

A Reference Collection
for the Executive Offices of
The Society for the History of Technology

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This certainly was NOT what I had in mind when I gave this assignment and what you produced was far beyond what anyone ever has since I began teaching this course almost 30 years ago. One of the skills I was trying to instill in this particular exercise was the ability to discriminate and select among a number of competing sources of information. Having said all of this, I am in awe of the scope and quality of this bibliography. What you have produced is a core bibliography for research in the history of technology. I expect that it is far beyond what one would want in the headquarters of SHOT. It would serve very well as the reference collection for a place like the Smithsonian or perhaps the Burndy Library. With your permission, I would like to make a copy of this for use in setting up the new Burndy Library.

I appreciate all the work you did. It sounds like you also learned a lot and had a little fun, too.

The Society for the History of Technology (SHOT) describes itself as ...formed in 1958 to encourage the study of the development of technology and its relations with society and culture... The Society is interdisciplinary, concerned not only with the history of technological devices and processes, but also with the relations of technology to politics, economics, labor, business, the environment, public policy, science, and the arts.

(flyleaf of *Technology and Culture*)

A further statement of mission is articulated in Bruce Sinclair's 1989 Presidential Address, "An Agenda for SHOT":

We are not simply a tributary branch of the history of science, or of economic history either. Behind the apparatus of a field of study --society meetings and a publication-- we have the field itself. Collectively, we know a great deal about technology and the nature of technical change. And we know these things not simply in their details, but in a critical sense, too. So we have the task of taking command over all the high ground of our subject --the analytical framework and mode of discourse-- as well as the job of insuring that people have their facts straight. It is for us to order the understanding of our subject.... we wanted the Society to produce a wide range of teaching materials that would stimulate the study of the history of technology... to integrate the teaching of the history of technology into the teaching of American history... (598)

It is our job to produce the resources necessary for people beyond our immediate circle to learn technology's history, and we must articulate standards for that discourse... (600)

From these sources it is clear that SHOT means to adopt an active and even militant stance toward reaching a broader audience for its concerns; this bibliography seeks to reflect this present intent. The main vehicle for the Society's programs to date has been the quarterly journal *Technology and Culture*, which serves as one of the main sources (through the "Annual Current Bibliography in the History of Technology") for bibliographic control in this field; other important background sources for the evolutionary history and present definition of SHOT's role include John Staudenmaier's Technology's Storytellers: reweaving the human fabric (1985), the same author's "Recent Trends in the History of Technology" (*American Historical Review* 1990 [95:3:715-725]), and materials from Melvin Kranzberg and William H. Davenport Technology and Culture: at the start (1972).

My own summary of the separate tasks of SHOT, for which the reference collection should provide the documentary basis:

- I. to understand technologies of the past (a) in terms of the worlds in which they developed and existed, *and* (b) in terms of what we *now* know of materials and processes;
- II. to understand technologies of the present as outcomes of evolutionary processes and foundations for future development; and
- III. to make these perspectives and their findings *accessible* to present and future students of technological history.

Designing the Reference Collection

The question of the boundary between reference collection and broader library holdings is difficult for me to resolve; I have assumed that the library in the Executive Offices has several domains of activity: (1) support of editorial work on *Technology and Culture* (which may in fact be carried on elsewhere), including the checking of matters of fact in manuscripts; (2) provision of resources to answer questions about technology that arrive by letter and telephone; (3) support for the work of visiting specialists, for whom general libraries are not adequate; (4) collection and centralization of access tools that can help to locate important collections and unique items that are not held in the Society's library; (5) support for the curriculum development objectives of the Society; and (6) collection of the classic works and a broad range of current books and periodicals in the areas of history of technology and adjacent disciplines, as defined in the Society's statement of its mandate. I have also made the gratuitous assumption that cost of the sources is not a factor in the decision to add them to the reference collection.

One would ordinarily not include histories and monographs in a reference collection, but the reference *tasks* of the SHOT offices require a broader spectrum of materials than would be the case in a corporate library or a specialized agency. The SHOT reference collection exists to support the agenda of the organization, and that agenda is principally educational and oriented to the narrative. Matters of fact are certainly important (and are supported in encyclopedias, dictionaries, handbooks, biographies), as are access to information resources (bibliographies, guides, CD-ROMs, online access), but matters of *context* are central to what SHOT is all about --why it was created and how it proposes to evolve.

The history of technology is inextricably entangled with history of science, but just as entangled with other historical perspectives --economic, political, social, cultural. Few scholars can entertain more than two of these perspectives at once, and those few are sometimes viewed with suspicion (as dilettantes) by people whose disciplinary perspective is fixed on a single field. Protean scholars like Joseph Needham are all too rare, but necessary if the field of history of technology is really to transcend the cataloging of mechanisms.

