

Sir John Cornforth ('Kappa'): Some Personal Recollections

Harold Kroto

Chemical Sciences Laboratory, Department of Chemistry and Biochemistry,
The Florida State University, Tallahassee, FL 32306, USA. Email: kroto@chem.fsu.edu

Manuscript received: 2 October 2014.

Manuscript accepted: 7 October 2014.

Published online: 11 November 2014.



Sir Harold Kroto is the Francis Eppes Professor of Chemistry at Florida State University carrying out research in cluster chemistry. He is a Fellow of the Royal Society of London and a foreign associate of the National Academy of Sciences. In 1996, he was a co-recipient of the Nobel Prize for discovering the fullerenes which resulted in a new and unique field of chemistry. His awards include the Copley Medal as well as the Blakett and Faraday Lectureships of the Royal Society, the Tilden Lectureship and Longstaff Medal of the Royal Society of Chemistry, the Italgas Prize for Innovation and the Louis Vuitton Moët Hennessy 'Science pour l'Art' prize. He has some 40 honorary degrees. His Global Educational Outreach for SET (GEOSSET streaming from www.geoset.info) project evolved from his earlier TV/Internet Vega Science Trust initiative which has some 300 lectures, interviews, discussions, workshops, and career programmes archived and streaming from www.vega.org.uk

I only came to know two geniuses well; one was Kappa (Fig. 1). There was almost no subject on which Kappa had nothing cogent and prescient to say. Perhaps it was due to his deafness which isolated him from the usual verbal interaction and forced him to read and digest everything carefully that he developed a quiet, deep, rational perspective. As time progressed at Sussex, Kappa and I seemed to develop a relationship of mutual respect and understanding. Although I, as a gas-phase molecular spectroscopist, was not in his field, he appreciated my favourite and most intellectually satisfying scientific contributions on phospha-alkenes and -alkynes (with John Nixon) and interstellar carbon chain molecules (with David Walton and the Canadian astronomers Lorne Avery, Norman Broten, Takeshi Oka, and John McLeod).^[1] Although it was difficult, because of his complete deafness, to communicate with him, I did seem to be able to do it a little better than many.

The day I arrived back from Houston in September 1985 with news of our C₆₀ Buckminsterfullerene discovery, I met Kappa in the corridor of the department and told him about it. He 'umm'd and ahh'd' and looked at me quizzically, not completely convinced. I then said that I was sure that a molecule with a pentagon surrounded by five hexagons must have already been synthesised, perhaps a saucer-shaped cousin of coronene, but Kappa was not sure. I went back to my room and ~10 min later there was a knock on the door and he came in to say I was right and presented me with a copy of Barth and Lawton's beautiful paper on the synthesis of corannulene.^[2] The rest on this subject is history.



Fig. 1. John W. Cornforth as an 18-year-old student (he entered the University of Sydney at 16), after a bushwalking trip in the Blue Mountains near Sydney in the 1930s. Photo by his friend Dick Welsh, from the family album of daughter Philippa Cornforth.

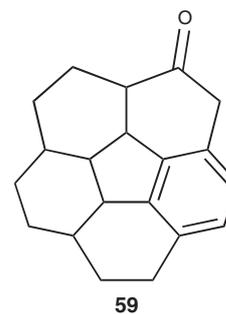


Chart 1.

Kappa made a point of carefully reading papers in which he was interested. He told me that invariably the most important point of an important paper was not to be found in the abstract, but buried somewhere in the body of the paper. A most beautiful and probably unique example of Kappa's claim is to be found in the Barth and Lawton corannulene paper^[2]. In the discussion of the synthesis, they wrote about the final ring closure step:

'Then, in a rather optimistic experiment, a small sample of the ketone (**59**) was mixed with an equal amount of 5% palladium on carbon catalyst and the mixture heated gradually, under nitrogen, to 240° over a 2-hr period. After cooling, the product was eluted from the carbon cake with chloroform. Its pmr spectrum showed only one peak, a sharp singlet at 2.19, an indication that all of the protons of the product were aromatic and equivalent and that we had obtained corannulene!' (Chart 1)

