

# BIOGRAPHICAL MEMOIRS

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## **Thomas Stevens Stevens. 8 October 1900 – 13 November 2000**

Edwin Haslam and David G. Morris

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THOMAS STEVENS STEVENS

8 October 1900 — 13 November 2000



*J. S. Stevens*

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8 October 1900 — 13 November 2000

Elected FRS 1963

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### EDUCATION AND CAREER

Born at Renfrew on 8 October 1900, Thomas Stevens Stevens ('TSS') was the only child of John and Jane Stevens. His father, a draughtsman and engineer, was production director of William Simons and Company Ltd of Renfrew, shipbuilders specializing in dredger construction. Before her marriage in 1898, his mother Jane (*née* Irving) was a schoolteacher. His upbringing was typically middle-class, and both parents gave every encouragement for their son to study. However, as a delicate asthmatic youngster Tom's early education was given, until the age of eight, at home by his mother—a fact held by many to be responsible for the seeds that brought forth his great love of language and his sensitive and wide-ranging intellect. Thereafter he attended Paisley Grammar School (1909–15) and the Glasgow Academy (1915–17). At Paisley Grammar School his attention was drawn by Joseph Towers, a teacher of English, and at the Glasgow Academy he delighted in the sardonic humour of G.L. Moffatt, who taught mathematics. Physics and chemistry had nevertheless captured his imagination and in the Academy he enjoyed the extensive opportunities that were provided for practical chemistry. It was a love and a boyish enthusiasm that he retained and continued to practise throughout his professional career. In a popular lecture that he gave in the 1950s, 'The anatomy of the chemist', Tommy includes the account given by the famous American teacher, Ira Remsen, of the most impressive experiment he had ever performed: 'nitric acid acts upon copper'. The story ends, '... I drew my fingers across my trousers and another fact was discovered. Nitric acid acts on trousers...'. With its smells, fizzes and bangs it is surely a portrait of the young Stevens himself.

In 1917 he won a Taylor Open Bursary and entered the University of Glasgow. He

graduated in 1921 with distinction in applied chemistry and in 1922 he was awarded a first-class honours degree in pure science (principal subject chemistry). He had a brilliant scholastic career, and honours and prizes fell his way like autumn leaves on the wind. Prominent among these were Dux of Modern Side and Medallist in Mathematics and Science, Cleland Medallist in Natural Philosophy and First Prizeman in Mathematics (1918) and First Prizeman in Natural Philosophy (1920). After a year's research, as a university assistant, in Glasgow with S. Horwood Tucker and armed with a William Ramsay Memorial Fellowship, he went in 1923 to Oxford and Lincoln College, there to study under W.H. Perkin Jr FRS the synthesis of isoquinoline alkaloids. He was admitted to the degree of DPhil in 1925. 'TSS' then returned to Glasgow in 1925, first as a university assistant (1925–28), then Carnegie Teaching Fellow (1928–33) and finally Lecturer (1933–47) in the Department of Chemistry.

It was during this period that he established himself with a series of inspired and highly original researches in organic chemistry and in particular in the area of molecular rearrangements. As he later wrote, characteristically tongue in cheek, 'Molecular rearrangements have attracted the attention of organic chemists, in the first instance because they constitute a distressing, if not scandalous, crack in the foundations of structural chemistry'. Aided in some measure by the blessings of serendipity, the Stevens rearrangement of quaternary ammonium salts formed the first (1928) of a series of beautifully executed studies. Principal among other rearrangement reactions that followed were the McFadyen–Stevens procedure for the conversion of carboxylic acids into aldehydes (1936), and the Bamford–Stevens reaction for the preparation of olefins (and after slight modification cyclopropanes) from ketones (1952). Thirty years after its discovery 'TSS' enjoyed the mild notoriety that attended earnest discussions of the mechanism of the Stevens rearrangement and the view that it was indeed 'forbidden'. Suffice it to say, to have one named (and 'forbidden') reaction in the literature might be considered fortunate, but to have three is surely the mark of a genius, albeit a very humble one.

In 1946 Brynmor Jones left the Department of Chemistry in Sheffield to take up the first Chair of Chemistry in Hull and then its Vice-Chancellorship. The organization of chemistry staffing in Glasgow was such that the prospects for promotion for 'TSS' were poor; in the following year he applied for the vacant post of Senior Lecturer in Chemistry in the Department in Sheffield, led by a former colleague in Oxford, R.D. Haworth FRS. Writing to support his application, a former student in Glasgow, and later Nobel laureate, wrote 'that the most surprising thing about Stevens is that he was not appointed as a young man to a major Chair of Chemistry'. Perhaps he did not want one!

