

Two Engineering Societies

A Centennial History of the American Society of Mechanical Engineers, 1880-1980. BRUCE SINCLAIR with the assistance of James P. Hull. Published for the American Society of Mechanical Engineers by University of Toronto Press, Toronto, 1980. xii, 256 pp., illus. \$15.

Seven Decades That Changed America. A History of the American Society of Agricultural Engineers, 1907-1977. ROBERT E. STEWART. American Society of Agricultural Engineers, St. Joseph, Mich., 1979. vi, 434 pp., illus. \$19.95.

The central role of the American Society of Mechanical Engineers in establishing codes and standards for the nuclear power industry and of the American Society of Agricultural Engineers in creating a highly mechanized agricultural system that led to the effective demise of the family farm are among the topics that are illuminated considerably in these two institutional histories. Some striking similarities as well as some interesting differences in the origins and evolution of the two societies are revealed. Both experienced frequent difficulty in arriving at an equitable allocation of resources and political power among geographic and technical divisions. They responded in quite similar ways to critics during the Depression and at other times during their history. Their leadership generally shared an ideology that included a faith in the social benefits of mechanized production and large-scale productive units. There were differences in the relationships that were established between the organizations and government, industry, and education. The ASAE encountered greater difficulties in achieving status and a unique mission because of its being something of a hybrid of agricultural science and the older engineering professions.

Sinclair's book should appeal to a wider audience of readers who are interested in the social phenomenon of professionalization and the public policy and social responsibility aspects of engineering. A professional historian of technology who previously authored an important monograph on the history of the Franklin Institute, he has avoided the flaws that commonly afflict in-house institutional histories and has successfully linked an interpretative study of the

ASME to well-known themes in American social and intellectual history. He has written not a chronological narrative with a catalog of officers and meetings but rather a scholarly and analytical study complete with source notes and a historiographic postscript.

Sinclair's central thesis is that the ASME originally was founded with two primary purposes, social and technical, and that its subsequent history was marked by a continuing dialectic between them. He credits Robert H. Thurston, the first president of the ASME, with having combined elements of democratic ideology, social Darwinism, cultural nationalism, and inductive philosophy into a compelling rationale for a new engineering society that would embody a new and closer relationship between industrial capitalists and a technological elite. By making mechanical engineering into a learned profession, the founders hoped to achieve the social purpose of uniting "the members in fraternal spirit, providing the matrix for a new social class" and the technical purpose of collecting "the power of expert knowledge" needed to solve problems in the mechanical industries (p. 61). The social segment included the governance of the society and "the concerted power and influence of the members applied to politics and public opinion in order to advance their business interests and professional standing" (p. 76). As manifestations of the social element, Sinclair includes the controversial effort to reform the ASME led by Frederick W. Taylor and the attempt by Morris L. Cooke to bring about more society activities in the public interest. Cooke's proposal to convene a national conference on air pollution in 1909 was rejected by an ASME committee. Sinclair explains, however, that the rejection did not reflect simply concerted opposition of utility engineers but was more the result of overrepresentation of New York members on the committee.

Anyone who has wondered how industry standards are established in the United States should read Sinclair's fifth chapter. He suggests that there existed a "penchant for specialization in American industry" and a "propensity to produce a limited range of standard goods rather than, as in Europe, allowing the

customer to determine such things" (p. 145). Initially the ASME standards activities were part of a general search for order and system that was characteristic of America in the late 19th century. Sinclair includes a careful analysis of the process by which the ASME boiler code committee became "an institutional device of great power" and ultimately became responsible for the formulation of standards for the nuclear power industry (p. 157). He notes that the committee received substantial financial support from the boiler industry and that the major firms always had representatives on the code committee. For example, David S. Jacobus occupied the "Babcock and Wilcox seat" on the ASME committee for more than 30 years (p. 152). This process seems to have worked well for the most part in a nation "where government did practically nothing toward the creation of standards, and where their adoption depended on acceptance by the private sector" (p. 154). However, it left the ASME vulnerable to claims that the code served as a weapon against firms that were not represented. Such a claim served as the basis for litigation against the ASME in the 1930's by John C. Parker, an episode that is the subject of a chapter in Sinclair's book.

In 1930 the ASME celebrated its 50th anniversary by "one of the most elaborate, broadly gauged, highly organized, and skillfully worked out public relations campaigns any American engineering society had ever undertaken" (p. 20). The celebration included a commissioned multimedia program entitled "Control: A Pageant of Engineering Progress" that was intended as a response to those critics who were inclined to attribute the Depression to excessive mechanization and production. The pageant and other events served to promulgate an ideology that "emphasized values of speed, size and energy" and "the value of a large, highly organized, capital intensive style of technology, a system in which the centrality of mechanical engineers was evident" (p. 19).

The major role played by engineers during the Second World War served to restore the self-confidence of the ASME, and the membership increased rapidly after the war. The turmoil of the 1960's and renewed criticism of the values shared by most mechanical engineers stimulated a Goals Conference in 1970 to debate whether the society needed to devote more attention to social responsibility and the economic welfare of its members. The issue was again, as it had been throughout the history of the organization, whether the social or technical

sphere would predominate. A challenge of the ASME's tax-exempt status by the Internal Revenue Service, litigation over the boiler code, and criticism of its role in advancing nuclear power were among the factors that led to a more defensive strategy by the society by the late 1970's.

