

Obituary

SAMUEL TERTIUS COWAN, 1905-1976

When S. T. Cowan, an honorary member of the Society and a distinguished microbial systematist, died last year the Society lost one who was among the best known and most affectionately regarded of its members. Sam Cowan, as he was known to all, was born on 24 September 1905 at Eccles, Lancashire. His father was Samuel Cowan, son of Samuel Cowan, so that S. T. Cowan was the third in line to bear the name, and his middle name Tertius was added by deed-poll in 1926. His mother's maiden name was Emily Woods.

His early life was spent near Lytham St Anne's, and his education was mainly at Buxton College nearby. Cowan always said he was a poor scholar, generally near the bottom of his class, but it seems likely that he found little to interest him at school: he had an aversion to Latin (which in later years was evinced by his impatience with the minutiae of Latin grammar when discussing the nomenclature of bacteria), and despite going in 1922 to a 'crammer' in Manchester, his poor performance at Latin (then a required subject for medicine) delayed his matriculation till 1924. He then studied medicine at Manchester University and qualified M.B., Ch.B. in December 1930, and M.R.C.S. (Eng.), L.R.C.P. (Lond.) in 1931.

Sam Cowan's first house-job was House Physician in 1931 to F. E. Tylecote, Professor of Systematic Medicine at Manchester Royal Infirmary. He had already found an interest in pathology, because later that year he became Assistant Resident Medical Officer and Resident Clinical Pathologist at the Infirmary. In 1932 he was fortunate enough to obtain a Dickinson Medical Research Scholarship (at the salary of £75 per annum) for research in the Bacteriology Department in York Place, Manchester.

He recorded that his research work fired his enthusiasm for the first time. Those who remember Sam Cowan's insatiable curiosity in all aspects of bacteriology can form some idea of the transformation that this period must have effected in the young doctor. In 1933 he was awarded his M.D. with commendation for his thesis on '*Observations on the haemolysin of the pneumococcus*'. In later years he obtained his D.Sc. from Manchester (1953) and the Fellowship of the Royal College of Pathologists (1963).

At the termination of the research scholarship he did some locums but soon decided he was not suited to the usual kind of clinical work, so he returned to Manchester University as a student on the course for the Diploma in Bacteriology, which he obtained in 1934. He was then appointed Research Assistant in Bacteriology and worked on the detection of tubercle bacilli in milk. In 1935 he had the choice of three appointments: a job at the Connaught Laboratories at Toronto, a lectureship at Birmingham, and the appointment as First Assistant in Bacteriology at Hammersmith at what was then the British Postgraduate Medical School. He accepted the last of these, and shared 'digs' with Allan Downie, then Senior Freedom Research Fellow at the London Hospital. In the summer of 1936 Sam became the Junior Freedom Research Fellow. In 1936 he married Nancy Lingard Heathcott of Chapel-en-le-Frith.

Somewhat later Cowan moved back to Manchester, where he was Lecturer in Bacteriology at the outbreak of the Second World War. He was greatly influenced in his early days at Hammersmith by Ashley (now Sir Ashley) Miles, who insisted that each routine specimen should be treated as a research problem.

In the Second World War, Cowan served in the Royal Army Medical Corps and reached the rank of Major. Much of this service was in the Middle East, but he was stationed for a

time at Woolwich and at the War Office. In the Army he gained wide experience of the enterobacteria, which became one of his special interests. At the end of hostilities he returned to Manchester University before succeeding Dr R. St John-Brooks as Curator of the National Collection of Type Cultures, which was housed at the Lister Institute at Elstree.

