



Obituary

William Alexander Bain,
Ph.D., D.Sc., F.R.S.E.

Honorary Member

William Alexander Bain, the last of a long line of scientists nurtured and disciplined under the influence of Schafer, died from the effects of a bronchial carcinoma on 24 August 1971, four days after his sixty-sixth birthday.

Early Days

Willie Bain was a kinsman of the philosopher Alexander Bain of Aberdeen, and a grandson of William Bain, farmer, of Cairnie near Musselburgh, and of Mary Gardner. His father was the Reverend Alexander Wright Bain, minister of the Erskine United Free Church at Dunbar, a Royal Burgh on the east coast of Scotland; his mother was Grace Martin, daughter of James Brough, J.P., manager of Inveresk paper mills. They had a family of four, Willie being the eldest child and the only boy.

During his early school days, first at Dunbar and later at the High School at Broxburn in West Lothian, his family having moved there in 1916, he was looked upon by friends and school mates as a 'lad o'pairts' being especially noted for his prowess in higher mathematics and physics, a talent which he continued to show when, later, he went to Bathgate Academy and which in the course of time he applied to his chosen vocation.

As a boy the young Bain showed considerable musical talent. He loved to play piano duets with his mother, and by the age of fourteen he was playing a three-manual pipe organ in his father's church.

Student Career

In 1923, Bain went up to the University of Edinburgh with various awards including the John Newlands bursary and, intending to follow his father into the church, he enrolled as a student in the Faculty of Arts. After a year he transferred to Science and qualified to enter the final honours schools of physiology and of zoology. At this stage he was strongly advised to specialize in zoology as Sharpey-Schafer, the Professor of Physiology, had never awarded a first-class honours

degree. Nevertheless, having decided to take the risk, Bain graduated in 1928 with first-class honours in physiology—the first to do so in Schafer's new science school.

As an undergraduate, Bain took a serious interest in the history of medicine under the stimulating influence of Schafer and Comrie. In 1928 he was awarded the Wellcome Gold Medal in the History of Medicine for an essay on *The history of the development of our knowledge of the structure and function of the lymphatic system*. Well planned and carefully written in characteristic style, it summarized the existing knowledge of the lymphatic system ranging from the views of the Greeks to those of Sharpey-Schafer. Extensive quotations in Latin, and references from French and German sources, indicate the author's linguistic ability. A keen photographer, Bain went to considerable trouble in reproducing title pages and pictures from old medical works to illustrate his thesis. The illustrations were so good that one of his examiners rang up a colleague to say that a candidate for the Wellcome Gold Medal had apparently torn pictures from library books to illustrate his thesis! This thoroughness was an early example of the meticulous attention to detail which became apparent in his later striving for perfection in all he did. The Wellcome Medal, which stood for many years on his mantelpiece at Leeds, was Bain's first connexion with Sir Henry Wellcome—a connexion renewed many years later in dealings with The Wellcome Trust to the great benefit of his academic department.

In 1929 Bain married Miss Bessie Beveridge Smith of Uphall, the daughter of a leading elder in his father's kirk. They had two children: Magda (Margaret Elizabeth Brough, now Mrs. Peter Casson) and Sandy (Alexander William Macnab), an Edinburgh graduate and now a medical practitioner in Canada.

Professional Life

In his final year as a student Bain became part-time assistant to Professor Sir E. Sharpey-Schafer, F.R.S., and on qualifying in 1928 he was promoted to be full-time first assistant—an honour which he valued greatly. During this period Bain studied anatomy along with the medical students to whom he was teaching physiology, but pressure of work in physiology made it impossible for him to continue with medical studies. He won the Ellis Prize in physiology in 1930 and was appointed to a Crichton Research Scholarship for 1930–31. These awards enabled him to spend some time working at the University of Brussels with Demoor and Rijlant, and at the University of Ghent with Heymans.

On his return to Edinburgh in 1931, he was appointed Lecturer in Experimental Physiology and elected a Fellow of the Royal Society of Edinburgh—probably the youngest fellow at that time. In 1932 he was awarded his Ph.D. in the Faculty of Medicine. The following year was Schafer's last as Professor of Physiology and during it Bain ran the Department of Physiology at the University of Edinburgh. He assisted Schafer in writing the 5th edition of *Experimental Physiology* and edited the 6th edition after Schafer's death. As his junior colleague, Bain's initial respect for Schafer grew into intense admiration and permanent affection. Schafer's death in 1935 had a marked effect upon him and his influence lasted throughout Bain's life. Indeed, Bain modelled himself upon Schafer in many ways and even his handwriting came to resemble that of his chief.

