure of the University to tell the Medical Research Council of this move beforehand. The Council had in the past, by its annual grant of £600, made life possible for a grossly underpaid University officer with a distinguished record; and he thought that the University might well have regarded it as a first obligation to relieve the Council of part of this burden. 'Despite his earlier achievements', Fletcher wrote, 'there has been nothing in Twort's recent work that justifies the continuance of a large payment from funds intended only for the promotion of research'. For this oversight Deller apologized. The breach appears to have been closed by a personal meeting of the two functionaries.

In December 1932 Fletcher in a letter to Twort said that the Council were preparing their annual report and would like to know what he had been doing. In a very injured reply, 5½ foolscap pages long, Twort, addressing Sir Walter Fletcher as 'Dear Sir', spoke of his past work on Johne's bacillus, his theoretical views on ultramicroscopic viruses, the refusal of the Council to provide him with an assistant, and his current experiments on the effect on viruses of electromagnetic waves of different frequencies.

To find out exactly what Twort was doing, the Council in 1933 deputed Sir Joseph Arkwright, a member of their Bacteriological Committee, to go and see Twort at the Institution. So far as can be gathered, Arkwright was not impressed, and the Council decided to terminate Twort's annual grant. This had never been regarded as more than temporary, and had not led either to successful research work or even to any improvement of the conditions at the Brown Institution which might make them more favourable for research work. The Council therefore gave notice that, though the grant would be continued for another three years, they could not commit themselves to provide it beyond that period. It would be made subject to Twort's being able to continue in active research work and to his keeping the Council informed of the progress he made. In the course of this letter Fletcher made it clear that the Council had always refused to augment the salaries of University professors. That was the responsibility of the universities,

which received a large annual subvention from Parliament intended mainly for the improvement of salaries.

As might be expected, Twort wrote back complaining of the lack of support given him by the Council; accusing the Council of obtaining his original ideas, and failing to show either recognition or appreciation of the services rendered; maintaining that it was wrong for all research work to be under the control of the Council, and that the best original work was usually started by one man in a laboratory where independence of thought and work was welcomed.

Six months before the expiration of his grant, Landsborough Thomson (later Sir Landsborough) wrote to Twort saying that the Council would continue his personal grant for another six months, i.e. till 30 September 1936. In July of the same year Sir Edward Mellanby, who was then Secretary of the Council, offered Twort an annual grant of £300 a year, payable through the University, till he was 65 years of age, on the understanding that he continued in active work. Twort maintained that the Council had no right to withdraw his annual grant of £600, which he regarded as permanent; and refused to accept the generous offer on the part of the Council.

In a letter to Deller of 20 July 1936, Mellanby suggested that the University should raise Twort's salary from £500 to £700 a year so that he would then have a total of £1000 a year – a sum only £100 less than he was receiving at the time. To this proposal Deller agreed, pointing out that the £700 from the University would carry with it superannuation. Deller therefore wrote to Twort putting forward what both he and Mellanby considered a satisfactory solution to the problem. Twort, however, obstinately refused to accept this offer, insisting again that the Medical Research Council had no right to repudiate the agreement reached on 23 January 1919. He referred to the annual grant of the Council as a 'salary', carrying with it fixity of tenure.

In a letter dated 5 August, 1936, a month before the Council's grant of £600 a year was due to expire, Mellanby referred to Fletcher's letter of 21 March 1933 in which it was stated that the Council's grant had been 'renewed year by year'. Moreover, since 1929 the Council had adopted the policy of sending out annually a notice to all grantees, among whom Twort was included, referring to the conditions under which their grant was held.

Writing in reply to Mellanby's letter, Twort again refused to accept cancellation of the original agreement of January 1919, or the future arrangements proposed by Mellanby. At this point Mellanby went so far as to go himself to the Brown Institution and reason with Twort, but to no avail.

On 31 August 1936 the Medical Research Council received a letter from Twort's solicitors. The Council sought the advice of the Treasury Solicitor, who expressed the opinion that there was no binding contract by which the Council were under obligation to continue their annual grant of £600; and that Twort's solicitors should therefore be informed of the Council's refusal to reconsider their decision to terminate the grant. The Treasury Solicitor agreed himself to inform Twort's solicitors of this decision.