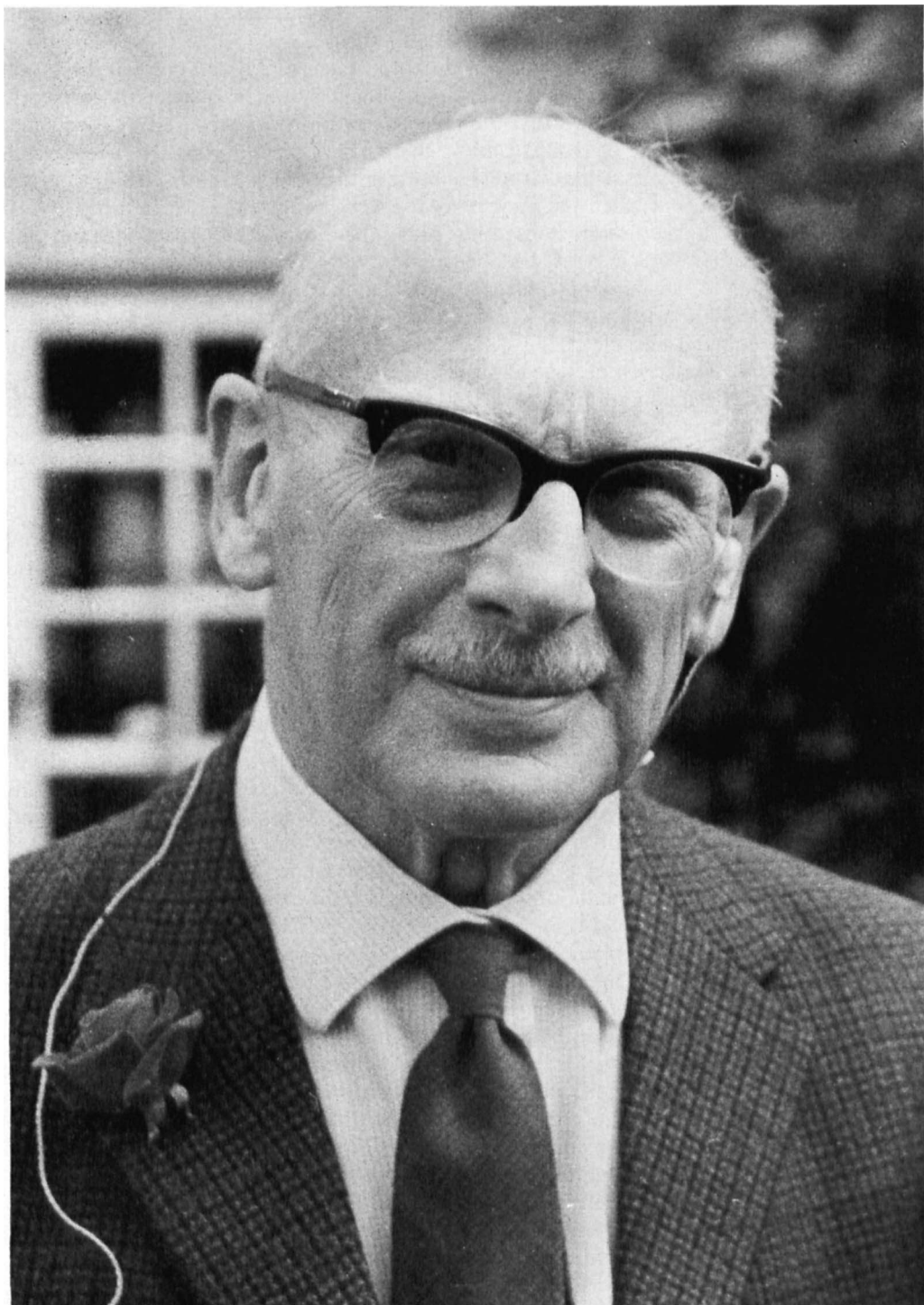
When Sam Cowan became Curator in 1947 he inherited a varied but not well-documented collection of micro-organisms. The coverage was patchy: most were human and animal pathogens; some important pathogens were scarcely represented; in other groups the non-pathogenic representatives were unavailable for comparison; and there were scattered representatives from groups that were mainly of interest to dairying, ecology, agriculture, industry and the like. A major reorganization was required. Also, this had to be coordinated with the needs for cultures of organisms that were not human and animal pathogens, which were served by a number of special culture collections, founded over the years by a variety of different organizations.

The opportunity for major reorganization came in 1949 when the National Collection of Type Cultures moved to the Central Public Health Laboratory at Colindale, where better facilities were available. Cowan introduced the large-scale use of freeze-drying into the Collection as its main method of preservation and distribution, and started the detailed records of the Collection that make it one of the foremost in the world. Cultures of doubtful authenticity were discarded; others were transferred to more appropriate collections; all the cultures that were retained were carefully characterized by standards that were far ahead of their day. The thoroughness of this work is shown by the way in which these new records were later used for analysis by methods not then thought of.

At that time a common complaint was that strains obtained from culture collections were either not what they were labelled, or had become so changed over the years that they were no longer typical. Sam Cowan was determined to show that it was possible to distribute cultures that were authentic, pure and typical: the fact that this is now broadly accepted as the normal practice is a measure of his success. Only freeze-dried cultures from checked batches were issued, and a careful watch was made for colonial and antigenic variation (which are the two types of variation most likely to occur in culture, both much reduced by adopting freeze-drying as a policy).