It seems most useful to present the bibliography arrayed by type of material and topic, rather than as a single list in alphabetical order; SHOT's own subject headings (as found in the annual "Current Bibliography in the History of Technology" in *Technology and Culture*) make an appropriate starting place for the definition of a typology of technological categories, though I have found it expedient not to use this typological framework in gathering and presenting the bibliography:

- General and Collected
- Historiography and Documentation
- Biography
- Technical Societies, Technical Education
- Economic, Political and Social History
- General relationships between Technology and Culture; Philosophy of Technology
- Civil Engineering
 - Architecture and Building Construction
 - Bridges, Harbors, Tunnels, Dams
 - Surveying
 - instruments and maps
 - cartography
 - urban engineering
 - water supply and sewerage
- Transportation
 - Land
 - Marine
 - Air and Space
- Energy Conversion
- Materials and Processes
 - Metals
 - mining
 - processing
 - metallurgy
 - Chemical industries, oil and gas, coal, rubber, plastics
 - Ceramics, glass, cement, stone, salt
 - Paper, lumber, textiles, leather, bone
- Electronics; Mechanical and Electro-mechanical Technology
- Computing Technology
- Communication and Records
- Agriculture and Food Technology
- Industrial Organization and Labor
- Military Technology
- Industrial Archaeology

Minimally, the SHOT reference library must provide the important tools for bibliographic access to each of the above categories; a wider ambition would (a) broaden the categories, (b) refine the contents of the categories, and (c) consider interlinkage (i.e., make explicit connection of sources that are applicable to more than one category). Indeed, the SHOT typology above is unsatisfactory when one starts to relate it to the structure of academic disciplines (e.g., is mechanical engineering to be seen as a subspecies of *electronics*?) or attempts to find appropriate categories to contain realms of technology like textiles or metallurgy ('materials and processes' seems too broad to be useful). I have used LC call numbers as the organizational backbone for my work, less because I am fully satisfied with LC's definitions of categories and relationships in technology than because most of the library collections I have worked with are so organized.

SHOT is itself a sprawling enterprise, not to be confined to a restrictive definition of technology *or* history, and design of a reference collection to

support its activities requires stretching of traditional definitions of what should be included. I have sought to design a freestanding collection of (a) access tools, (b) summary treatments, (c) classics, (d) the exemplary and suggestive, with the idea that a reference collection should be browsed, and needs also to be made browsable. Many of the sources in the bibliography are finding aids to enable better use to be made of the excellent library resources in Chicago (CRL and the John Crerar Library particularly), and (thanks to the Internet) in more distant libraries.

Construction of the Bibliography

Something must be said of the methods employed in gathering the references which appear in this bibliography, and of the intent of the schemes underlying their arrangement and presentation. The process has been neither so exhaustive nor so systematic as one might wish, and has been largely composed of browsing in OPACs, in bibliographies of likely books and articles, and in library stacks in Cambridge and Washington.

I began with investigation of SHOT itself (a morning spent with recent issues of *T&C*, and reading of Staudenmaier [1985, 1990] and Kranzberg and Davenport [1972]) and with visits to libraries and stack sections that I was sure *would* have sources relevant to the project (the T section on the D level of Widener, the McKay and Cabot libraries at Harvard, and Hayden and Barker at MIT). I spent many hours exploring likely subject headings and tracings in HOLLIS, and used the opportunity of a visit to Washington DC to spend a morning at the Dibner Library in the Smithsonian. I ransacked several bibliographies (Ferguson 1968, Chen 1987, Jayawardene 1982, Rider 1970, etc.) for sources that looked essential, and in the middle stages of the project I consulted OCLC to find LC call numbers and nearest (or otherwise convenient) locations of sources that were unavailable at Harvard or MIT. I have included sources that I have not been able to examine myself (mostly marked with brackets for location, *viz.* [Amherst]), usually on the basis that they would be useful if their contents lived up to their titles, but in general I have tried to base inclusion in the collection on the conviction that I would want to be able to lay my hands on a particular book *again*.

Once a critical mass of about 300 essentials was collected, I put the references into FoxBase and was thus able to sort by LC number, by my own scheme for classification, and by alphabetical order --and thus to examine the collection for over- and underrepresentation. As this sorting proceeded I continued to add sources by systematic and serendipitous means, but with a growing sense that the waters were getting deeper faster than my swimming capabilities were improving. I sometimes felt that the corpus resembled in its profusion the vast collection of pickle jars of feces that fill the cellar of a miser's house in one of John Barth's novels --once a source was added I was loath to delete it, and so was led to contrive an explanation for its retention.

