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Q-RIOUSER AND *Q*-RIOUSER

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SUMMARY

The history of the use of *Q* is traced back to 1914 and geophysics found to be a latecomer to its use.

Dr Bertha Jeffreys (**1**) raises the question of the origin of the use of *Q* for a quantity characteristic of damped oscillations and related matters, and seems to approach its use in fields other than geophysics with a slight air of surprise. She traces the notion back to the *Admiralty Handbook of Wireless Telegraphy* of 1939.

However, I recall *Q* being in common use in electronics from the time I first became aware of the subject in the mid-1930s. So familiar was it that it would be introduced into an exposition without any need for explanation being felt. It was treated as a word in its own right, even being incorporated in the well-known trademark '*Q*-max'.

I did not, however, know how the usage originated, and was stimulated to write a 'letter' to the *Journal of the Institution of Electronic and Radio Engineers* (**2**). This provoked a lively correspondence, leading eventually to what seems to be a definitive, though admittedly secondary, source. This is E.I.Green's 'The story of *Q*' (**3**). He ascribes *Q* to K.S.Johnson at the Western Electric Company's Engineering Department, which in 1925 was re-named the Bell Telephone Laboratories. The quantity itself is said to date from 1914, the symbol *Q* for it from 1920, and the first published use of *Q* to Johnson's US Patent No. 1628983 and to a book published by him in 1924. Although *Q* was afterwards interpreted as the 'quality factor' of an inductor, being in this sense the ratio of its reactance to its resistance, Green quotes Johnson as saying that he used the letter simply because it was the next one not already pre-empted in his algebraic development.

The most significant result of the correspondence is, however, conceptual. Early workers in electric telegraphy and telephony thought in terms of signal-waveforms as functions of time. A vital turning point was when signals began to be thought of in terms of frequency. Mathematicians and engineers of Bell Laboratories played a leading rôle in this, and without it there could never have been the modern development of telecommunications, feedback and control technology. This conceptual shift was the deeper reason why it became more natural to think in terms of *Q* rather than of a quantity such as logarithmic decrement which had been preferred earlier. To go back now to the earlier usage would be retrograde.

I hope to publish a fuller account of these matters in the *Journal of the Institution of Electronic and Radio Engineers* (**4**).

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