While on a visit to Cambridge, Bain was entertained to breakfast on Sunday,

20 May, 1934 by Thomas Hunt Morgan, the distinguished zoologist and geneticist and winner of the Nobel Prize for Physiology and Medicine in 1934. Morgan failed in his attempt to persuade Bain to go to the newly created research chair of physiology in the California Institute at Pasadena. In later years Bain often referred to this meeting, especially when dwelling on the virtues of *Drosophila melanogaster*—Morgan's favourite heuristic tool—over those of *Musca domestica*: this at a time when houseflies were being bred in large numbers in the laboratory adjacent to his office, during my search for some of the doping or intoxicating factors of *Amanita muscaria*.

Bain left Edinburgh on 3 August, 1934 to take up a lectureship in physiology at the University of Leeds which had become vacant through the appointment of G. L. (later Sir Lindor) Brown to a post in the National Institute for Medical Research. His diary entry for that day reads, 'Left Edinburgh, alas!'

Still clearly a physiologist, he was promoted in 1935 to the readership in pharmacology vacated by A. St. G. Huggett. At this time, pharmacology was taught within the Department of Physiology at Leeds and, as Reader, Bain undertook all the teaching of pharmacology, along with a substantial share in the instruction given in physiology. It was not until 1945 that a demonstrator—Peter Dews, one of his own pupils and now Stanley Cobb Professor of Psychiatry at Harvard—was appointed to help him with the pharmacology.

In 1946, the University of Leeds established a Chair of Pharmacology within the Department of Physiology, but after a short period an independent Department of Pharmacology was created. Bain was appointed to the new Chair and became the first non-medical Professor of Pharmacology in the United Kingdom. The Department had a heavy commitment to courses in pharmacy, inherited when the Leeds College of Pharmacy had been absorbed in 1933 by the University of Leeds. During the war, however, Bain planned his own 'post-intermediate' degree course, leading to a B.Sc. It had a considerable content of pharmacology and led to an ordinary degree in pharmacy. He began to accept students for this course in 1943, and the pharmacy courses leading to the C. and D. and to the Ph.C. qualifications were gradually abolished. The Pharmaceutical Society of Great Britain recognized this degree and admitted to membership Leeds graduates in pharmacy, subject to their having passed the Society's examination in forensic pharmacy and having completed their apprenticeship. In 1952 Bain obtained the approval of the University for the B.Sc. in Pharmacy to be an honours degree.

Provision was also made for those pharmacy graduates who had shown good promise in pharmacology to proceed to a fourth-year course devoted exclusively to pharmacology, making possible the addition of honours in pharmacology to their B.Sc. in pharmacy. Leeds University was thus the first to establish an honours degree in pharmacology based on pharmacy and, as Leeds medical students or graduates were able to enrol in Bain's honours school of pharmacology, Leeds was, at that time, the only university to provide both a pharmaceutical and a medical approach to pharmacology.

Although Bain clearly foresaw the day when pharmacy teaching would cease altogether he made no efforts to accelerate this trend largely out of loyalty to the pharmaceutical members of his staff. He did, however, take the precaution of using the designation lecturer in pharmacological chemistry, instead of lecturer in pharmaceutical chemistry, for the departmental post held in succession by Hey

and Clark, so that, should pharmacy go, pharmacological chemistry would remain. Another of his reasons for the retention of pharmacy degree courses was that it favoured more widespread interests among the staff—it was always a proud boast of Bain's that his department professed all aspects of drug lore!

Bain went to Leeds with a considerable reputation as a teacher—a reputation which he maintained and enhanced, until increased administrative work, consequent upon the expansion of his department and the extension of the research programme, obliged him to hand over most of his teaching duties. Those who attended his lectures will understand the tragedy involved. Models of lucidity and accuracy, and in precise, polished English, his lectures were always interesting. They were works of art as well as of science, and were delivered in an easy and relaxed fashion but nonetheless authoritatively. Notes were limited to an odd word or two on a postcard deep in a pocket of his white coat fastened with a towel clip.

From 1935–45 he was the only pharmacologist at Leeds, lecturing at least twice a week for most of the year, both to junior and to senior medical students, and in addition running an experimental course for eight or nine sessions. He also undertook separate and special courses for pharmacy and for dental students, and contributed substantially to the physiology instruction given to medical students and graduates. He covered the whole field of pharmacology, from its historical beginnings to the most recent developments.