In 1948 'TSS' was one of the first members of staff in Sheffield to be promoted to the newly instituted title of Reader. He was elected to the Fellowship of The Royal Society in 1963, and a year later to the Fellowship of the Royal Society of Edinburgh. In October 1963 the University of Sheffield promoted him to a Chair of Chemistry, *ad hominem*; the first in its history. He retired in 1966 to return to his native Scotland where, for one academic year, he took on the role of Visiting Professor at Strathclyde University. On 19 June 1985 'TSS' was awarded the honorary degree of DSc by his Alma Mater. It was the final accolade and a fitting climax to the scientific career of this gentlest and most unassuming of men. His creativity arose directly from his own innate talents, which were without doubt fostered and nourished by his mother in those early formative years. Experiments such as those that led to the discovery of the Stevens rearrangement cannot be planned, but it falls to individual men and women of great perspicacity and creativity to recognize the significance of their outcome. 'TSS' was just such a man. Recognition of his early outstanding researches did not come until

the twilight of his career, but the official photograph, at the degree ceremony in 1985, of the smiling figure of Tommy in full colourful regalia clutching the scroll of his honorary DSc, with his wife Netta at his side, tells all.

### RESEARCHES, 1923–70

Whether by accident or design, ‘TSS’ seems to have taken a statement by N.V. Sidgwick FRS, in the introduction to his textbook *The organic chemistry of nitrogen* (1910, 1937), as the inspiration for his own researches:

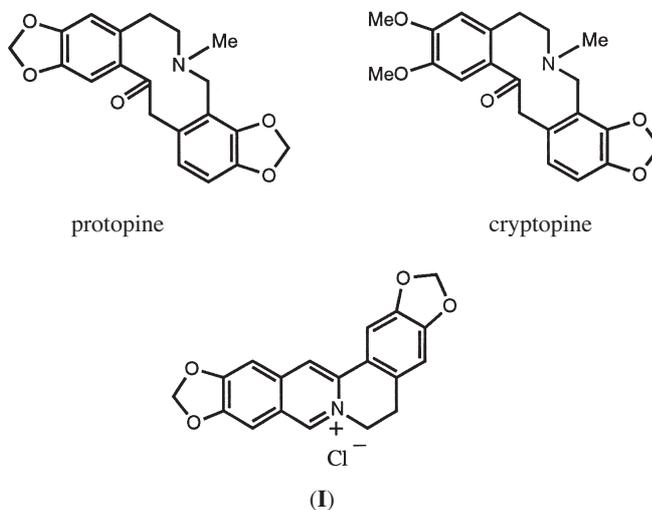
Next to carbon, nitrogen is the most important element in organic chemistry for the variety and interest of the compounds into which it enters.

His first published paper in 1923 was with S. Horwood-Tucker (1)\* in Glasgow on the alkylation of nitrocarbazole and was an early essay in the anticipation of the unexpected. His doctoral work was as a pupil in Oxford of W.H. Perkin Jr on syntheses related to the alkaloids protopine and cryptopine. It generated an early interest in alkaloids that he sustained throughout his career and brought occasionally to life, most notably with gelsemine and sempervirine. This aspect of his work culminated in 1969 with a biogenetically patterned synthesis, with Peter Pauson at Strathclyde, of the unique phenanthroquinolizidine alkaloid cryptopleurine (23). However, alkaloid chemistry soon proved to be a minor theme. In the course of a particular synthesis a method was required whereby the nitrogen atom of a secondary amine might be protected in such a way as to admit of quaternary salt formation and then the subsequent removal of the protecting group. Thereby he discovered, in 1928, the first of the molecular rearrangements—the Stevens rearrangement (5)—with which he was to make his name, and which also first drew the attention of a wider audience to a chemist of great originality and ingenuity. Characteristically (see below) he wrote at the time, with typical Scots caution, ‘we prefer not to speculate as to the mechanism of the reaction until more experimental data are forthcoming’. Thereafter he embarked on a series of studies that led to the discovery of a wealth and diversity of rearrangement reactions of organic compounds containing nitrogen, and at the same time established the dominant leitmotif of his contributions to the growing edifice of organic chemistry. Among these other transformations are, most notably, the McFadyen–Stevens (1936) and Bamford–Stevens reactions (1952).