After a delay of five months Twort filed a Petition of Right, claiming continua-

tion of his £600 annual grant, damages for breach of contract, and some other relief upon such terms as His Majesty might decide just and equitable. The Petition was submitted to the Home Office, who in March 1937 informed the Medical Research Council that the King had given it his fiat 'Let Right be done'. In their observations on the Petition the Council pointed out to the Treasury Solicitor, among other things, that under the agreement reached with the University Twort would have received a total annual emolument, only £80 less than that he had before the Council terminated his £600 grant.

The Petition of Right was heard before Mr Justice Goddard of the King's Bench Division of the High Court of Justice on 31 January 1938 and adjourned till the following day. The case was dismissed with costs without Counsel for the Crown being called upon. The Judge pointed out that the Medical Research Committee's original letter bore no such interpretation as Twort had pleaded; that the present proceedings were misconceived; and that there was no ground for a Petition of Right in this case. The costs came to £98 and were paid without question by Twort.

After the judgement had been delivered Twort, who for financial reasons had pleaded his own case, wrote to the Press complaining that his request for trial by Judge and Jury had been refused; that he had not been allowed to select the documents to be put before the Judge; and that the Judge had summed up and delivered judgement without hearing as much as the first two pages of Twort's opening statement or seeing his additional vital documents.

On 20 August 1938 a long letter from Twort appeared in *The Times* complaining that neither the Board of Agriculture nor the Development Fund Commissioners had helped him in his investigation into the substance he had found to be essential for the growth of Johne's bacillus; that he had received no help to follow up his work on the bacteriophage; and that the Medical Research Council had cut off his grant in 1936 when he was investigating viruses.

On 7 December 1938 Messrs Bosley, Legg and Co., Solicitors at Brighton, who had been instructed to advise Twort, wrote to the Medical Research Council wanting to know whether the Council could reconsider their attitude to Twort. After seeking the advice of the Treasury Solicitor, the Council replied regretting their inability to offer Twort any further research grant. Mr Bosley then called at the Council's offices and was seen by Sir Landsborough Thomson. He explained what he did not like to put in writing, namely that Twort had been badly advised by his London solicitors, who had now 'ceased to be solicitors'. They had received considerable sums of money from Twort during the preparation of his case, and had incited him to go on with it instead of warning him of its weakness. Mr Bosley contended that Twort, having been victimized, was now in a chastened frame of mind and deserved some sympathy. Landsborough Thomson held out no hope that the Council would reverse the decision. His opinion was upheld by the Council, who informed Messrs Bosley, Legg and Co. accordingly in a letter dated 21 March 1939.

In May 1939 Twort presented a Memorandum to the Council of the Royal Society objecting to the failure of Dr Marjory Stephenson (1930) in her book

Bacterial Metabolism to give him any credit for his work at the Brown; instead, she had given it nearly all to the Medical Research Council, even though Twort and Ingram's work on the essential substance or vitamin for the growth of Johne's bacillus had been incorporated in two papers received by the Royal Society in 1911, some months before Hopkins's classical publication on vitamins in 1912. In response to a letter from the Secretary of the Royal Society, Sir Edward Mellanby said that neither he nor any one else in the Medical Research Council had had anything to do with Marjory Stephenson's work nor, so far as he was aware, had even seen her book.

In January 1946 Mellanby received a letter from the Royal Society telling him that Twort had applied for the Sorby Research Fellowship. In reply, Mellanby gave a careful review and assessment of Twort's work. He had a high opinion of his ability, but said that after Twort's return from Salonika there developed in his mind 'a mild kind of persecution mania, or at least an exaggerated idea that he was not receiving fair play'. This obsession had become more and more powerful and had prevented him from carrying out effective research for a number of years. About 1928 he had again taken up research in order to discover the physical factors that might control the change from inanimate to animate matter. His interest, however, lessened till the advent of the Second World War, when the Brown Institution was so damaged as to render further work impossible. Now, at the age of 67 Twort wanted to return to active research. He had suffered from his deliberately chosen isolation and collaboration with other workers who might have modified his wild enthusiasms and his ideas of harsh treatment.

After the closing of the Brown Institution, Twort took the undamaged equipment to his home at Camberley, and later paid the University £100 for it. So far as can be gathered, he made little use of it, but rather spent his time nursing his grievances and writing letters and reports, of which only two or three can be referred to here, to various bodies complaining of the unfair way in which he had been treated. For example, in a letter to the *Lancet*, 16 October 1948, he deplored the suppression of the independent thinker by a small but powerful group of 'experts', referring presumably to the Medical Research Council. To the Secretary to the Senate he wrote earlier: 'It is, however, a profound and crushing disappointment to me that the University is terminating my appointment'. He added a statement to the effect that his most important research – on viruses – had been impeded by the actions of the Medical Research Council and a few others in the 'political ring'.