Despite this enormous teaching load it is probable that he would have been without peer as an experimental pharmacologist during the thirties and forties had he chosen to devote the remaining small part of his time to his own experimental work. Instead, he accepted many other responsibilities. A glance at the bibliography reveals the large gap in his published work during the years 1938–48—a silent tribute in itself to his selfless devotion to the interests of others. He served in the Home Guard during the war and was Academic Sub-Dean in the Faculty of Medicine from 1943–8. (A prospective student, who later became a member of Bain's research team, recalls the interview he had with the Sub-Dean for entry to the University of Leeds; the young embryonic pharmacologist, already overawed by the importance of the occasion, was completely dumbfounded by the fact that the whole interview seemed to be conducted in a foreign language quite incomprehensible to a Sassenach.)

At one time or another, Bain served on many University committees. They included those concerned with Post-War Developments, Scholarships, Applications, Superannuation, Women's Halls, and the Joint Advisory Committee of the University, Teaching Hospital and Regional Hospital Board. He also served on the Pharmaceutical Advisory Committee of the Leeds Regional Hospital Board. As editor of the University of Leeds Medical Magazine he found time to stir up controversy with his editorials. A member of the Academic Consulting Staff of the General Infirmary at Leeds from 1935 until the 'appointed day', Bain strove continually to establish cordial relations between clinical and academic staff. His paper with Taverner affords evidence that his efforts in fostering his ideal of collaboration on equal terms between an academic department of pharmacology and hospital clinicians, met with considerable success. In addition to these local activities he gave sterling service to the British Pharmacological Society.

In 1947 Bain's staff was augmented by the appointment of another demonstrator

in pharmacology—John Broadbent, now Professor of Pharmacology and Dean of the Faculty of Medicine at Lusaka. At this time, James Dare, Peter Hey and George Nelson were responsible for the pharmaceutical teaching. Bain was able to devote more time to experimental work and the department became active in research, establishing a reputation in more than one field. This applied particularly to the development of quantitative methods in human pharmacology, and their application in the assessment of the then new antihistamine drugs—never to be called antihistamines, for Bain, like Dale, argued that there is only one histamine.

The growth of this young and active department was greatly facilitated when additional accommodation became available. Bain planned a new research floor for pharmacology. Alterations and equipment were financed by a generous grant from the Wellcome Trust and the Chairman, Sir Henry Dale, opened the new research laboratories in January 1955 on the occasion of the first meeting of the British Pharmacological Society in Leeds.

Throughout the 1950s Bain acted as guide and mentor to a small band of workers who, in addition to those already mentioned, also included Jean Batty, Barbara Brown, Willey, Exley, Cahal, Fielden and me—this in spite of much anxiety and unhappiness in his private life resulting partly from his wife's ill-health and from his own frequently recurring attacks of bronchitis. He often felt that conditions at Leeds were not ideal for his wife or for himself, and he particularly disliked the interminable arguments over accommodation in the Medical School.

Thus, those who were closest to him were not surprised when, late in 1958, he decided to vacate his chair from March 1959 in order to assume the directorship of the new Smith, Kline and French Research Institute at Welwyn Garden City. Essentially a university man, it was not easy for him to leave academic life and move into industry, although outwardly he appeared unconcerned. The move ended his responsibility for pharmacology at Leeds, a responsibility he had carried for almost twenty-five years, much of the time on his own.

Many of his staff and students rallied round him and moved with him to the S K & F Research Institute where he was rejoined by two former colleagues—Hey and Broadbent, who had meanwhile been working overseas—along with others recruited from various fields. He quickly established an active research programme run on academic lines, with the research staff given as much freedom as most academic workers, but with better and more lavish equipment and technical help. His technical staff was headed by his chief technician, Duncan Cameron, who had worked for him for a long time at Leeds. One of his innovations was the establishment of a common room for the staff of the Institute where meetings for coffee and tea provided frequent opportunities for the sharing of interests and the discussion of problems.

Pioneering a research institute on university lines within a commercial organization would undoubtedly have led to valuable and profitable new drugs. But materially rewarding discoveries were too slow in surfacing, and the inevitable conflict between academic curiosity and practical application in commerce led to Bain's resignation on 13 May, 1966. He continued as a consultant to the Research Institute until he reached retiring age; and he was able, through the S K & F Foundation, to extend his support for many projects in universities and to foster the development of some pharmacology departments, such as that of Trinity

College, Dublin—an interest complementary to his work as an assessor for the University Grants Committee from 1958 onwards.