#### *Alkaloids and other nitrogen compounds*

The elucidation of the structures of cryptopine and protopine was due almost entirely to W.H. Perkin Jr, who, in two major publications (Perkin 1916, 1919) described their chemistry. Although they are often classified as isoquinoline alkaloids, they contain no such ring system but are characterized by the presence of a 10-membered ring, containing a tertiary nitrogen atom and a ketonic carbonyl group. A great deal of attention was devoted subsequently to the synthesis of these and related alkaloids of the berberine group by the Oxford school under Perkin, of which ‘TSS’ became a member in 1923. He accomplished in 1925 (2) syntheses of two important protoberberine and protopapaverine derivatives and undertook (3) in 1926, with R.D. Haworth, preparations of crucial building blocks for these syntheses. However, later

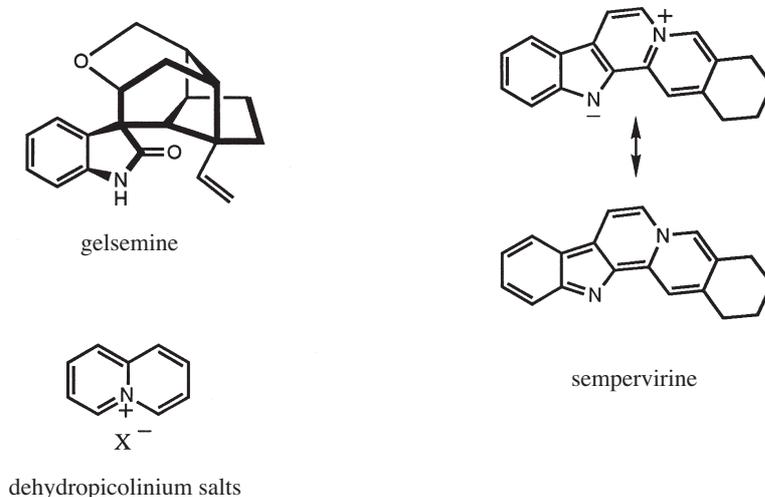
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independent investigations in 1927 (4), undertaken by ‘TSS’ with the admirable objective of elaborating methods for the formation of the key 10-membered ring of cryptopine and protopine by direct ring closure of appropriate precursors, were not successful. In 1935 (13) he described a novel one-pot synthesis of the protoberberinium salt (**I**) in which three reactions (two ring closures and a dehydrogenation) occur concurrently. This work also finally authenticated the structural assignments used in much of the earlier synthetic work, and made a decade previously.

In the 1940s ‘TSS’ turned his attention to the alkaloids gelsemine and sempervirine. The root of the yellow American jasmine (*Gelsemium sempervirens*) has a history of medical applications ranging from treatments for neuralgia to migraine. The principal alkaloid gelsemine,  $C_{20}H_{22}O_2N_2$ , was first obtained in 1876 but, with W.G.C. Forsyth and S.F. Marrian, ‘TSS’ described (15) substantially improved methods for its isolation and that of the co-occurring sempervirine. Nevertheless, in 1953 Stevens and G. Jones (19) echoed the views of many who had wrestled with this child of nature when they wrote, with typical understatement, that ‘Experiments on the general decomposition of gelsemine were not enlightening’. The presence of an oxindole system, having a free imino group, a sharply mono-acid tertiary base containing one –N–Me group, and two extraordinarily inert oxygen atoms, was confirmed. However, a variety of processes employed for the selective breakdown of the carbon–nitrogen skeleton of gelsemine were universally fruitless. Its structural elucidation was also a target for other groups worldwide, such as those of L. Marion, V. Prelog (ForMemRS 1962) and B. Witkop, but this objective was only finally realized by X-ray analysis (Lovell *et al.* 1959). Although its unique and intricate hexacyclic cage structure immediately became an intriguing target for synthetic chemists, including ‘TSS’, almost 30 years later Liu & Lu (1988) were able to write, ‘no total synthesis of this alkaloid has been reported nor is there any sign that anyone has gotten close’. Stevens and his colleagues were among the roll call of those to record a noble failure (25). Several syntheses of the alkaloid were nevertheless described before the end of the twentieth century.