In a report dated 8 August 1947, submitted to the Chancellor and Senate of London University, to the Royal Society, the British Medical Association, and other bodies, he castigated the University for not rebuilding the Brown Institution, for terminating his appointment, and for its neglect of the lone worker. 'It is an indisputable fact', he wrote, 'that although in the past nearly all fundamental advances in science have been made by the free independent worker, there is at the present time a growing tendency to withhold support from the Individualist, deny him facilities for his work, and suppress the publication of his views.'

In a letter to the Principal of 31 January 1949, only a little over a year before

he died, Twort referred to a report that he had submitted to the University and other bodies in 1945, demanding that the Brown Institution should be reopened and that he should be supplied with the necessary funds to complete his work; and insisting that the University was under a moral obligation to do this. He maintained that no one in this country had appreciated his work; that he had had to take his researches on the essential substance for the growth of Johne's bacillus to Copenhagen before it was accepted in 'state circles'; and that his research on the bacteriophage had not been appreciated till it had received recognition in France, Belgium and Holland. Therefore, if the University would not support his work on viruses, he would arrange for his researches to be carried out in other countries, as he was 'determined that mankind shall not be deprived of the vast remedial and economic harvest which a successful completion of the research will provide'.

In 1949 Sir Landsborough Thomson received a letter from the Privy Council asking what sort of reply should be sent to an application by Twort for funds and facilities. In answer to this, Sir Edward Mellanby advised Mr Herbert Morrison, the Lord President, against providing Twort with any financial help for research, suggesting instead the grant of a Civil List pension. This proved impracticable, because Twort was already receiving a pension of £350 a year from the University.

In the same year, Mrs Twort wrote to the King enclosing a cutting from the local newspaper. The Medical Research Council, on being asked for their observations, replied through Sir Landsborough Thomson, giving the facts of the case, and pointing out that Twort was now several years past retirement. The Lord President therefore wrote to Mrs Twort regretting that there was no longer any way of helping her husband.

On 20 March 1950 at the age of 72 Twort died. As his pension automatically ceased with his death, the Senate of the University decided to grant an *ex gratia* payment of £200 a year to his widow.

In summary, it may be said that Twort's tragedy lay in his being a lone worker with no one to maintain the balance of his mind or criticize his conjectures. The result was that ideas became fixed in his head and grew stronger as he got older. His chief *idée fixe* was that the bureaucrats, particularly those of the Medical Research Council, were treating him unfairly and, instead of encouraging and helping him as they did members of their own staff, looked down on him, paid little or no attention to his discoveries, and actually disliked the Brown Institution itself. Gradually, a sense of persecution developed which led him not only to spend his time writing letters of complaint to the Medical Research Council, the University of London, provincial universities, the Royal Society, the British Medical Association, and even the lay Press, warning them against entering unwisely into litigation over alleged maltreatment and virtual dishonesty such as he had received on the part of the Medical Research Council. Instead of being grateful to the Council for allowing him a grant of £600 a year for part-time research work, which in those days was very generous, continuing it for 17 years, giving him three years' notice of its withdrawal, and a final extension of six months, he misinterpreted their offer, accused them of bad faith, and, after he

had lost the ill-advised case he brought against the Council, he took every opportunity to revile them and pose as a martyr to the cause of individualism.

It is noteworthy that his main contributions to science were made before 1919. It was presumably on the strength of his originality that the Medical Research Council decided to give him financial support. After 1919, during the whole period in which Twort received his annual grant, he contributed nothing of note to our knowledge of bacteria or of viruses. The few reports he made to the Council – made after much solicitation – were uninformative, or highly speculative. Admittedly, he was interested mainly in what is sometimes referred to as fundamental research, and in such original investigations nothing of importance may result, even after many years' work. The Medical Research Council gave him a long run for his money and could not be blamed for deciding to withdraw his grant and divert it to more fruitful purposes – an action that Twort interpreted as characteristic of bureaucratic dictatorship. It is sad to think that what should have been his most productive years were ruined by his state of paranoia. His was a striking example of the danger in any intellectual occupation of being cut off, deliberately or by circumstance, from the healthy criticism of one's ideas by other workers in the field. In the organization of science a way has to be found between isolation on the one hand and team work on the other, in which originality may be given full expression but, by free discussion with one's departmental colleagues, prevented from running to extremes.