In 1961, soon after they had moved to Welwyn, Bessie Bain died. In 1962, Willie married Freda Dratman of Philadelphia who had previously been associated with Smith, Kline & French in the United States of America.

Scientific Work

Few people realize what a consummate experimentalist Bain was, for he himself did little experimental work from the outbreak of the war in 1939, largely confining himself to directing and advising his staff and students. Anyone who saw him setting up a spinal cat, a modified Langendorff heart, or a cat nerve-muscle preparation, could not fail to be impressed by his skill, elegance and speed. Many of his students—inept beginners lacking standards for comparison—were less impressed than they might have been; those who later saw famous experimental physiologists and pharmacologists at work then recognized Bain's artistry and outstanding expertise. He could cut down, clean and cannulate the femoral vein of a cat, with scalpel and forceps only, before blood had had a chance to ooze—a feat to admire but not to emulate.

Three main themes run through his published work—the functioning of the autonomic nerves, the inactivation of the sympathetic transmitter, and the assessment of antihistamine drugs.

His first paper came from the Marine Biological Laboratory at Plymouth; it dealt with the actions of adrenaline, and other drugs, on the hearts of various invertebrates. The effects of ergotoxine on the response to adrenaline had not previously been investigated in an invertebrate; Bain found that ergotoxine did not antagonize or reverse the action of adrenaline, and that pilocarpine produced an effect similar to that of adrenaline. The tribute at the end of this paper is interesting; it reads: 'The author's acknowledgements are due to . . . Miss B. B. Smith for assistance in conducting the experiments.' This is the only record of Bessie's participation in pharmacological experiments.

After his visit to Brussels, where he had worked with Demoor and Rijlant on active substances in the atria of mammals, Bain returned to Edinburgh and began to prepare his Ph.D. thesis which was submitted in 1932 with the title, *Studies on the Comparative Physiology of the Heart*. The thesis incorporated work he had done at Plymouth and in Brussels, and described the disappointing search for the 'heart hormone' which Demoor and Rijlant thought they had been able to extract from 'pacemaker' tissue. In it, one can discern Bain's awakening interest in pharmacology which made it easy for him at a later date to take the step from physiology to pharmacology. It contains a diagram of the apparatus used to demonstrate, on frog hearts, the humoral transmission of the effects of vagus stimulation. This diagram is now known throughout the world for, slightly modified, it has appeared in all editions of *The Pharmacological Basis of Therapeutics* by Goodman and Gilman; the original clearly shows the vago-sympathetic trunk still embedded in the tissues carrying it from the medulla oblongata.

Ten years earlier, Loewi had obtained experimental proof of the chemical transmission of the nervous impulse, and in a series of papers had gradually identified Vagusstoff as a choline ester, until he finally settled on acetylcholine.

Many who had attempted to repeat Loewi's fundamental work on the frog heart had found it difficult to get confirmative results, and some had failed to get any results at all. Bain devised a new technique 'whereby the humoral transmission of the effects of cardiac vagus stimulation in the frog may be strikingly demonstrated', and by it, many confirmations of Loewi's work were obtained, contributing to the worldwide acceptance of the theory of chemical transmission. Bain's technique was based on continuous and somewhat rapid flow through the donor to the recipient heart 'in the hope that the "vagus substance", almost as soon as it was formed, would pass into the irrigating fluid and thus away from at least one of the factors operating for its destruction'. With proper adjustment of flow, the irrigating fluid from the donor did not cease to flow when the donor heart was completely stopped. Thus, both donor and recipient hearts could be in standstill simultaneously.

For the remainder of his time in Edinburgh, Bain was largely responsible for running the Department of Physiology. He maintained his work on the mode of action of vasomotor nerves, the results forming the basis of his contribution to Volume 23 of the *Quarterly Journal of Experimental Physiology* which was dedicated to Schafer by his students, past and present, in honour of his eighty-third birthday in 1933.

On moving to Leeds in 1934, Bain continued to work on vasodilator and other autonomic nerves and his paper with Irving and McSwiney on visceral afferent nerves was the first attempt to work out the afferent pathways in the splanchnic nerves.