Sempervirine, which co-occurs with gelsemine, is remarkable for its high degree of unsaturation and its orange–yellow colour. It gives intensely blue–violet fluorescent solutions in



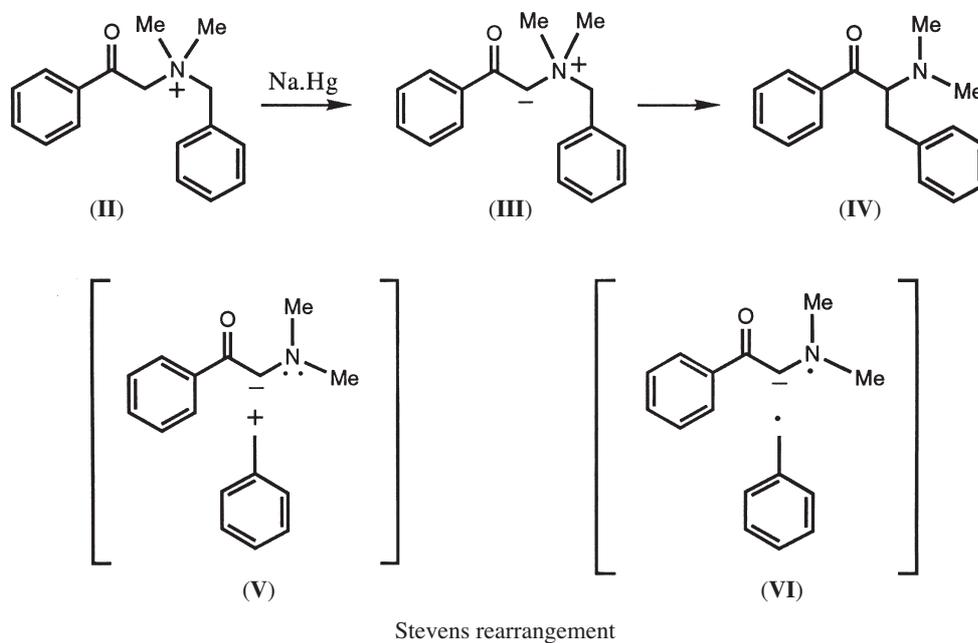
ethanol and its unique, non-oxygenated, anhydrobase structure was proposed simultaneously and independently by Stevens and R. Bentley (16) and by Woodward & Witkop (1949). Woodward & McLamore (1949) also described a synthesis of the methochloride. Although his approaches to the synthesis of the free alkaloid itself were unsuccessful (24), with A. Richards (21) 'TSS' described the synthesis and properties of variously substituted dehydropicolinium salts, which unusual structural unit is embodied in the structure of the alkaloid sempervirine.

#### *Reactions and molecular rearrangements*

Within three years of his return from Oxford to Glasgow and while still in his twenties, 'TSS' had published his first paper on what is now known universally as the Stevens rearrangement. In their introduction to the 1928 paper (5) the authors described how, to effect a particular synthesis, they were seeking a method for the protection of the nitrogen in an amine. The phenacyl group ( $\text{PhCOCH}_2-$ ) was identified as a probable candidate for this role. Formation of the quaternary salt (**II**) was straightforward, but its reaction with sodium amalgam unexpectedly gave (**IV**) in excellent yield. The structure of (**IV**), resulting from the migration of the benzyl group from quaternary nitrogen to an adjacent carbon, was confirmed by independent synthesis. The molecular rearrangement proved to have wide synthetic utility and to be a stimulus for researches on this and analogous 1,2-electrophilic rearrangements for the next 50 years.

First in Glasgow and then in Sheffield the generality of the rearrangement and the effects of solvent polarity and of variations in both migrating and activating groups were exemplified (6–12). In 1955, with R.A.W. Johnstone (20), the strictly intramolecular nature of the rearrangement was demonstrated by using carbon-14 labelling. When the migrating entity was a benzyl group bearing a stereogenic centre, for example,  $-\text{CHMePh}$ , J.H. Brewster and M.W. Kline showed that migration had occurred with substantially complete retention of configuration (an observation later confirmed with B.J. Millard (22)). These features seemed to rule out the intervention of a kinetically free chiral migrating entity, whether as anion, cation or free radical in the rearrangement, and thereby confirmed 'TSS' in his earlier reticence to speculate on the nature of its mechanism.

