Interpretations of the History of Technology and the Newcomen Society Tradition

by

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After a creditable run of 60 years, the Newcomen Society 'for the Study of the History of Engineering and Technology' may justifiably feel proud of its tradition. The Society is greatly respected, and I am proud to be a member of it. This does not, however, make it any the less desirable to take a close and critical look at this tradition and see how it tallies with trends and ideas elsewhere. This is what I propose to do here.

I don't want to get much involved with semantics, but it is necessary to understand our terms. And one of the questions is whether technology is the same as engineering. There is not much discussion of this in the literature; some think they are quite different;[1] the Society plays safe by using both terms in its title. Perhaps we should accept that technology is rather broader than engineering, including within its range such things as agriculture as well as engineering; but I am certain that technology and engineering are two of a kind. Both are human activities, both are creative (i.e. arts) and both involve knowledge (i.e. science with a small s, although often only loosely-formulated).[2]

Secondly, what is history? I used to think the answer was self-evident. However, there has been developing, especially across the Atlantic, an attitude to history that has a suggestion of intellectual snobbery: historians are superior, most of us are mere antiquarians. Two American quotes will perhaps illustrate this view. Robert Post,[3] reviewing a book on street tramways, said 'facts by themselves are not history, and so we have very little history of street railways'—even though we have many hundreds of books on the subject! G.H. Daniels[4] said ' .... "how things are done or made" is not a historian's question, and if we study the history of technology under this definition .... a more apt title for us would be "antiquarians of technology" '. He thought that the historical questions were only those that had to do with technology as a social phenomenon. Comment seems unnecessary.

There is a very marked trend, outside the Newcomen Society, and especially in America and continental Europe, to equate 'History of Technology' with 'The Social and Economic Interactions of Technology, past and present'. This is explored further below. But this equation is surely wrong. I would have thought that the history of technology comprised the study of the way technical ideas developed, how each stage of development is related to what has gone before, how new ideas are generated, how understanding gradually unfolds of how things work: the accurate description of how machines, devices, materials, are or were designed and made: the engineers and innovators themselves, and perhaps also the way they built up industrial organisations.[5] The social and economic interactions of technology seem to make a separate, although closely-related, interesting, and possibly even important subject.[6] However, the Newcomen Society has so far completely ignored it.

What may be called the British interpretation of History of Technology is perhaps typified not only by the Newcomen Society, but also by the splendid 5-volume work 'A History of Technology' edited by Charles Singer, Rupert Hall and others (Oxford, 1954-58)—now increased to seven volumes. This work brought scathing reviews from across the Atlantic. R.S. Woodbury was particularly outspoken. He condemned it as amateur, unbalanced, unreliable and unscholarly.[7] Later, Eugene Ferguson said[8] the set of books was chiefly concerned with 'how things are commonly done or made', and that 'the five ponderous volumes provide technical data without context'. He also said that the history of technology as a separate academic discipline dates from the founding in America of the Society for the History of Technology in 1958.

So it would obviously be worth while to examine what this prestigious American society has been doing. Its main activity has been the regular quarterly publication of its journal *Technology and Culture.* I decided to analyse its contents over the first 80 issues (i.e. Volumes **I - 20**), from Winter 1959/60 to October 1979, and the results are presented in Table I and Fig. I. These should be reasonably self-explanatory. Fortunately it is the editorial practice to give short notes on each author, so that it is usually possible to classify authors accurately both as regards type of employment (academic, curatorial, or other) and professional field (historian, engineer, or other).[9] The subject analysis has three main groups:

(1) history of technology as I defined it earlier, i.e. the Newcomen field.

(2) impact of technology on society, broadly.

(3) not directly concerned with technology: this comprises largely the 'philosophy of technology', which to an engineer seems a very sterile field of discussion.

In preparing this analysis I had to scan through all 80 issues and largely re-read their contents. Although time-consuming, this exercise was very rewarding. The quality of the papers is very high and there is real depth to the discussion. In the Newcomen field of the history of technology there are nearly as many pages of papers as in our own *Transactions* for the same period. Much space in *Technology and Culture* is devoted to book reviews and Society business, and these I have ignored in the analysis—likewise the lengthy and very valuable general bibliographies which have appeared every year. (It is worth noticing, in passing, that the early volumes of the *Transactions of the Newcomen Society* also included general bibliographies.) The small category 'About bibliography' includes only papers about specialised sources.