Apart from the mental perversion from which he suffered, Twort had an attractive personality, and it would be unfair to his memory not to lay stress on this. In his obituary note to the Royal Society, Sir Paul Fildes (1951) mentions Twort's athletic prowess in his early days, his success in the breeding of plants and animals, his skill in woodwork of various kinds, his inventions of special varnishes with which to treat the violins he made, his experiments with radio, and with power plants in the construction of what appeared to be something akin to that of a jet engine. In the same obituary note, Professor Hubert Turnbull, F.R.S. remarks that Twort was a gentle, kindly man, always ready to help, who worked steadily all the day long. His sense of humour enabled him to take with a smile all the personal jokes of his colleagues about the chimpanzee that sat devotedly at his side while he worked; and his ability to defend himself without in any way being combative. Let us end by quoting two extracts from his obituary notices. The *British Medical Journal* (Obituary 1950) wrote: 'Twort was one of those erratic geniuses who find life far from congenial in our planned and regimented age, when research has become so costly that it can no longer be financed by the private citizen. He would perhaps have been a happier man had he flourished in the reign of Charles II, in the earliest days of the Royal Society'. And secondly, Sir Paul Fildes's appreciation: 'He was the soul of honour and one of our scientific pioneers.'

(For obituary notices, see *British Medical Journal* (1950) i, 788; *Lancet* (1950), i, 648; Fildes (1951).

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CHAPTER 13. FINAL LITIGATION ON THE TRUST

As already mentioned in Chapter 3, the final destruction of the Brown Institution occurred on 20 July 1944. In 1949 the London County Council made an order for the compulsory purchase of the whole area, and in 1953 paid the University of London the sum of £4700. By that time it had been decided not to rebuild the Institution, and the question then arose as to the disposition of the Trust money, which was now providing an income of over £1800 a year.

Several bodies, such as St Thomas's Hospital Medical School, Wye College, the Lister Institute, and the Royal Veterinary College, were interested in obtaining part or the whole of the money. In 1950, for example, Professor J. B. Buxton, Principal of the Royal Veterinary College, suggested that it should be used for the foundation of a readership at the Beaumont Animals' Hospital to be designated the Thomas Brown Readership. The situation of the Hospital in Royal College Street, which was more than a mile from Westminster or Southwark, precluded the adoption of this proposal under the terms of the Will. The University therefore consulted its solicitors, Messrs Field, Roscoe and Company, on the possibility of transferring the Brown Institution to some other part of London. The reply was that the terms of the Will could not be varied except by the High Court of Justice or the Charity Commissioners.

The same objection was fatal to the proposal of Wye College in Kent that the Institution should be associated with its Department of Agriculture and with the Veterinary Investigation Officers of the Ministry of Agriculture based at the College.

Dr W. G. Barnard, Dean of St Thomas's Hospital Medical School, suggested that the identity of the Institution should be preserved in association with the bacteriological department of the School; and that the director should be called the Brown Professor of Bacteriology. Ultimately, the Brown Institution should be housed in a new building adjacent to the Hospital, or preferably incorporated in the new building of the Medical School. This proposal, the first to be made, was forwarded to Dr Henderson, the Academic Registrar of the University, as early as 1946.

Dr Alan Drury (later Sir Alan), Director of the Lister Institute, wrote saying that the Governing Body wished their claims to the annual income of the Brown Institution to be seriously considered when the future of the Institution came up for discussion. The Lister fulfilled the main terms of the Will, but would not be

prepared to open a dispensary for the reception of animals and the cure of their ailments.

These last three memoranda were not reported to the Senate till 1950, because it was waiting to see whether the Royal Veterinary College was to be admitted as a School of the University. This admission took place on 1 October 1949. After the views of the College on the transfer to it of the Brown Trust had been received, the Principal (Dr Logan, later Sir Douglas Logan) was requested to draw up a scheme for the application of the Trust Fund and to obtain legal opinion on whether any proposal put forward would accord with the terms of the benefaction. The informal advice given was that the Chancery Division of the High Court was unlikely to sanction a variation in the area in which the Brown Trust could be operated. The University therefore thought it desirable to take no action until Parliament had decided how far it was prepared to accept the recommendations of the Nathan Committee on Charitable Trusts, which reported in December 1952, that the High Court should be given wider powers of varying out-of-date trusts. The legislation in question did not reach the statute book until 1961 and there were certain further legal complications which had to be cleared up before fresh action could be taken in the matter.