More than anything it was perhaps these continuing uncertainties about mechanism that sus-



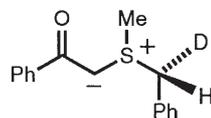
tained a lively interest in this subject well into the 1970s and beyond. ‘TSS’ considered three possible mechanisms for the rearrangement and concluded that, after zwitterion/ylide (**III**) formation, the reaction proceeded through a short-lived ‘tight’ ion pair (**V**). Others, such as Brewster and Kline, proposed a front-sided 1,2-nucleophilic displacement pathway. Much later, and much to the amusement of ‘TSS’, the application of orbital symmetry arguments earned such a mechanism the soubriquet ‘forbidden’. Attempts by ‘TSS’ and his colleagues to isolate ylides such as (**III**) failed (17). However, in 1970 Ollis and his group, also in Sheffield, succeeded. At about this same time a great change in thinking about the Stevens rearrangement also occurred. The discovery of chemically induced dynamic polarization in products of the Stevens rearrangement and the isolation of (previously undetected) very small amounts of 1,2-diphenylethane indicated that the pathway is indeed not an ionic one but involves a radical pair (**VI**).

A more striking change in interpretation of a rearrangement would be difficult to find, but as ‘TSS’ himself remarked (26):

This third possibility, envisaging an intermediate radical-pair, was probably long in receiving adequate consideration because it seemed unnatural to look for such a mechanism for a reaction often initiated by drastic treatment with a powerful base—which almost irresistibly, though not logically, suggests a heterolytic process.

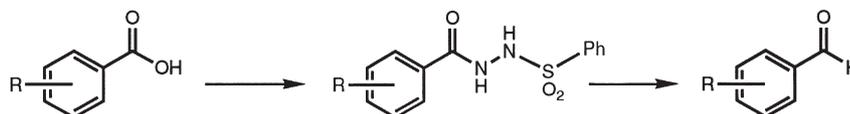
A further stereochemical investigation of the rearrangement by Baldwin and his colleagues, employing the sulphonium ylide (**VII**), which is chiral by virtue of isotopic substitution, revealed that the benzyl group migrated with *ca.* 36% retention of configuration. This removed some of the interpretative difficulties of Brewster’s finding of complete retention of configuration within the migrating group and was in accord with the expectations of a radical dissociation–recombination process.

The discovery of the Stevens rearrangement undoubtedly fired his fertile imagination and allowed ‘TSS’ to indulge his favoured approach to research—speculation, whether on the back



(VII)

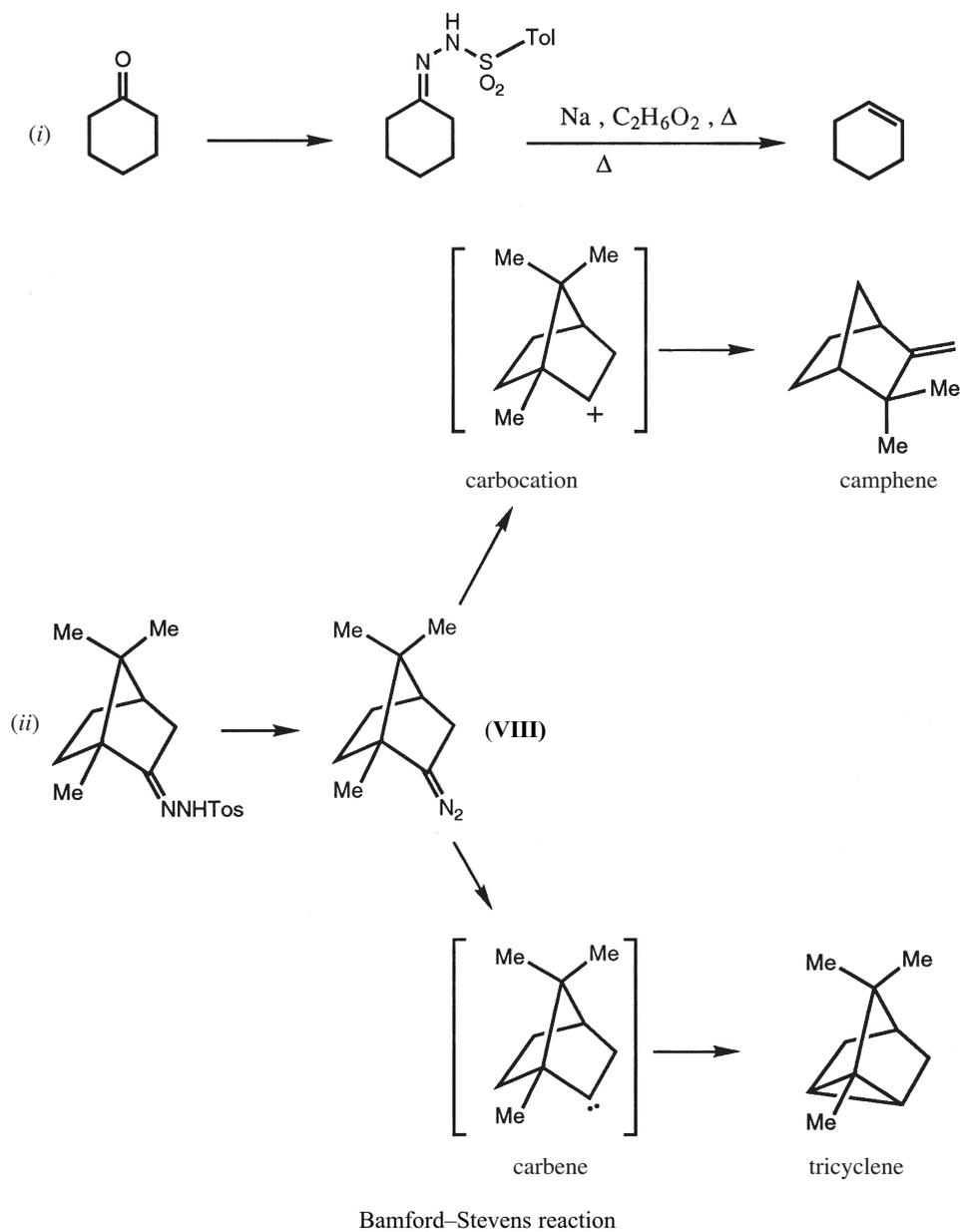
of the proverbial envelope or on the golf course, followed by personal experimentation. These researches exemplified his eclectic interests and tastes and numbered, *inter alia*, the rearrangement of  $\alpha$ -arylamino ketones, aliphatic diazo compounds, sulphinic esters, amine oxides, nitrones, tertiary amines and ethers. Although the influence and significance of the Stevens rearrangement to the development of organic chemistry has been paramount, 'TSS' discovered two other important reactions that bear his name—the McFadyen–Stevens (14) and the Bamford–Stevens (18) reactions. Both owe their genesis to his encyclopaedic knowledge of the German literature and to an observation made originally in 1885 by Escales.