At this stage he began to take an interest in the subject of the destruction of adrenaline—he always pronounced it *adreenaline* for, as he said, we got it from the adrenal gland. In a series of papers between 1936 and the outbreak of World War II, he showed that adrenaline in Ringer solution lost all its pressor activity in 40 minutes whereas in blood it lost only 40–60% of its pressor activity in 4 hours. Cocaine did not alter the rate of inactivation, but when liver slices were added to the mixture of blood and adrenaline all activity disappeared within 4 hours. Kidney was intermediate between liver and skeletal muscle which had very little effect. Boiling for a few minutes destroyed the power of the liver, and cocaine did not inhibit the inactivating principle of the liver, which he failed to isolate.

In the first paper from his own pharmacology department (*J. Physiol.* 1937, **91**, 233) he showed that most of the apparent loss of pressor activity in blood alone was accounted for by uptake of adrenaline into, or on to, red blood corpuscles from which it could be recovered by laking. He felt that it was wrong to assume, as many had done, that inactivation of adrenaline in tissues was similar to the free oxidation that can occur in Ringer solution—most studies on adrenaline inactivation before Bain's time had been done with Ringer solution as the medium. He exposed this fallacy and went on to investigate the different rates of inactivation by livers of different species, guinea-pig being very active followed by man, rat, cat and dog, with mouse having the least effect.

He found that in specimens of liver from three human beings there was much less activity than in other human livers. As two of these people had suffered from arterial hypertension of a non-renal type, and as the third had had a diastolic pressure of 90 mm but no other signs of hypertension, he associated the low inactivating power with the high pressure, and suggested that the raised pressure in

hypertension might result from delayed inactivation of the transmitter of adrenergic vasomotor activity—then thought to be adrenaline.

After the war, Bain returned to experimental work, and devised a technique for the quantitative assessment in man of antihistamine agents. He measured the area of a weal provoked by the intradermal injection of histamine before, and at various times after, an antihistamine drug. The regular experimental animals were the staff of the department but he sometimes also enlisted the co-operation of Ph.D. students among whom at that time were Stuart Adams (now with Boots) and Gobinda Achari (lately Professor of Pharmacology and Principal of the P. W. Medical College at Patna). Interest in antihistaminics continued until well into the 1950s and was extended to the clinical field by co-operation with various clinical colleagues particularly dermatologists Warin and Hellier.

Despite the attractions of histamine and its antagonists, Bain could not ignore adrenaline for long. Along with Jean Batty he extended his previous investigation on the destruction of adrenaline to include noradrenaline, whose importance had not been realized when the earlier work was done, and which they now showed to be destroyed by liver similarly to, but faster than, adrenaline. And they suggested that 'the original hypothesis based on results with adrenaline can now, whatever its worth, be extended to include noradrenaline'.

At about the same time Barbara Brown's attention had been directed to another aspect of adrenaline inactivation—inhibition of monoamine oxidase. Many of her test compounds were made by Hey who was also busy investigating the requirements for nicotine-stimulating activity among ring-substituted choline phenyl ethers. In the process he synthesized choline 2:6-xylyl ether bromide, known as TM10. Willey, testing on the cat's nictitating membrane stimulated pre-ganglionically and post-ganglionically, and on the arterial blood pressure, was impressed by the dramatic and very prolonged tachyphylaxis shown by TM10—a first injection produced a marked rise in blood pressure but a second, even a long time afterwards, did not. Hey and Willey explained this on the basis of known pharmacological actions—as local anaesthetics produced a similar but transient effect, and as TM10 had a powerful and prolonged local anaesthetic effect, they argued that the prolonged blockade could result from the prolonged suppression of conduction in post-ganglionic sympathetic fibres.

So the situation remained until Exley showed that the post-ganglionic action potentials were not suppressed by TM10 in doses that blocked adrenergic-nerve activity; he went on to show that it blocked the output of noradrenaline from the spleen on stimulation of the splenic nerves and that, in acute experiments, it did not prevent the release of adrenaline or noradrenaline from the suprarenal medulla; and he suggested that it worked by reducing the output of the mediator liberated from adrenergic nerves.

Bain saw at once the importance of Exley's observation and, while encouraging him to continue with his investigation of the cause of this selective inhibition of adrenergic nerve function, he began, along with Fielden, to examine the effect of TM10 on the synthesis of the adrenergic transmitter.

