

A PERSONAL APPRECIATION OF TONY SWAIN

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When I became Keeper of the Jodrell Laboratory in October 1969, one of my first tasks was to decide whether it was possible to accede to the request from the Secretary of the Agricultural Research Council to find accommodation for a Dr Swain and a small team to set up an ARC laboratory of Biochemistry within the Jodrell. At that time our building was filled with our own staff and it would have been impossible to squeeze in another group and in any event I had not heard of Dr Swain nor did I feel passionate about Biochemistry. (That perhaps you can attribute to my ignorance at the time.) Now I cannot recall precisely what moved me to look around the areas adjacent to the Jodrell to try to oblige the ARC. It might have been a visit from Tony Swain or a reconsideration of the advantages of a biochemistry laboratory close at hand; in any event I recalled that there was a large room which I and my cytology staff had used for almost two years whilst the new Jodrell was being constructed. That was on the first floor of an old building in our Melon Yard used from time to time as a quiet place of refuge for lady student gardeners, but there were few of them at the time and permission was given for its use by ARC.

In due course, early in 1970, Tony arrived to begin the task of converting an empty room into a laboratory. It was then that I understood that he had spent some years in the Cabinet Office and at the end of his appointment there the ARC offered him the opportunity to set up a lab. somewhere and he had given Kew as his first choice. My first impressions of Tony were of a man who knew his own mind and could enforce it with a single look of a baleful eye. It was also clear that he was a man of considerable scientific experience with a broad outlook and a genuine willingness to co-operate with colleagues in associated disciplines. On top of all that he had an interesting sense of humour, a tendency to be outrageous and a liking for beer. I thought we would get along well together!

I observed with interest how he set up his lab. He went to the hardware shop across the road and ordered various items of white-wood kitchen units and these cupboards and drawers and sinks, with the aid of our local PSA, were converted into a series of benches—the ones which are still with us today. Within a short time all was ready for use and occupation and a small team of assistants appeared to begin the biochemical work. Tony occupied quite a nice room next to the lab. and impressed us all with his many books and journals. It was a room whose window was visible from mine in the Jodrell—a convenience we later appreciated when working after hours, for we could signal when it was time for a drink in the "Coach and Horses" across the road.

Well I don't think it is up to me to comment on Tony's biochemical expertise and his editorial abilities—all that I need to say is that we frequently discussed such subjects as allelopathy and chemotaxonomy and of course the de-

cline of the dinosaurs. You may know that he imported several tortoises into Kew and fed them with phenolic-tainted lettuce to prove his theories. He wished above all to convince Kew that chemotaxonomy should play an important part in the processes of plant classification and to this end placed all his facilities and advice at the disposal of Kew's staff. There are a number who will remember his generosity and remain grateful to him for advancing their research. Of course now I and my colleagues have to thank him for providing Kew with that essential starting point from which we were later to establish the Biochemistry Section of the Jodrell Laboratory.

Tony attracted many visitors to his lab. and saw to it that they met me and my colleagues, so establishing contacts that we would never have made. Each year, just before Christmas, he would bring his collaborators and others together at a dinner held in the lab. I was usually present as was his old friend Arthur Bell with whom he had collaborated in the non-protein amino acid field. These occasions were quite memorable for the songs and jokes and the incautious amounts of beer drunk in the pub afterwards. They became a part of the tradition of the ARC lab which has persisted right up to the present time under Linda Fellows' guidance though I hasten to add that her consumption of alcohol in no way matches that of Tony or myself.

Tony's wide biological interests led him to be a regular attender at meetings of the Linnean Society and many other meetings and seminars outside those of the Phytochemical Society. He was very fond of discussion and debate and enjoyed being outrageous. Indeed his forthrightness and choice of English were interpreted by some as downright aggressiveness but those who knew him well realised that he was a kind, generous and very sensitive person. He did not suffer fools gladly but treated them as delicately as his Yorkshire nature could allow. He was, as you can imagine, very proud of his origin which I suspect from his name and appearance had a touch of the Viking. Shortly before his untimely death he displayed on his wall a tea-towel with the words 'Thar can allus tell a Yorkshire man though thar canna tell him much'. In fact he was in my experience a man of very positive views but always susceptible to good reasoned argument.