McFadyen–Stevens reaction

In the McFadyen–Stevens reaction, an aromatic carboxylic acid (the reaction is unsuccessful with aliphatic acids) is converted by way of the acid chloride into the hydrazide. When warmed with alkali, decomposition takes place to yield the aldehyde. 'TSS' liked to recall that this reaction occurred to him one Saturday afternoon during a game of golf. That evening he established the correctness of his ideas after the detection of the odour of benzaldehyde ('olfactory' analysis as he was wont to say) during a cursory experiment. McFadyen was reported to have then spent over two months reproducing the reaction reliably.

In 1952 W.R. Bamford and Stevens (18) published details of a reaction that, like the Stevens rearrangement and a good West End play, was to run and run (see Shapiro 1976). In retrospect one aspect of this study is now seen to be an early exploitation of carbenes as intermediates in a mechanistic patterned synthetic reaction. Treatment of the *p*-toluenesulphonylhydrazone of a ketone by heating with a strong base (sodium in ethylene glycol) gave nitrogen, the *p*-toluenesulphinate anion and the olefin. Propan-2-one and cyclohexanone gave propylene and cyclohexene (reaction i) in quantitative yields. For branched ketones, such as pinacolone, the reaction was accompanied by a Wagner–Meerwein rearrangement to give tetramethylethylene. Similarly, camphor was converted integrally into camphene (reaction *ii*a). The mechanism of the Bamford–Stevens reaction is believed to involve a two-step elimination reaction of *p*-toluenesulphonic acid to yield the diazo compound (VIII), whose fate is largely dependent on the protic or aprotic nature of the solvent. In protic solvents decomposition proceeds by way of a carbocation (reaction *ii*a), in aprotic media by way of a carbene (reaction *ii*b). This latter pathway now forms the basis of one of the methods of choice for the formation of three-membered (cyclopropane) rings in monocyclic and polycyclic aliphatic systems.