Annotation has proved a bugaboo (or perhaps it's a boojum). While I admire the evaluative style of Ferguson, the experience, erudition and time are simply not available to me to emulate it. The descriptive annotation style of, say, Sheehy or Chen seems less satisfying and sometimes pretty perfunctory. And what is one to do with a source that *looks* like it would be a valuable addition but can't be examined, or (worse yet) is available for examination but defies brief summary? What can be said of the work of Joseph Needham or Singer *et al.* except that they are essential, unless one is to take the time to read the sources and reviews of them? Similarly with the many essentially bibliographic sources: simple description is pretty wan, while evaluative characterization requires experience and time that I don't have. My choice of a middle course has been to seek short passages from the works themselves (generally from preface, introduction or foreword) that epitomise the style and content of the source, or that state the author's intentions for the work. In some cases the annotation is to show what the source might be used *for* -- thus, 50 Years of Popular Mechanics (119) is a certain *kind* of document in the popular history of technology; while not an authority on what is depicted, it does ANNOUNCE to a large audience (and similarly with other mass-market tech magazines, which would be a fascinating source for analysis of content). Annotations are absent for most sources unavailable to me, for materials in the LS484 reference list, and for sources like periodicals, dictionaries and bibliographies for which the reason for inclusion seems self-evident.

In the last two months I have enjoyed a developing sense of what History of Technology has been and might become; if I had known at the beginning what I now think and know, I would certainly have gathered my sources more efficiently, but the resulting bibliography would have been enormous instead of merely unwieldy. Length has a broader purpose than to appall, confound, or impress. My intention here has been to realize a conception, to augment my skills in search and presentation, and to broaden my perspectives on the organization of knowledge and its retrieval as information. Another purpose has been to reconnoitre this fascinating literature, as if I was making a reading and research bibliography for my own use. I don't foresee that I'll have time or opportunity to carry out the reading program implied, but it makes a good justification for the time spent and energies focused. I have enjoyed a considerable augmentation of my ideas of what bibliography is about and how to undertake it --from increased facility with OPACs and OCLC to broadened ideas of ways to conceptualize the structure of a field and the means of presentation. This is my third exercise in subject bibliography since June (others in applied linguistics and folklore) and I find that I love doing it, especially the opportunity to think about how sources found change my conception of the field in question. Bibliography in this sense seems a very active and creative pursuit, though its real apotheosis consists in finding a public to share it with.

Organization of the Bibliography

The bibliography is divided into several sections, according to the types of material included; in all sections the order of presentation is by Library of Congress call number. Numbers in parentheses in the discussion below refer to sources as they are listed in the Appendix, which collects all items together in brief format, and thus permits an overview of abundances and lacunæ.

I. Bibliographies (BIB)

Some 45 bibliographies have been included and would be consulted for sources, leads, and inspiration; such resources are especially valuable when used in conjunction with OPACs, and particularly with those that (like HOLLIS) permit the use of tracings to follow subject leads. Bibliographies are of course *time-limited*, but they can serve as guides to the *range* of LC numbers in which similar sources might be found. Many of the items listed here were first encountered while browsing in HOLLIS. Some sources classified elsewhere also contain substantial bibliographic resources.

II. Dictionaries and Encyclopedias (DIC and ENC)

Specialized dictionaries (*viz.* 291, 350, 351, 362, 367, 376) are necessary to elucidate terms and to provide access to realms not covered in standard dictionaries, and to cope with challenges posed by technical communication in various languages (50, 51, 53, 54, 55, 63, 65, 69, 128, 130, 131); encyclopedias include a broad range of historical (1, 2, 61, 125, 126, 156, 161, 183, 216, 297, 300) and contemporary (62, 66, 68, 159, 220, 222, 266, 337, 345) compilations. Also included under this heading are grand historical summaries (9, 157, 171).

III. Handbooks and Guides (HBK and GUI)

Handbooks are generally produced as ready-reference sources for specialists, but are often useful to those struggling to understand the nuances and details of particular technologies (111, 227, 259, 268, 286, 290, 298, 299, 306, 319, 322, 330, 342, 343, 346). Guides provide roadmaps through the welter of information in specialized areas, and here include topical finding aids (12, 13, 133, 134, 226, 267, 344, 373), directories to information about geographical regions (79, 80, 84, 85, 90, 107, 193, 199, 229, 238, 239, 389), and historical catalogs (56, 74, 87, 105, 149, 402, 407, 427, 432, 433).

IV. Catalogs, Directories and Indexes (CAT, DIR and IDX)

This category provides subject access to the important realms of patents (242), translations (410), and book reviews (420), and includes the catalogs that provide access to the riches of two of the most extensive libraries of technology (392 and 404); the John Crerar Library is now a part of the University of Chicago Libraries, and thus might be expected to be of great significance to the users of the executive offices of SHOT.

V. Biographies (BIO)

These sources provide a human face for the processes of innovation and technical development; in retrospect I would add the Dictionary of Scientific Biography to those listed, and seek out other exemplary biographical monographs and collections, along the lines of 198, 214 and 282.