It is perhaps reassuring that a little over half (on average) of the papers are devoted to the history of technology proper. The most striking conclusions of the analysis are, however, those shown graphically in Fig. I. Over three-quarters of the authors are academics, and the proportion is increasing. The proportion of authors who are engineers has fallen from almost one-quarter to only one-seventh and the proportion of pages written by them has fallen even more dramatically. The proportion of pages written by academic historians has risen to one-half. I hope it is significant that the proportion of pages not directly concerned with technology has fallen sharply.

The American concept of the history of technology is clearly indicated by the fact that the Society for the History of Technology called its journal *Technology and Culture* from the beginning, and its Editor, Melvin Kranzberg, stated that:[10]

> We intend to appeal to the engineer, to the social scientist, to the humanist—to the academic scholar as well as to the intelligent layman .... Anyone who is at all interested in understanding the past, in learning how the present got to be the way it is, or in speculating about the future—and this would include every thinking man—must be concerned with the development of technology and its relation with society and culture.

That this broad view is considered important in Europe too is indicated by the titles of two recent new journals:

Kultur und Technik from Germany, started in 1977.[11]

Technique et Culture from France, started in 1979.[12]

Nearly 20 years after Kranzberg's statement, just quoted, Otto Mayr,[13] a leading member of the Society for the History of Technology, summed up its hopes and its achievements thus:

> The conventional view, virtually canonical in America, holds that technology and culture, although both indispensible, are .... antithetical .... culture signifies all that is sublime and beautiful while technology is at best a necessary evil .... *T & C*, in its youth, had set out to bridge this dichotomy, but after twenty years the passion has gone out of this quest. Instead it has turned into an academic journal for and by professional scholars of technology which cultivates the interests of insiders.

The question of the purpose of writing history of technology is important. Let me quote another American, H.I. Sharlin,[14] who complained that in a book on the history of electrical engineering which he was reviewing, all the sources cited were technical:

> Who was the history written for? If for history-minded electrical engineers, then the audience .... is too small to warrant the effort of writing a book. One hopes that the intent is of more importance than making electrical engineering understandable to the laymen .... Such a history as this should be directed to the historian of technology and the general historian, both of whom need to see these developments in a wider perspective.

TABLE 1. ANALYSIS OF 'TECHNOLOGY AND CULTURE'
(Analysis excludes Bibliographies, Society business and Book reviews)

	AUTHORSHIP ANALYSIS											SUBJECT ANALYSIS				NOTES
VOLUMES & YEARS	TOTAL NUMBER OF AUTHORS	Academic %	Curatorial %	Other %	Historians %	Engineers %	Others %	TOTAL NUMBER OF PAGES OF PAPERS	Academic-historian %	Engineers %	Others %	History of Technology %	Social, political, economic relationships of techn'y %	Not directly concerned with technology %	About bibliography %	Subject analysis is by % of pages
1 – 5 1960–64	118	63	5	32	33	23	38	1506	26	27	37	44	22	31	3	Excludes 125 pp for review of Oxford Hist. Techy.
6 – 10 1965–69	155	60	19	21	39	21	26	1714	32	19	29	58	15	25	2	
11 – 15 1970–74	114	80	13	7	48	13	25	1608	40	11	29	62	21	15	2	Excludes 220 pp bibliography of Philosophy of Technology.
16 – 20 1975–79	139	82	10	8	53	14	24	1862	49	12	22	47	37	14	2	