My co-Nobel C₆₀ colleague Bob Curl drew my attention to the exclamation mark which indicated (perhaps) that Barth and Lawton were somewhat surprised that final step which they described as 'rather optimistic' was achieved more readily than they had expected. Arguably – and I would argue it – the exclamation mark is, with the 60:60 vision of the ease with which C₆₀ forms, the most elegant and subtle example of Kappa's claim. It can also be seen, with hindsight, as an indication that the concept of out-of-plane strain should, in certain circumstances, be treated with great caution as it is not such a simple issue.

One of the most important interviews I have ever recorded was the set with Kappa and his wife Rita, which are to be found on my Vega Archive website at www.vega.org.uk. There you will find an excellent interview with Bob Thomas on Kappa's research as well as one with me on more personal issues. As important as anything else is the wonderful article 'Scientists as Citizens'^[3] which I recommend to as many students as possible. This has been for me the most important article I have ever read. It is brim-full with cogent, intelligent, rational commentary and gentle advice on almost every major issue. A second essay, 'Becoming a Scientist',^[4] is a lovely personal autobiographical account of how, as a young adolescent, Kappa's interest in science was sparked.

Kappa and I were very close on most philosophical issues, and when I discuss belief issues I invariably enlist quotations from Kappa's 'Scientists as Citizens'^[3]; in particular, parts of the following segment:

'I accept, without full belief, the findings of fellow scientists in fields where I have no expertise. They do the same with my findings. Something must tie me to these scientists, and them to me. What is it?

[It is] The art of the probable: It is certainly not faith; it is more tentative and incomplete. What one scientist assumes in a statement by another is that evidence about it has been recorded and can be checked, and that facts incompatible with it have been looked for and not found. It is never acceptable as a final statement of truth; it can serve until upset or absorbed by something better, as a basis for further work that will approach the truth more closely. Science is the art of the probable; and I am using that word not just in its modern sense of “likely”, but in its older and more exact meaning: “testable”.

Scientists do not believe; they check. And I am not asking you to believe anything I say on a scientific matter; only that there is tested evidence for all of it, and that I know the nature of that evidence and can make a judgment of its worth.

It may seem odd that a system of knowledge based on doubt could have been the driving force in constructing modern civilisation. At its foundation in 1660 the Royal Society of London, for improving natural knowledge, was given by a quaint and still surviving custom a coat of arms and a motto. One motto considered was “Quantum nescimus”, which translates as “What a lot we don’t know”. It is a good motto and I don’t know why it was not adopted. Perhaps some much-mistaken person thought that it wouldn’t be true for long enough. In the end, the one chosen was “Nullius in verba”. This means, from its original context, “We take nobody’s word for it”.

So what exactly did Kappa believe, if anything? In fact, as he has indicated in the above paragraphs, he did not believe anything at all. In one discussion with me on the subject of atheism, he resolutely maintained to me without any elaboration that he was a sceptic, and as far as I can tell this is more-or-less his definition: a sceptic is a person inclined to question or doubt all accepted opinions – and he did mean *all opinions!* – he certainly doubted most of mine!

After all the years spent living in England, Kappa was still defiantly an Aussie. I think he really considered the UK more the last outpost of the Australian Empire rather than the reverse in that Australia seemed to have retained more of the ethical Anglo-Saxon mentality implicit in such things as the Magna Carta. He supported Australia in Test matches like a true Aussie, and I remember that when he was named Australian ‘Man of the Year’ (of which he was really particularly proud), I asked him what it meant. He said that when he was asked the same question by a journalist, he had responded with, ‘Well, I hope it will mean at least a crate of Fosters.’ A few weeks later, several crates of Fosters arrived. I must admit that as Kappa (and I also) was a great wine lover, had he thought a few seconds more he would surely have included ‘... and a crate of the “The Grange”’.