During this final burst of experimental work, he showed that dopamine restored activity in the Finkleman preparation that had been treated with TM10 whereas tyrosine, phenylalanine and dopa did not, and he concluded that TM10 probably worked by hindering the formation of dopamine perhaps from inhibition of dopa

decarboxylase. Direct testing of this hypothesis showed, however, that dopa decarboxylase from guinea-pig kidney was not inhibited by TM10 and further work, with human chromaffin cell tumour tissue, seemed to show that TM10 largely inhibited the conversion of dopamine to noradrenaline. This last result was, however, not unequivocal and it was never fully accepted.

Even to this day, the exact mode of action of TM10 has not been elucidated, but when Clark—who had followed Hey as chemist in the department—elegantly showed that the nicotinic rise in blood pressure produced by the original sample of TM10 was due to small traces of the *O*-tolyl ether, and not to the TM10, Bain was finally convinced of the value of serendipity in pharmacological research. Serendipity or not, however, this work of Bain and his department gave rise to the adrenergic-neurone blocking drugs which now play an important rôle in the control of hypertension.

Pharmacological Society

Bain was a staunch supporter of the British Pharmacological Society which he joined as an ordinary member in 1939, the year when it was suggested that membership should be limited to 50. He served in various capacities until his death.

As Treasurer from 1947 to 1964, he was fanatically determined to keep down expenses and to hold the subscription within the capacity of the pockets of junior members. Much of his success was achieved by good housekeeping, for which some of the credit must go to his secretary, Miss Mary Turnbull, but also partly by making use of the facilities of university departments with committee members on the staff. But even so, before he gave up as Treasurer and handed over in 1965 to Derek Wood, his successor in the Chair at Leeds, he knew that expenses were mounting and would soon inevitably surmount income. His record of seventeen years as Treasurer is unlikely to be broken for a long time.

During his period as Treasurer he was an ex-officio member of the Society's Committee, and from 1965 to 1967 he was an elected member. From 1955–60 and from 1967 until his death he represented the Society on the British National Committee for Physiological Sciences.

From 1954 to 1957 he was Press Editor of the *British Journal of Pharmacology and Chemotherapy*, a task that he much enjoyed although for family reasons he did not always have as much time to devote to it as he would have wished. How he laughed at some of the phraseology, especially late at night when relaxed by 'the beneficial pharmacological properties of ethyl alcohol'. 'Here's another' he would say, 'in the case of adrenaline. I approve of whisky in a case but not adrenaline.' *Human* to him was never a noun, and he was a great chaser of *only* into its proper place. 'If you take hyphens seriously you will surely go mad', said this Scot, a clergyman's son, laughing uproariously at the thought of a pharmacologist who was unco-ordinated. And juxtapositions like 'isolated invertebrate hearts found on the south coast' would make his face redden and puff out until he exploded in a great guffaw. He was a great Press Editor. Even after he gave up the Editorship he continued to serve until 1960 on the Editorial Board and did much for the journal.

Many members will recall how he used to insist that communications at the Society's meetings should not be read, and how—following Trevan's example—he would protest when slides were not legible or were packed with typewritten figures.

In 1967, soon after his retirement, the Society recognized his many contributions and elected him to Honorary Membership. Bain was very proud of this honour which made him one of an elite group of very distinguished pharmacologists.

Shortly before he died he showed that he still had the Society's welfare at heart when he indicated that he would like his friends to contribute to the funds of the Society rather than to send floral tributes to his funeral. Recalling that some papers read at the Society's meetings were trivial, and had been submitted for reasons other than their intrinsic merit, he asked that any memorial in his name should be used to allow a young pharmacologist to attend an international meeting provided that the visit did not include the reading of a paper.

Other Societies and Honours

Although our Society undoubtedly commanded Bain's main interest and loyalty, he took an active part in the proceedings of many others. He was a member of the Physiological Society and for many years, particularly early in his career, he was a frequent contributor at physiology meetings. He was also a member of the Society for Experimental Biology, the Royal Medical Society of Edinburgh, the Royal Society of Medicine and the Biometric Society.

In 1931 he was elected to the Fellowship of the Royal Society of Edinburgh and more recently to the Fellowship of the Institute of Biology.

In 1953 his Alma Mater awarded him the Doctor of Science degree and in 1967 the University of Dublin honoured him with an honorary Sc.D.

The Man

The tributes published at the time of his death show that Willie Bain—or Bill, as he was sometimes called—was much more than a pharmacologist—that the man was even more outstanding than the scientist.