## ‘TSS’, TOM, TOMMY

People enter the University of Oxford for every sort of reason: to follow in parental footsteps, to be sure of getting into the Civil Service or Royal Dutch Shell, to grow up, to stay young, but perhaps George Bernard Shaw best summarized the business of Oxford as being ‘to make

a few scholars and a great many gentlemen'. Thomas Stevens Stevens was both scholar and gentleman. In the days when it was possible to know, to some degree, everyone on the academic establishment of a university, colleagues in Sheffield across the board invariably referred to him as the most highly educated man in the university. He was a man of wide-ranging intellect, great honesty and integrity, regarded with affection and held in esteem by so many. It is given to few to wear their erudition lightly; even more seldom can they transmit it to others without humiliation. Yet this was his hallmark and the enduring memory of all who knew him. He was an authoritative and stimulating lecturer; every exposition was graced at some point with his lucid and impromptu powers of vivid expression and delivered with his unforgettable yet endearing stammer in which ideas and speech were not always in total synchrony. The then Professor of Education, W.H.G. Armytage, wrote in 1966 of 'TSS':

His gift of weaving the most arcane and erudite, yet illuminating anecdote was nowhere better illustrated than in the lectures he gave on the history of chemistry to students studying The History and Philosophy of Science. For in the last ten years he has held them spellbound as, with practised ease, he opened up the dark tracts of post-phlogiston chemistry. His courteous wit made the delivery of the lectures an education in itself, and his skill as a teacher has been manifest in the fact that he has inspired those biologists whose knowledge of chemistry was almost non-existent.

Self-aggrandisement and medal hunting had little appeal to him. Although he became an Associate of the Royal Institute of Chemistry in 1922 he always declined to become a Fellow, preferring to give the additional annual subscription to the Institute Benevolent fund.

Conversations with 'TSS' were peppered likewise with quotations, *bons mots* and anecdotes from Lewis Carroll to W.S. Gilbert. Unchecked, it was said, he would quote Gilbert by the yard and whistle Sullivan by the mile. He had an amazing collection of anecdotes, and it is said he never repeated the same story. The only recorded exception was the one describing *the run* that he once made in a Staff versus Students cricket match. A gentleness and congeniality suffused all his actions; the wisdom of his advice he gave to all who asked. The humblest and most prolix of his inquirers never saw the face of his watch. As befits such a man his language was always polite and gentlemanly; blasphemy and coarseness of expression were totally foreign to his repertoire. Not that he was wholly averse to telling slightly risqué stories, but even here the literary streak was not far from the surface—as when he spoke of the Bishop's favourite relaxation on a Sunday afternoon being an hour on the sofa with his favourite Trollope. It is therefore not surprising that he never passed unsolicited judgement on another. Equally emphatically, no one ever had a bad word to say of the man himself. It is therefore little surprise that, in an era when surnames were *de rigueur* as forms of address and recognition, students always referred to him affectionately as Tommy. His method of research supervision was, however, enigmatic and daunting to the uninitiated, based as it was on the old-fashioned premise that if the student was going to carry out research, and was good enough, then that is exactly what he should do. Hour-by-hour, day-to-day contact was not his forte. Instead his method seemed to be to wait for some sort of verbal report from the student, while he stood, eyes half-closed, looking slightly over his colleague's shoulder, or at the ground. After what often seemed an age Tommy might say 'So!', in his characteristic way, maybe add a word or two, and return to try his luck another day.

'TSS' possessed an encyclopaedic knowledge of the chemical literature. He was also an accomplished linguist. Beilstein, it was said, was a useful compendium; Beilstein and Stevens a complete chemical education. At parties and other informal occasions he was particularly

fond of stories that amused him and in which the punch line was delivered in French, German or Latin. While incomprehension and agonies of embarrassment invariably covered the faces of his audience, Tommy would look on in eager innocent anticipation that the penny might finally drop. His own contributions to what is often euphemistically called ‘the literature’ seem numerically modest (although double the number of Meerwein, an earlier great master in the field of molecular rearrangements). Doubtless the nitrogenous turgidity which the Chemical Society imposed on its contributors did not best suit his style, which, given greater freedom elsewhere, could sparkle in prose or verse. In Glasgow, under the nom de plume ‘Phorone’, he was a frequent contributor to *The Alchemist*—witness his poem ‘The Professor who put the Bar in Barataria’ (*The Alchemist*, 1932–33), the final verse of which is reproduced below:

He thought all men as wise as he,  
And never gave a pass degree,  
But First Class Hons. or PhD  
Conferred on everybody.  
Now *that's* the kind of Prof I'd be:  
I'd hand round kingly Burgundie.  
And nothing short of D.Sc.  
I'd give to anybody.