At the same time Cowan played the leading part in the discussions that led to a more rational policy for the different national culture collections, which themselves underwent major reorganization in the 1950s. The National Collection of Type Cultures became responsible for human and animal pathogenic bacteria and those closely allied to them. Efforts were made to get genuine type strains of as many species as possible. The collection of bacteria of industrial interest at the National Physical Laboratory at Teddington assumed responsibility for most of the free-living bacteria and became the National Collection of Industrial Bacteria. Other collections were set up or expanded for other bacteria, and for yeasts, fungi, protozoa and algae, so that the British collections today provide well-documented, catalogued and comprehensive cover of almost all micro-organisms except viruses. In this reorganization Cowan played a major part, as also in the coordination of Commonwealth culture collections (which formed a collaborative body in the postwar years, a forerunner in many ways of the World Federation of Culture Collections), with their Commonwealth lists of cultures. At this time, too, he developed an interest in taxonomy and nomenclature of bacteria of all kinds (not simply animal pathogens); this became his second major interest, although he returned later to the diagnostic side of bacteriology in collaboration with K. J. Steel. His lucid, intelligent and shrewd contributions over the years had a wide influence on microbial systematics.

A substantial part of Sam Cowan's effort went to international affairs, particularly in bacterial systematics. In 1950 he became Permanent Secretary for Medical Bacteriology of the International Committee on Bacteriological Nomenclature (the Permanent Secretary for Non-medical Bacteriology was then R. S. Breed). Cowan's long association with Robert



SAMUEL TERTIUS COWAN

Earle Buchanan had started a little earlier, because he was associated with Buchanan and St John-Brooks in preparing the First International Bacteriological Code of Nomenclature, approved at the Congress of Microbiology in Copenhagen in 1947. Little information is now available on just what part different individuals played in producing this early Code, because although it is known that the bulk of the draft was prepared by Buchanan, based on the Botanical Code of Nomenclature, there were numerous changes necessitated by the need to use living types (type cultures) in bacteriology. Buchanan was little interested in cultures of bacteria, but chiefly in their names; Breed was chiefly interested in the descriptions of bacteria in the literature; it seems likely therefore that the parts dealing with type cultures (together with a great deal of common sense) were largely contributed by Cowan. He did try to persuade his colleagues that the Starting Date for bacterial names should be set at a date after modern cultural methods had been invented. He suggested works such as Lehmann and Neumann's *Atlas und Grundriss der Bakteriologie* of 1896 or Migula's *System der Bakterien* of 1900 as suitable. This was a compromise between a date like 1920 (which Miles and Cowan suggested as approximately the time that pure cultures of anaerobes were first obtained regularly) and the totally unrealistic date of 1753 of Linnaeus' *Species Plantarum*. But Cowan was overruled by his colleagues, and it is not until the last few years that this critical issue has been taken up again. The proposal to make a new start for bacterial names in 1980 gave Cowan much quiet satisfaction.

In collaboration with Buchanan and Breed he prepared numerous early annotations and Opinions of the Judicial Commission upon points of bacterial nomenclature. He was also active on some of the taxonomic subcommittees, of which he and William A. Clark (who became the other Permanent Secretary) were the main proponents, and which now form such a major activity in systematic bacteriology. Though he was *ex officio* a member of many, his active work was mainly on the Subcommittee on the Enterobacteriaceae.

Cowan remained a Permanent Secretary until 1962, and for the next three years was Chairman of the International Committee on Bacteriological Nomenclature (now the International Committee on Systematic Bacteriology) and a member of the Judicial Commission. In 1966 he was elected a life member of the Committee in recognition of his outstanding contributions to systematic bacteriology. He was also a member of the Committee on Bacteria of the Botanical Congress of 1953, which was intended to formalize the separation of the Bacteriological Code from the Botanical Code (in the event no very clear decisions were reached: the separation was generally agreed to be *de facto* if not *de jure*). He was an active member of the Editorial Board of the *International Bulletin of Bacteriological Nomenclature and Taxonomy*. He used to say this was the most cumbersome journal title that he knew, but it took many years of his persistent effort before it was renamed the *International Journal of Systematic Bacteriology*.