When he returned to Kew in 1986 he wanted to find a permanent spot in the Jodrell to continue research and his editorial work. He had obtained agreement from Boston University to spend his last year before retirement as a sabbatical at Kew and he planned then to stay on for as long as possible. His presence amongst us was of great importance to our biochemists and although there was no space in the much expanded laboratory for him to establish an office we did have a hut at our disposal and he established himself there. Very shortly he made his presence felt in the experimental area co-operating with the Commonwealth Mycological Institute

in the search for useful chemicals from fungi, working in collaboration with a member of their staff who had been given facilities in our Biochemistry laboratory. He was then given the status of an Honorary Research Associate at Kew which pleased him immensely because he earnestly wished to be identified with the institution. His love and admiration for Kew was well demonstrated by his decision to donate his very large and valuable library to us and in due course a number of very large boxes of books arrived from Boston to greatly enhance our own scientific library. Of course the general congestion in our premises made it impossible initially to shelve and display Tony's collection but it was hoped that a space could be found in due

course and that he and I could share some offices and found a new unit at Kew which we were going to call the GRI-The Geriatrics Research Institute. Alas before the date of my retirement and before we could put our plan into effect, the M4 claimed him on a Friday night in late September.

I miss this man-his wit and charm, his ebullience and his sensitiveness, his boyish humour and his generosity. Science and biochemistry in particular will suffer a more grievous loss and it is most fitting that we should be gathered here today in the Jodrell Laboratory with which he so strongly identified, to remember him and his contributions to both our scientific and personal lives.

THE LINK BETWEEN SYSTEMATICS AND ECOLOGY

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While the chemistry of plant phenolics was a prime and abiding interest of Tony Swain's, he always had a lively curiosity concerning the possible systematic and ecological significance of other secondary compounds. It was as Director of the Agricultural Research Council Laboratory for Biochemical Systematics here at the Royal Botanic Gardens, Kew that he carried out experiments to determine whether reptiles are less able than mammals to detect and therefore avoid potentially toxic alkaloids in plant materials. Some of us may not have been totally convinced that the disappearance of the dinosaurs was related to the appearance of alkaloid-synthesizing angiosperms on the evolutionary scene. None of us, however, who took part in the stimulating and invariably amusing discussions with Tony on this and a hundred other theories was less than totally convinced of the impetus that his ideas were giving to biochemical ecology.

It was during this, his first period at Kew, that he and Dr Gillian Cooper-Driver, whom we welcome again today, made their observations on the selection of acyanogenic forms of bracken and the avoidance of cyanogenic forms by deer and sheep grazing in Richmond Park [1]. With accounts of these and other experiments Tony would enliven the lectures which he gave, as Visiting Professor, in my former Department at King's College, London. His entertaining classes, his breadth of knowledge in both chemistry and biology and above all his willingness to give his time and share his ideas with his students made him a much valued teacher. He was greatly missed in King's when he moved to Boston.

When eventually he came back to England and the Royal Botanic Gardens, it was with pleasure that I, now moved to Kew myself, was able to tell him how the seeds that he had planted in the Annex of the Jodrell Laboratory were flourishing.

Of particular interest to him was the discovery in plants of polyhydroxy alkaloids which resemble sugars [2]. Several of these are not only able to inhibit glycosidase enzymes in phytophagous insects but also inhibit enzymes involved in the synthesis of glycoproteins found in the cell walls of viruses. One such compound, castanospermine, which is active against the AIDS virus *in vitro*

[3] was first isolated from the monotypic Australian legume *Castanospermum australe*. Subsequently, however, it was possible, using dried herbarium material, to detect it in eight species of *Alexa*, a morphologically related genus from South America and isolate it from *A. leiopetala* [4]. This work provided not only information about alternative sources of castanospermine but independent chemical evidence of a close evolutionary link between the two genera and support for the view that selectionary pressures, possibly exercised by phytophagous insects, have favoured the synthesis and accumulation of castanospermine since it first arose in some early ancestor of our present day *Castanospermum* and *Alexa* species that flourished when Australia and South America were not yet separate continents.

Another investigation which was underway in the Jodrell Laboratory at the time of Tony's return was again one which involved many of those elements that fascinated him most. It concerned the interaction of the rare butterfly *Eumaeus atala floridana* and its host plant, *Zamia floridana*. The conspicuous larvae of this insect which are coloured red and have two parallel lines of yellow spots running down the back, feed on the young leaves of *Z. floridana*. Like other members of the Cycadales *Z. floridana* synthesizes and accumulates glycosides of methylazoxymethanol, a potent toxin and carcinogen. The adult butterfly is also brilliantly coloured even though, as Dr Miriam Rothschild pointed out, warning coloration is virtually unknown in species of other Lycaenid genera. Using a population of insects reared in captivity it was shown that *E. atala* did not avoid the anticipated toxic effects of the plant carcinogen by metabolizing it but rather sequestered it as the β -D-glucoside, cycasin. The young leaves of *Z. floridana* on which the larvae had fed contained 0.2% of cycasin, the adult butterflies between 1.0% and 1.8%. The ability of the insect to sequester cycasin together with its warning coloration suggest a very ancient association between *E. atala* and its host plant, the insect having apparently not only circumvented the plant's chemical defence but turned it to its own advantage [5].

Established as an Honorary Research Associate in his old laboratory, Tony planned a programme of work on