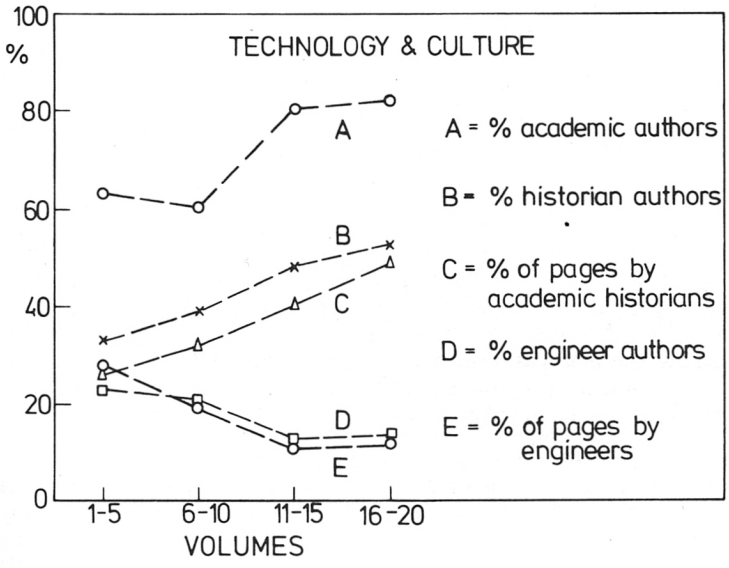

Fig. 1. Authorship of papers in *Technology and Culture,* 1960 – 79.

So *if* we agree with Sharlin, the professional historian is the only important audience o reader!

After all this discussion of other people's ideas, let us turn our eyes inwards and look a the Newcomen Society. It is not possible to analyse the *Transactions of the Newcomen Societ* with the same precision as *Technology and Culture* because it has never been the Newcome practice to give a note on the author of a paper. All we have are the letters after his name. Degree do not help when you can get a B.A. in engineering as well as in history or anything else. The onl usable indicators are the professional qualifications, i.e. generally corporate membership of professional engineering institution. For the volumes (**31 - 49**) covering the most recent 20 year period I have also been able to use my own acquaintance with most of the authors to b able to make a category of 'museum curator or professional historian'. The results for this perio are summarised in Table 2. Roughly half the authors have corporate membership of a professiona engineering institution, so well over half must be professional engineers of some kind.

TABLE 2. ANALYSIS OF 'TRANSACTIONS OF THE NEWCOMEN SOCIETY'

Volumes & Years: 31-49, 1957-78

Total Number of Authors:	214
Curators or professional historians	25%
Corporate Members of professional engineering institutions	46%
Total Number of Pages of Papers:	3860
Not directly concerned with history of technology	1.5%

N.B. Same author recurring in one volume counts only once; but authors recurring in different volumes are counted each time.

As regards the contents of *Transactions,* taking only the formal papers and communications the proportion which is not strictly history of technology is negligible at 1.5%—although some o the papers on industrial history and some of the biographical papers have a rather low technologica content. I also examined the first 20 volumes of *Transactions* (1920-40), and found almost exactl the same results as for the last 20. The actual figures are 48% of authors with professional engineerin qualifications, and 3.4% of pages not strictly history of technology. I could not determine th proportion of curators and historians.

One very marked difference between *Transactions* and *Technology and Culture* is that whereas the former hardly ever ventures into the 20th century, the latter does so regularly, ofte having papers and discussions on such topics as rocket and nuclear-power technology. One curiou feature of both, however, is the very low proportion of pages concerned with electricity, electri power and telecommunications. Considering the way these things dominate our lives, it is indee surprising.

It is clear that the Newcomen Society tradition is a very strong one; it has not change over the 60 years of the Society's existence. I have given numerical support to the dominanc of concern with the history of technology as such, and to the very large contribution of engineer to the *Transactions*. There is also the continuing concern with a high standard of scholarly researc and presentation—so much aided by those members who *are* professional historians—while a the same time making the *amateur* historian the backbone of the membership. In this way peopl of very different professional backgrounds are brought together, and this is surely much preferabl to having a dominantly-academic membership.

On the occasion of this Diamond Jubilee, however, we should perhaps avoid being to self-congratulatory and complacent. Perhaps we should ask ourselves if our unchanging tradition i really good or whether it is perhaps only the result of too much inertia or an in-built conservatism We are now clearly out of step with developments elsewhere, and if we continue as we are i should be because we believe we are right in not extending our interests and not because we hav not the will to change.