During this period of uncertainty about the future of the Trust the Committee of the Brown Institution had been kept in being, and retiring or deceased members replaced. The accounts of the Trust Fund had been duly audited each year; and the total capital of the Fund had risen to £86000 bringing in an annual income of £4000. Since no attempt had been made since 1939 to maintain and carry out the functions of the Institution as laid down by the Testator, it was clear that if the University of London was to derive any permanent benefit from the Trust money something would have to be done.

In 1966, therefore, a proposal was put forward in correspondence between the Principal of the University and the Royal Veterinary College to use the Fund to establish a Chair of Veterinary Anaesthetics at the Royal Veterinary College. The Senate of the University approved the proposal, which was communicated informally to the Department of Education and Science to see if it was willing to exercise its delegated statutory powers to vary the conditions attached to the Trust.

It may be mentioned that in his letter to Mr Dudman of the Department of Education and Science, Sir Douglas Logan enclosed an extract from Lord Beveridge's (1948) book entitled *Voluntary Action*. In it Lord Beveridge, who was Vice-Chancellor of London University from 1926 to 1928, describes the history of the Brown Bequest, saying that 'The University of London has once more to reconsider the whole problem of the future of this charity, and in particular the possibility of obtaining an alteration of the terms of the Trust, in order to secure greater freedom of action', to which Sir Douglas Logan added the comment: 'It was the first bequest made to the University of London and has been a source of trouble ever since.'

The Department of Education and Science took the view that any variation in the terms of the Trust more properly fell within the jurisdiction of the Charity

Commission. This body, when approached, suggested that the opinion of Counsel should be obtained on the construction of the Will, particularly in connexion with the gift-over to Trinity College, Dublin. In his opinion Mr Browne-Wilkinson (now Mr Justice Browne-Wilkinson) recommended that, since the Institution had not functioned since 1939, the University of Dublin should be informed of the present situation to see whether they wished to put forward a claim under the gift-over. Before doing this, however, the solicitors suggested that the University of London should apply to the High Court under the Variation of Trusts Act, 1957, for power to extend the area of the Trust from one mile from Westminster or Southwark to (say) 20 miles, so as to include the Field Station of the Royal Veterinary College at Potters Bar.

Accordingly, the Principal consulted Mr S. P. Grounds of the Charity Commission, and was told that the University, being an exempt charity, did not need the consent of the Charity Commissioners before approaching the High Court for a variation of trust. Mr Grounds added that in his opinion an application to the High Court under the Variation of Trusts Act 1957 was unlikely to be successful.

The Principal, therefore, wrote on 13 December 1966 to Dr A. J. McConnell, Provost of Trinity College, Dublin, or to give it its full title, The University of Dublin, Trinity College, informing him of the present position of the Brown Trust, and suggesting that they should meet to discuss the matter informally. He enclosed a financial statement showing that the capital value of the Fund was now £90 000. Dr McConnell, in reply, said that neither he nor anyone else in Trinity College knew anything about the Brown Bequest.

Sir Douglas Logan and Dr McConnell met for dinner at the Athenaeum on 29 January 1967. Dr McConnell made it clear that Trinity College was not anxious to lay out money on legal expenses and suggested that the University of London should institute proceedings in the Chancery Division on the assumption that the High Court would order Trinity College to be made a party to the proceedings with the result that the costs would come out of the Trust Fund. This was done and the University formally asked that the terms of the Trust should be varied so as to allow the income to be used towards meeting the stipend of the holder of the proposed Chair of Veterinary Anaesthetics at the Royal Veterinary College.

The Originating Summons, issued in 1967, contained a memorandum setting out the history and present position of the Brown Institution and the Trust Fund. In this, the University of London acknowledged that the gift over to Trinity College, Dublin, had now taken effect, since the Institution had ceased to be conducted *bona fide* for the purposes specified in the Testator's Will, at least by 1952, if not earlier. Accompanying the Summons was an affidavit, $7\frac{1}{2}$ pages long, signed by the Principal. A copy of this was forwarded to Dr McConnell at Dublin.

The Originating Summons was heard in February 1968 before a Master of the Chancery Division. Trinity College, Dublin, was given six weeks in which to file their evidence, and the University of London four weeks afterwards to consider it and file a reply. The solicitors reported that, when the Attorney-General had then considered the evidence, the Summons would be restored before the Master, and then adjourned into Court.