I well remember discussing his love of poetry with him, when he told me that: ‘Poetry is my music. I can recall some twenty thousand lines of poetry, and you know, when I recall them I often find, I’ve improved them!’ This was a typical example of his gentle, clever wit. Kappa also had a wicked sense of humour too. Whenever we went round to see him and Rita in their home high on the Cuilfail Hill overlooking the 1000-year-old town of Lewes, I often took things which I thought he would like, such as books and cards, etc. One time I took a set of ribald cards and at once he guffawed – for anyone who knew Kappa well, his unmistakable laughter was sometimes almost uncontrollable. When he had finally stopped laughing, he said, ‘This reminds me of a joke.’ Kappa loved jokes – especially close-to-the-edge ones: ‘In the operating theatre, the surgeon screamed: “No, no nurse, I said remove his spectacles.”’

When Kappa died, I was in the middle of negotiating a testing of Google Glass together with speech recognition software, which would show the words of incoming speech as written text, so that Kappa could have read them in the Glass. I must admit

that I had in mind a favourite and particularly hilarious, highly politically incorrect, scene involving Arnold Schwarzenegger as ‘The Terminator’. As the janitor is knocking and shouting at him through his locked door, Arnie, as a robot, chooses a particularly rude response from a list of suggestions presented to him in his vision (<http://www.youtube.com/watch?v=LUZgPfdkWis>). It clearly is a much appreciated scene internationally as it has been translated into numerous languages (http://www.youtube.com/watch?v=GSxhD_XKsUI). I leave it to the reader to access this priceless scene, which I am sure that Kappa would also have appreciated.

Kappa also loved to play tennis; he was, after all, an Australian, so that was inevitable, and those of us who played against him would often be obliterated by his ferocious forehand. Of course, Kappa’s ability to make up limericks almost instantaneously was legendary, and I once asked him if he had kept a record of them. Unfortunately he had not, he just said they were made up on the spur of the moment, and were just for the moment. He wrote one about me too, but it seems to be lost in my personal collection of printed and other paper ephemera. I have managed to find a few. The first about his and Rita’s contemporary, Arthur Birch, of Birch Reduction fame, is quite well-known. There seems to be a stream of liquid flowing through most of the ones that I have found! It would be nice to put together a larger collection, if others have some record.

*That outpost of empire Australia,
Produces some curious mammalia:
The kangaroo rat,
The blood sucking bat,
And Arthur J. Birch inter alia.*

*If you are anxious for over-exposure,
To pre-publication disclosure,
To good food and drink,
Without leisure to think,
Try IUPAC symposia.*

*A physical fellow named Planck,
Used to set up nine beers in a rank,
And, quantum by quantum,
Proceed to decant ‘em,
Till under the table he sank.*

*This animal here is a panda,
Her family call her Amanda,
She spends all her days,
In the best of ways,
Drinking Penfolds on her Veranda.*

My wife Margaret and I loved Rita and Kappa dearly and went round to see them whenever we were back in the UK. In the last couple of years, as Rita became less and less well, Kappa helped to look after her and was proud to be, as he said, ‘Rita’s carer’. We have lost two of the most beautiful of people, characterised by their humanity as well as their intellectual brilliance – for many recognised that Rita who worked alongside Kappa was also an outstanding researcher. Australia can be truly proud of these two wonderful human beings.

References

- [1] Tilden Lecture: H. W. Kroto, *Chem. Soc. Rev.* **1982**, *11*, 435. doi:10.1039/CS9821100435
[2] R. G. Lawton, W. E. Barth, *J. Am. Chem. Soc.* **1971**, *93*, 1730. doi:10.1021/JA00736A028

- [3] J. W. Cornforth, *Aust. J. Chem.* **1993**, *46*, 265. doi:10.1071/CH9930265
[4] J. W. Cornforth, ‘Becoming a Scientist’. Available at <http://vega.org.uk/video/internal/7> (accessed 1 October 2014).