VI. Histories and Monographs (HIS and MON)

As explained above, the particular interests and mission of SHOT make monographic treatments an important element of the reference collection, particularly if (as I have assumed) the executive offices do not also contain a general library to which the reference collection is an adjunct.

VII. Periodicals

23 serials are listed, 10 of which are published in languages other than English; national styles in the history of technology (e.g., the British interest in industrial archaeology) are certainly important to be aware of and follow. While a number of the listed periodicals are especially important to SHOT, much of the literature in the history of technology is monographic and none of the journals listed enjoys a wide circulation.

VIII. On-line access should take the form of Internet connection (especially important for access to OPACs and, increasingly, for communication among enthusiasts in the history of technology) and use of DIALOG. A wide variety of databases are potentially relevant to the work of SHOT, though few enjoy much time depth as yet; 387 and 388 are current guides to the on-line world. Use of WAIS technology and other (prospective) AI/Expert Systems search engines will greatly change the process of research in this and other fields; for the moment it is sensible only to specify that SHOT should invest in a high speed modem and seek direct fiber optic connection as soon as possible.

Other comments on sources

Many subsets of sources may be found in the bibliography, addressing various needs, interests, deficiencies and potentials, and often indicating realms of the history of technology that especially need further work. Thus, fewer than 5% of the sources are principally concerned with non-Western technologies (4, 8, 9, 10, 34, 79, 82, 83, 85, 90, 97, 98, 117, 206, 207, 295, 389), giving an indication of how Eurocentric the conception and execution of the History of Technology has been. By way of contrast, sources primarily concerned with European technologies before the modern era (i.e., before ca. 1500) are plentiful (14, 17, 44, 45, 48, 78, 97, 161, 168, 175, 176, 177, 178, 179, 181, 184, 250, 251, 296, 327, 333, 335, 339, 372, 421), and many other sources combine coverage of pre-modern and modern technologies.

Sources in languages other than English would not be frequently used, but are important as correctives to the all too common bias that sees important events and developments as basically English and American. In addition to

the bilingual and polyglot dictionaries discussed above, bibliographies (15, 60, 92, 394 and 413), encyclopedias and handbooks (1, 73, 216, 219, 324, 354, 355) and periodicals (59, 77, 121, 122, 123, 144, 150, 152, 237) in readily accessible European languages provide some entrée into the wealth of research outside the English-speaking countries. I have also included a number of classics and sources without English parallels among the monographs and histories (157, 158, 160, 161, 177, 200, 201).

Some of the sources are rare and/or obscure, but they are listed because they are desirable and significant tools (2, 61, 71, 73, 124, 125, 126, 128, 129, 156, 160, 216, 217, 242, 297, 300, 305, 325, 332, 354, 355, 391, 411, 414, 415).

Some Useful Sources, cited above and in annotations

American Library Association

1988 Books for College Libraries: a core collection of 50,000 titles.
(3rd ed.) Chicago:ALA

Basalla, George

1988 The Evolution of Technology. Cambridge:Cambridge University Press

Chen, Ching-chih

1987 Scientific and Technical Information Sources. (2nd ed.)
Cambridge:MIT Press

Hurt, C.D.

1985 Information Sources in Science and Technology. Englewood,
Colorado:Libraries Unlimited

Ferguson, Eugene

1968 Bibliography of the History of Technology. Cambridge:MIT Press

Hurt, C.D.

1985 Information Sources in Science and Technology. Englewood,
Colo:Libraries Unlimited

Jayawardene, S.A.

1982 Reference Books for the Historian of Science. London:Science
Museum

Kranzberg, Melvin and William H. Davenport (eds.)

1972 Technology and Culture: an anthology. New York:Shocken

Pacey, Arnold

1991 Technology in World Civilization. Cambridge:MIT Press

Ratner, Rhoda S.

1990 Historical Research in Trade Catalogs. Science and Technology
Libraries 10:15-22

Rider, K.J.

1970 History of Science and Technology: a select bibliography for
students. (2nd ed.) London:The Library Association

Rothenberg, Marc

1982 History of Science and Technology in the United States: a critical
and selective bibliography. New York:Garland

Smith, Michael L.

1986 Back to the Future: EPCOT, Camelot, and the history of technology.
in Sinclair, Bruce New Perspectives on Technology and American
Culture. Philadelphia:American Philosophical Society. pp 69-79

Staudenmaier, John M.

1985 Technology's Storytellers: reweaving the human fabric.

Cambridge:MIT Press

1990 Recent Trends in the History of Technology. American Historical
Review 95:3:715-725

Strandh, Sigvard

1979 A History of the Machine. New York:A&W Publishers

Williams, Trevor I.

1987 The History of Invention. New York:Facts on File

Woodbury, Robert S.

1972 Studies in the History of Machine Tools. Cambridge:MIT Press