Cowan had a powerful influence on the eighth and most recent edition of *Bergey's Manual of Determinative Bacteriology* (Buchanan & Gibbons, 1974). He joined the Board of Trustees of the *Manual* in 1958, but for several years the Board's main concern was the publication of *Index Bergeyana*, the brainchild of R. E. Buchanan, (Buchanan, Holt & Lessel, 1966). Once this was completed the Board could give its attention to revising *Bergey's Manual*, and Cowan was a strong advocate for enlarging the Board, appointing a full-time editor and setting up advisory committees to handle specified areas of the bacteria. Buchanan was finding the tasks of editing increasingly burdensome; finally he was persuaded that a full-time editor was essential, and N. E. Gibbons was appointed. Cowan considered that these changes were the best decisions the Board made, though he regretted the delay in appointing an editor, because by then it was difficult both to ensure that all the authors received precise instructions on their contributions, and to remedy oversights during preparation of copy for the press.

He was fond of emphasizing how little we know about the bacterial world, and believed that only a minority of species had been described – a speculation that seems to be borne

out by recent work. He was far from convinced about the reality of higher categories like Families and Orders, and persuaded the Board to omit them in those areas where no consistent views could be put forward by the advisory boards – much to the disappointment of Buchanan. He was, however, the strictest of the Board in requiring full and detailed descriptions from authors: certainly the eighth edition marked a new level in the quality and completeness of characterization of bacterial species. His last contribution to bacteriology was a summary of his experiences on the Bergey Trust, which the President of the Society for General Microbiology read at a joint meeting of the Society with the Society for Applied Bacteriology in January 1977.

Most of his scientific work was on systematic and diagnostic bacteriology. In addition he had a lively interest in the philosophy of science, so that these formed three related themes throughout his career. Despite growing administrative duties and much scientific writing he managed to continue some personal laboratory work almost to his retirement. He would regularly take his place at the bench to examine strains sent in, or to check those about to be freeze-dried. He was widely read in microbiology, and especially knowledgeable about ‘the tricks of the trade’ – those small technical points that are seldom published in accessible form.

He contributed a good deal to the taxonomy of the staphylococci and micrococci in a paper (Shaw, Stitt & Cowan, 1951) that is one of the classic contributions to the group, the foundation of modern work on them and the next major advance after the work of the Winslows in the early part of the century. He recognized the pseudomonad nature of Whitmore’s bacillus (Brindle & Cowan, 1951). He studied the enterobacteria, particularly the *Proteus* and Providence group, and *Klebsiella*. He was himself a ‘lumper’ rather than a ‘splitter’, as he held (Cowan, 1959) that the family Enterobacteriaceae would be best treated as a single genus – thus showing he was an exception to his own dictum that bacteriologists are splitters in the group they know best.

The introduction of numerical methods into taxonomy and of studies using DNA were developments that aroused much interest in his mind. Though a shrewd critic of weaknesses of early proposals, his pragmatic approach to taxonomy made him open-minded. Thus he encouraged an early numerical study from records of the properties of NCTC strains (Sneath & Cowan, 1958). Both authors were surprised by the cogency of the findings despite obvious drawbacks and misplacements. In retrospect the quality of the data accumulated in the National Collection of Type Cultures was remarkably high, and this study is still one of the few where data from the literature that were not specially collected for numerical work have yielded passable results. Thereafter Cowan was a supporter of the method, though perhaps because he claimed to be not numerate he did not participate actively in such work. His interest in DNA was less, and his comments suggested that he was over-cautious, fearing the kind of difficulties that have dogged the application of serology to systematics.

In diagnostic bacteriology he became the foremost exponent in the world. With Patricia H. Clarke he pioneered several forms of micromethods for characterizing bacteria (Clarke & Cowan, 1952) and became aware of the need for much more careful standardization of diagnostic tests than was usually considered necessary. Cowan & Steel’s *Manual for the Identification of Medical Bacteria* (1965, 1974) was written in collaboration with Kenneth J. Steel who sadly died at an early age. This is one of the best-known reference books in microbiology, familiar throughout the world to medical bacteriologists. It grew from an outline published in the *Journal of Hygiene* (Cowan & Steel, 1961), and was immediately in demand. It was innovative in two respects: an unknown strain was explicitly compared on as many tests as possible with taxon entries in tables of reactions of taxa versus tests; and it employed two or more tables in successive stages to narrow down the possible diagnoses. These principles were not at the time commonly employed.