I believe that the best interpretation of the history of technology is that it means just what it says. But that still leaves it open to us to place our technology in context—with other technology as well as with its relationship to society and economics. It is all a matter of proportion and perspective. Some other organisations seem almost to have let the context dominate the technology. Perhaps this is right for those concerned primarily with the social, economic, and political fields; but I suggest we should take care to avoid it in the field of the history of technology.

NOTES

1. G. Sinclair, 'A call for a philosophy of engineering', *Technology and Culture* (hereafter referred to as *T & C*), 18, 1977, 685-9.
2. *The Concise Oxford Dictionary* defines technology as 'science of the industrial arts', from Greek tekhne = art, but does not define engineering. *The Encyclopedia Britannica* (1970) quotes a definition of engineering as 'the creative application of scientific principles to design or develop...'. *Chambers's Encyclopedia* (1950) defines engineering as 'that branch of human endeavour by which the forces of nature are brought under human control and the properties of matter are made useful to man in structures and machines'.

   I cannot accept Fores' definition of technology: 'the modern process of making useful, bulky artifacts' (M. Fores, 'The history of technology: an alternative view', *T & C*, **20**, 1979, 853-860).

   I admire Angus Buchanan's book *'Technology and Social Progress'* (Pergamon, 1965), but as an experienced engineer cannot accept that 'for all practical purposes technology may now be regarded as applied science' (p.4). Surprisingly, five years later, Tom Rolt in his Dickinson Memorial Lecture seemed to have accepted it (L.T.C. Rolt, 'The history of the history of engineering', *Trans. Newc. Soc.*, **42**, 1969-70, 149-158).

   In any case, these definitions do little to help us decide the meaning of technology in the past: according to them, technology would have only a very short history.
3. R.C. Post, Review of 'Tramways and Trolleys' by J.P. McKay, *T & C*, **19**, 1978, 746.
4. G.H. Daniels, 'The big questions in the history of American technology', *T & C*, **11**, 1970, 1-21.
5. Note that Tom Rolt,op.cit. (2) thought that industrial history should not be confused with the 'history of engineering', but regarded instead as a branch of economic history.
6. Although industrial archaeology is strictly outside the scope of this paper, being dealt with by Dr. Buchanan in his, I should perhaps mention that similar conclusions do *not* apply to it. It is very difficult to work in Industrial Archaeology without being forced to think about the conditions of life of the workers (for it is their workplaces and cottages that are being studied), about the economic geography of the industry, and such-like matters which I have argued are not part of the history of technology.
7. R.S. Woodbury, 'The scholarly future of the history of technology', *T & C*, **I**, 1959-60, 345-8.

   Woodbury himself wrote an excellent treatise on 'History of Technology' for the Encyclopedia Britannica (1970). I cannot detect any significant difference in approach or quality in it as compared with the Oxford work except (1) its terseness and homogeneity, as befits a limited-length article by a single author; (2) its assumption of a good standard of scientific education in the reader which was not allowed to the authors of the Oxford work—this permitted the discussion of scientific and technical principles; and (3) a more dogmatic presentation, with more self-confidence in the author's judgements. It is probably significant that in the latest (1974) edition of Encyclopedia Britannica, Woodbury's article has been replaced by one of a different kind written by a professional historian, our own R.A. Buchanan. Many of us will remember the charming and modest Prof. Woodbury who accompanied us on the 1970 Newcomen Summer Meeting.
8. E.S. Ferguson, 'Toward a discipline of the history of technology', *T & C*, **15**, 1974, 13-30.
9. Where percentages under type of employment and under professional field do not add up to 100 in each group, this is because of the cases where the correct classification is not known.
10. M. Kranzberg, 'At the start', *T & C*, **I**, 1959-60, 1-10.
11. See review by O. Mayr, *T & C*, 19, 1978, 724-5.
12. Published by Centre de Recherche sur la Culture Technique, Neuilly-sur-Seine.
13. O. Mayr, op. cit. (11).
14. H.I. Sharlin, Review of books on history of electrical engineering, *T & C*, **4**, 1963, 340.