Those who have been his students or colleagues know of his uncompromising rejection of the shoddy and the superficial, of his tremendous strength and integrity, and of his unfailing tolerance and good humour towards those he respected. Contemptuous of people who—to use his own expression—‘had not the brain of a biscuit weevil,’ he would nevertheless help and defend to his utmost limit anyone showing capacity for original thought coupled with reasonable industry. One of his charms was his easy ability to accept people completely and, although this was done on a selective basis, once accepted it was ‘warts and all’, his loyalty thereafter being assured. He was without pomp and he treated amateur politicians—both academic and otherwise—with undisguised contempt.

Those who knew him best remember him for his human qualities; for his warm friendship; for his pretended disdain of the Sassenach; for his dislike of flying machines; for his pleasure in the company of the great and the famous; for his generous hospitality; and for his irresistible sense of fun which cloaked deep veins of seriousness and disappointment. Had he been more selfish and less considerate of others in pursuing his professional scientific career he would surely have been more famous. But who among us would have wished to change him? Perhaps some of those who came up against his stubbornness in the defence of what he regarded as a matter of principle?

Cultured in the arts as well as in the sciences, he befriended and helped several artists in their early days, and treasured the reminders they had given him—his likeness drawn by Jacob Kramer, once destitute and now remembered in Leeds by the Jacob Kramer College; and his portrait in bronze by John Mills, a beautiful and now poignant tribute. His deep knowledge and love of literature and books, especially of lexicons, is clearly reflected in his fine library at Oakdene. It was a great delight to hear him talk of the Scottish worthies and on the divines of the auld Scottish Kirk, and to enjoy his conversation extending over topics as rich and varied as Tovey and his music, the proper use of the gerund, and the impact of science on theology. Like Schafer, Bain had had a strict upbringing within the Church, and although in later life he no longer proclaimed his religion, he maintained his high ethical standards and never forgot his Bible which he could quote so as to astonish even theologians.

A fine pianist and equally good in song, he loved to play and sing German Lieder, particularly Schubert, Schumann and Brahms. His sympathetic understanding of the music, and his willingness to play second fiddle to the singer, made him quite outstanding as an accompanist.

He loved to retell his special stories, enriched with Scottish idiom, and accompanied by grimace or buffoonery to achieve the maximum effect, being less concerned with any loss of dignity than with the delight of his audience. One remembers the impromptu departmental parties starting mysteriously with 'a wee drop of the auld kirk', usually in a beaker—'we have dispensed with accuracy'—and ending on special occasions with his own Scottish song 'I had a barrie and the wheel gaed roond'. Sometimes, as the party wore on, great matters of scientific import would be solemnly discussed, until the 'Prof' deflated everything and everybody with his face-reddening suppressed laughter, and his infectious chuckle 'Och chaps! It's a poor heart that never rejoices'.

His end was not easy. He suffered much and long, but his courage was great and his sense of humour never deserted him. Look at his final and shortest publication and admire the spirit that enabled him, a few weeks before he died, to joke about the tautophony of Ouabain and W. A. Bain.

Lord Platt, who had become a close friend during Bain's later years also noted the humour: 'I saw him a few days before he died. He was unruffled, and his humour and intellectual power were intact. His taste for a wee drop of malt whisky was mercifully unimpaired. It happened to be his birthday, August 20th. I mentioned that I had seen it in *The Times* birthday list. He said, "I thought they might have telephoned first to find out if I was still here."'

Such was this friendly scholarly man who was always full of fun, and you were not long with him before it bubbled over, even during his last illness, whose inevitable end he clearly foresaw and awaited with great courage, tenderly supported by his devoted Freda from whom he derived much strength and who brought him great happiness in the final decade of his life.

With the death of Willie Bain, 'Jock Tamson's family' has lost one of its best bairns.

I am grateful to the British Pharmacological Society for having asked me to write this obituary on my old chief and friend. In writing it I have drawn freely upon the tributes sent to the Society by his friends and colleagues, and I acknowledge my debt. I am particularly grateful to Miss W. M. Parker, Assistant Librarian of the University of Leeds Medical

Library for help with the bibliography; to Dr. Henry Adam for information from the library in the University of Edinburgh; to Emeritus Professor W. S. Craig and Dr. Walter Perry for critical reading of the first draft; and to Bill's 'American friend', Freda, who chose and provided the photograph, for access to notes and books and for many helpful discussions.

GEORGE MOGEY.

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