One aspect of Sam Cowan’s work will last – his numerous contributions to the philosophy

of bacterial classification. He had read widely on this: he knew what was meant by the Tree of Porphyry and John Locke's comments on the definition of species. Many of his ideas are summarized in the annotations in his book *A Dictionary of Microbial Taxonomic Usage* (1968). This is full of his concise and witty comments, e.g. 'Cowan is Adansonian in classification but applies selective weighting for identification, and believes that by so doing he gets the best of both schools'. Sometimes Homer nodded, as when he says genetic homology may be estimated quantitatively by determining the GC composition. But the book is unique in the taxonomic literature. He dedicated it to R. E. Buchanan, 'The Father of Bacteriological Nomenclature', and although he did not see eye to eye on many points, he was much influenced by Buchanan on nomenclature and the type concept. He was one of the very few people who could successfully argue about bacterial names with that formidable individual: equally he was one of the few who appreciated what Buchanan's aims were.

A major contribution was his thesis (Cowan, 1962) that bacteria form phenotypically and genetically a continuous spectrum of variation. This is a question that in many respects is still unanswered, for although there is evidence that some bacterial species are well-demarcated and separate from others, there is great uncertainty whether genera, families and the like have any natural boundaries separating them from adjoining ones. He thought that bacterial species might be evolving so fast that we could not classify them by the usual methods. In another contribution (Cowan, 1970) with the characteristic title 'Heretical taxonomy for bacteriologists', he put forward 10 'heresies', some of them iconoclastic, as when he advocated abolishing rules of nomenclature and retaining only principles. But he wisely noted that species could be better represented by a collection of strains to represent the range of the species, rather than single strains – a concept whose importance is only slowly being realized.

He was the first to acknowledge that some of his suggestions were impracticable, but insisted that they made people think about the problems. In this way he stimulated many young microbiologists of a philosophical turn of mind into venturing into unorthodox paths. A list of his publications is deposited in the Society's archives.

Sam Cowan was very active in the Society for General Microbiology. He was on Council soon after the formation of the Society and also again from the late 1950s for many years. He was General Secretary from 1960 to 1965. In this capacity he was largely responsible for framing the liberal constitution for the Groups of the Society which has permitted them to grow so successfully while remaining within the framework of the whole Society. He was an Assistant Editor (1952 to 1961) and International Representative from 1966 to 1971. In 1971 he was elected an Honorary Member of the Society.

The Society owes much to him. His breadth of interest, friendliness and enthusiasm attracted many new members. His views on scientific programmes struck a happy balance between the general and the special which has been one of the strengths of the Society over the years.

A loyal friend, reasonable in counsel, open and frank in conversation, Sam Cowan was unfailingly courteous and helpful to those who sought his advice. He was always willing to assist in difficult problems of taxonomy or nomenclature. He was especially kind to the inexperienced, because he well remembered the long years he had himself spent in learning the diversity of the bacterial realm. He used to say that bacterial systematics was difficult enough for him to understand despite long study. He was an excellent lecturer, able to arouse the interest of his audience, lucid in speech and enlivened by humour. He had the unusual ability to make taxonomy interesting to other people.

In the early 1960s he suffered a coronary thrombosis from which he made a good recovery, and was able to take on, in addition, the administrative responsibilities of Director of the Central Public Health Laboratory from 1961 to 1964 and, from 1964 to 1967, of Deputy Director of the Public Health Laboratory Service. He proved himself capable of adminis-

tration in his quiet but thorough way. Although not greatly inconvenienced, Sam was rather deaf and resorted to a hearing aid. One of the reasons he gave for retiring to the depths of the country was that he could then turn up his record player without disturbing neighbours. The observant might notice at scientific meetings that a seraphic expression would come over his face midway through a long-winded oration: Sam had turned off his hearing aid.

He retired in 1967 to a quiet country house at Queen Camel near Yeovil, Somerset, but he remained active in Society affairs and on the Bergey Trust, though he deliberately gave up executive and policy-making roles and retained only those where he felt he could still offer useful advice. One of his last policy actions was to get the Bergey Trust to fix a retiring age for its trustees. It is not widely known that he was a steam-railway enthusiast with a fine collection of photographs of steam engines started in boyhood. In 1973 he became Curator of the Somerset and Dorset Railway Museum. He died suddenly while on a visit to Hereford on 24 September 1976, his 71st birthday. Sam was a strong family man, and was very fortunate in his happy family life. He took great pleasure in the company of his wife and children, a son and two daughters. His many friends remember him with respect and affection.

P. H. A. SNEATH

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