It barely conceals his heart of gold. In 1950 the published form (27) of his universally popular lecture ‘The anatomy of the chemist’ revealed once more the wit and the consummate style of his prose. The lecture was devoted to an analysis of the vanities and eccentricities of scientists and was based on Wilhelm Ostwald’s thesis that ‘The school, in its present state, is an apparatus rather for the destruction than for the development of future originality.... In all cases where the development of a specific talent is concerned it should be totally avoided.’ He noted, for example, that celebrated chemists had a tendency to be members of large families: ‘Thus Kolbe was the eldest of fifteen, and that Mendeleeff was the youngest child of his parents, who with typical Slavonic exuberance and inaccuracy, estimated their offspring at anything from eleven to seventeen individuals’. In respect of scientific publication he wrote, impishly, that ‘Some like Cavendish, close up oyster-like, and publish only with extreme reluctance; while others tell the world with the rapturous haste of a hen which has just fulfilled its cosmical purpose’. Great age among scientists was, he decided, not an isolated phenomenon. However, among chemists the record (in 1950) was held by M.E. Chevreul, who lived to be 103. Surely he smiled as he passed the 100-year milestone himself, perhaps adding, *sotto voce*, ‘So!’.

The success that individual universities enjoyed in their postwar expansion often owed as much to the students they recruited as to the staff they appointed. Chemistry in Sheffield was particularly fortunate in this respect, with its one-man selection board. ‘TSS’ undertook this task unaided for more than a decade. He recorded many of his impressions in the University Student Chemical Society journal *Byproduct* in an article entitled ‘Picking the winners’. He concluded that GCE results gave only a moderate forecast of university performances, headmasters were less reliable, and the observations of one interviewer ‘less reliable still’—a typical understatement of someone who recruited two future Nobel laureates to the student body. In reality his fair, balanced and thoughtful judgements were invaluable to all. Monotony in the task of selection was leavened by moments of unexpected, unintentional humour. One long gradually thawing correspondence took place with a particular headmaster, concerned for his star pupil, who had failed to meet the entry requirements. In what ‘TSS’ thought would be the

final letter he wrote that he hoped the student would obtain a place in some congenial university. 'TSS' characteristically recorded the final denouement: 'the head holed a twelve-yarder on the last green to end one up' when he wrote, 'You may be interested to know that A. has found a place in a congenial University; he is going to read Metallurgy in Sheffield'. One young man up from Lincolnshire for interview as a prospective student was so taken by the fastidious old-world charm and otherworldliness of his interviewer that he made the decision there and then that if this was what universities were about then this was the life for him. Conversely, imagine the total bemusement of a young lady interviewee when, never having set eyes on the limpid waters of the River Don, she was informed by her interviewer that, 'if she was thinking of taking up rowing, then Sheffield was not the place for her'.

In style Tommy seemed to reflect the outlook and the optimism of an earlier generation of scientists, when the opportunity to make big scientific discoveries still seemed unlimited, and when the element of surprise still attended a great many of them. Moreover, it was a young man's enthusiasm that he retained throughout his career and his long life. No appreciation would be complete without mention of his wife and the unfailing support that she gave him. In 1949 Tommy married Janet Wilson Forsyth, belovedly known as Netta. Their friendship had extended over many years. She joined him in Tom (where else?) Lane in Sheffield and soon became renowned for the warmth of her Scots hospitality. They were both extraordinarily proud of their birthright, and each summer they returned to Scotland to spend part of their holidays among old friends in a small hotel on the south side of Glasgow. They would also stay in the hotel over the New Year period and would organize dinner parties and pantomime visits with their friends. It was therefore no surprise that on retirement they went back to Glasgow and Pollokshields. They purchased the hotel and, after conversion, used it as their retirement home. From here they made a number of forays far up the west coast of Scotland, chauffeured voluntarily by an old medical friend. It was here that they enjoyed many happy years and, until Netta's death in 1994, many victorious 'games and rubbers'. It was here that Tommy continued to live until his death.

#### ACKNOWLEDGEMENTS

It is a very great pleasure to record the generous help and advice given in writing this memoir by Mr J.S. Nicol, long-time friend of the Stevens, and Professor Peter Wyatt, Dr Roger Brettle and Dr David Cook, former colleagues in Sheffield. The authors also drew upon the note entitled 'From Shiltonborough to Sheffield' penned by the late Dr Andrew Kent, which appeared in 1947 in *The Alchemist*, the magazine of the Glasgow Alchemist's Club, upon Tommy Stevens's translation to Sheffield.

The frontispiece photograph was taken by Walter Bird, and is reproduced with permission.

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