In April 1968 the solicitors acting for Trinity College made an affidavit claiming the whole of the Brown monies on behalf of the College. The solicitors to the University suggested that, as a compromise, the Trust Fund should be equally divided between London University and Trinity College, Dublin. This compromise was then put to Trinity College and after a long interval the Dublin solicitors wrote in November 1968 to say that Leading Counsel had advised Trinity College to agree to a compromise on the basis of a 75:25 division instead of the 50:50 that had been suggested. Mr Justice Browne-Wilkinson gave it as his opinion that London University should hold out for the 50:50 division, which was ultimately accepted by the Dublin solicitors in March 1969.

Since the division of the Trust monies made it impossible to endow a Chair of Veterinary Anaesthetics at the Royal Veterinary College as originally proposed, Sir John Ritchie, Principal of the College, was asked to prepare a revised scheme on the assumption that the University's share would be about £40 000, bringing in an annual income of rather over £2000. After discussion between representatives of the College and the University, Sir Douglas Logan suggested that, instead of a Professorship, a Research Fellowship should be instituted, at a stipend of £1500, tenable for one year in the first place and renewable for a total of not more than three years. The University would be Trustee of the Fund, and a Committee of Award might be set up consisting of the Principal and four professors of the Royal Veterinary College. This proposal was embodied in a draft memorandum to the London solicitors. Sir Douglas further suggested that the pension of Mrs Twort, the widow of the last Superintendent of the Brown Institution, amounting to £200 a year, should be shared between the University and Trinity College. The Dublin solicitors agreed to this on the understanding, with which the Court of London University also agreed, that the pension money should come out of their general funds, not out of the Brown funds.

In November 1969 the London solicitors submitted the draft Minutes of Order to come before the Chancery Division of the High Court of Justice, agreeing that the Trust money, which now amounted to over £96 000, should be shared equally between London and Dublin Universities; that the income of the London share should be used for the maintenance of a Fellowship at the Royal Veterinary College in one or more of the following subjects: veterinary surgery including anaesthesia and radiology; veterinary medicine including pharmacology and therapeutics; veterinary clinical pathology; and animal reproduction. Any surplus might be used for defraying the expenses of such research or the purchase of equipment. The Fellowship should be open to any person, but that preference should be given to persons holding veterinary qualifications registrable with the Royal College of Veterinary Surgeons. It should be tenable for one year, but should be extendible up to two years more. The Committee of Award should consist of the Principal of the College and the heads of the departments of veterinary medicine, surgery, clinical pathology, and animal reproduction. The summons for the 'construction' of the Will of Thomas Brown deceased was heard on 4 May 1970 before Mr Justice Megarry, who made an Order in the terms of the draft minutes agreed upon between Counsel for the University of London, the Attorney-General, and Trinity

College, Dublin. Counsel for Trinity College gave an undertaking that his clients would apply to the Eire Court for a *cy præs* scheme with regard to the Dublin share. The total costs of the Action, estimated before taxation to be about £1650, were to come out of the Brown Trust Fund.

In February 1971 the scheme laid down in the Order was submitted to the Department of Education, and on 26 May was published in *The Times*. In it the words 'Head of the Department of Pathology' were substituted for 'Veterinary Clinical Pathology', and the words 'Head of the Department of Animal Husbandry and Hygiene' for 'Animal Reproduction'. During the following month the scheme was open to the public for inspection; and on 10 August 1971 it received the Seal of the Department. Sir Douglas Logan informed the Principal of the Royal Veterinary College that the income of the University's half share would amount to about £2500 a year.

Finally, Sir Douglas Logan received a letter from Dr A. E. P. Twort saying that his mother had died on 2 April 1973 at the age of 78. This relieved the University of London and Trinity College of further payment of her pension.

At last the future of the Trust was settled. The proceedings had dragged on over a period of 25 years, and had presented a series of legal complexities that had taxed the patience, ingenuity, and persistence of Sir Douglas Logan to whom, for his part in the successful conclusion reached, the thanks of the University were due.

By way of postscript it may be added that, with their share of the money, the Royal Veterinary College established a Fellowship in veterinary pathology. In Dublin, a *cy præs* scheme was approved by the High Court for the use of the University's share for establishing a lectureship in Welsh, Slavonic, Russian, Persian, Chinese, Coptic, or Sanskrit, or in a near eastern language.

Thus the alternative purposes laid down in the Will were eventually realized, though without the provision of a dispensary for sick animals.