

Tribute



GEORGE DUNCAN DAWSON

On 13 November 1983 George Dawson passed away. Dr. Dawson was the originator of the recording of evoked potentials by signal summation. The introduction of this method over 30 years ago without question marked the most important technical advance in the field since the start of electroencephalography. One need but look at the program of any EEG meeting, anywhere in the world, to see how his method now dominates the field of EEG and clinical electrophysiology.

It had long been apparent — to me, at least — that Dawson's contribution merited recognition of the highest order, including a Nobel Prize, which I was still trying to promote at the time of his death. But he was a man of such modesty that to take any action designed to bring him greater fame, would be the farthest thing from his mind, and was totally alien to his nature.

Dr. Dawson's obituary has already appeared in several periodicals, written by others who were fortunate to be able to know George both longer and more intimately than I could, living across the ocean. I will, therefore, largely confine myself to my own remembrances of him, over a span of 35 years.

As I recall, I first met George at the 1949 International EEG Congress in Paris, this having been my first visit to Europe, after which I visited his laboratory at the National Hospital, Queen Square, London. We had much to discuss, both of us being interested in EEG technology. But what I vividly remember is his showing me recordings of evoked potentials from the human arm, made by superimposing images of repeated CRO traces on photographic film. He was thus able, for the first time, to record peripheral action potentials from

the surface of a limb. I was very impressed by these records, which quite evidently opened up a whole new field of clinical investigation.

In 1951, when I again visited his laboratory, he showed me the first model of the true signal averager, which was an electro-mechanical unit. The apparatus consisted of a motor-driven rotary switch, having 62 contacts, each connected to a capacitor. The switch was driven at a speed of 10 revolutions/sec, connecting each capacitor in turn to the signal source, and thus storing in it a sample of the signal, of about 1.6 msec duration. A stimulus was given the subject, once per revolution, and the evoked potential signal thus summed; the averaged potential was at the same time continuously monitored. Thus the stimulation could be continued for as many stimuli as required to make the signal rise out of the background 'noise.'

The fabrication of the scanning switch required a high degree of precision, but this should have been no great problem for Dawson, who insisted on as near perfection as possible in everything he did: the apparatus he constructed, his experimental work, and the presentation of his results.

Typical of this, as well as his modesty, were Dawson's efforts to give as much credit as possible to others, and to minimize the importance of his own contributions. It was so with signal summation: I recall that in his presentation of his method at an EEG meeting, he attributed it to someone (whom, I forget) in the early 19th century, who added up atmospheric tides for many years, and showed the influence of the moon's gravity. He similarly credits others who had done anything even vaguely similar, or who had given him any suggestions.

But it was George Dawson who first made an apparatus which could store summated signals as synchronized, summed samples: exactly the basis of the method so widely used today.

The importance of Dawson's method was quickly recognized by many in the field, as providing the possibility of detecting what goes on deep in the brain. Many wished to go into the field, and a number of attempts were made to do signal summation by methods demanding less mechanical precision than Dawson's scanning switch, but the major step occurred when digital techniques became feasible. Dawson soon made such an apparatus which, of course, was among the most highly developed and precise units of the epoch. Apparatus based on Dawson's principle is also widely used in other fields of scientific research, such as NMR.¹

The summation method of recording of evoked responses is today referred to under a number of different names: average response recording, computer of average transients, signal averaging, etc. I would like to suggest that in the future we simply refer to it as 'the Dawson method.'

I always tried to visit George on each of my too infrequent trips to England. I, like so many others, will miss him very much. Might we not now honour his memory by a special issue devoted to current work using the 'Dawson method'?

Franklin F. Offner

References

- Dawson, G.D. A summation technique for detecting small signals in a large irregular background. *J. Physiol. (Lond.)*, 1951, 115: 2.
- Dawson, G.D. A summation technique for the detection of small evoked potentials. *Electroenceph. clin. Neurophysiol.*, 1954, 6: 65-89.

¹ Readers will be interested to know that Dr. George Dawson's apparatus is now in the Science Museum, South Kensington, London.