Robert Stewart, a past president of the ASAE, has written a work of more limited interest to those outside his profession. The organization of the book is chronological, with a single chapter devoted to each of the seven decades of the ASAE. Unfortunately, Stewart chose not to use footnotes in order "to avoid distracting the reader" (p. 419). The writing style tends to be nominalistic, at times consisting of long lists of authors and paper titles. Most of the burden of interpretation is left to the reader, and the book does not reflect an awareness of the efforts of other historians of agricultural science and technology. Stewart's monograph contains much factual information, however, and is quite revealing of the attitudes and values of the ASAE leadership.

The first meeting of the ASAE was held at the University of Wisconsin in 1907 with 18 charter members. In contrast to the ASME with its New York City base, the ASAE has kept its headquarters in the Midwest. Stewart describes agriculture as "the world's most important industry" and agricultural engineering as a "joyful pursuit" (p. 408). He notes that "the technology developed by agricultural engineers and codified by ASAE has profoundly influenced the patterns of life in the United States and large areas of the world" (p. 409).

Stewart observes that the publications of ASAE contained little of lasting value in the early years but that members with industry affiliation "evidently found the meetings to be a congenial place to present papers on products and processes from their companies" (p. 17). The ASAE was generally a proponent of mechanization, although Stewart recites one instance in 1924 when a resolution that would have put the society on record as favoring tractors over animal power failed to pass because the "horse people had a lot of friends among the college members" (p. 44). He finds that research had become more sophisticated by the 1920's when E. G. McKibben contributed a "landmark series" of papers on "The Kinematics and Dynamics of the Wheel Type Farm Tractor" (p. 73).

The ASAE attempted with some success to influence government policy on

agriculture. The establishment of a Bureau of Agricultural Engineering in the U.S. Department of Agriculture in 1931 is described by Stewart as a "major triumph" of the ASAE (p. 86). However, the hope expressed at the time by the Secretary of Agriculture, Arthur Hyde, that the new bureau would "serve the needs of the family farm, rather than the more spectacular mass-production farm" was not a goal shared by the ASAE (p. 86). The issue had been raised earlier in a list of policy recommendations presented to President Coolidge in 1927 by an ASAE delegation. Among their recommendations was that "surplus farm people should be transferred to industrial activities" (p. 83). This recommendation stimulates Stewart to comment, parenthetically, that "engineers sometimes use inhuman phrases when proposing solutions to human problems" (p. 83). The dilemma for the professional agricultural engineer was expressed in 1936 by Harry B. Walker, who told an ASAE audience that "we invite disaster to good professional service when we try to design social justice into production machinery" (p. 92).

The gloom of the Depression years was followed by a long period of optimism and growth for the ASAE when the benefits of increased productivity through mechanization and chemical methods were largely unquestioned. Many of the members contributed to "an internationalization of American agricultural engineering" (p. 177). The perception that America was falling behind in technology that followed the launching of the first Sputnik in 1957 did not include agriculture, in which the United States still seemed invincible. The "Sputnik" for agricultural engineering instead became the publication of Rachel Carson's *Silent Spring* in 1962. The public response to Carson's indictment of pesticides was a source of "puzzled bafflement" to the ASAE, which again was placed on the defensive (p. 243). By 1970 the harmful side effects of many of the innovations introduced by ASAE members were the subject of a speech by an ASAE president, who urged that future emphasis be on the quality of rural life rather than quantity. Despite such indications of doubt about the traditional professional goals, the ASAE bicentennial view of the future of agriculture depicted "an empty landscape peopled by monstrous mechanisms almost as intelligent as their creators and requiring little human guidance to accomplish enormous tasks" (p. 365). Stewart comments that some engineers who con-

templated the social consequences of what they had wrought felt "something less than pride" and "something old-fashioned deep within them wondered at the loss to American values" (p. 360). He concludes that "it may be time for ASAE to stimulate significant thinking about alternative systems of food production" rather than to continue a single-minded advocacy of "farming large holdings with big machines" (p. 366).

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Old World Archeology

The Prehistory of Europe. PATRICIA PHILLIPS. Indiana University Press, Bloomington, 1980. 314 pp., illus., + plates. \$17.50.

The prehistoric archeology of Europe stands as an important branch of anthropological archeology because it covers that part of the world where archeological research has been the most intensive and extensive, thus exemplifying most completely what results archeological research can give, and because it rests on the material remains of the technology that became the foundations of our industrially based technology and society. Alas, however, most European prehistoric research consists either of reports of particular finds and excavations, or of broad syntheses, often constructed wholly or partly by intuition. First-order systematic syntheses, such as Härke's *Settlement Types and Patterns in the West Hallstatt Province*, in which sites of whatever function are grouped according to some commonality, such as artifact similarity or parallel adaptive adjustment, are relatively rare. Thus any author attempting to make the much-needed precise summary of European prehistory has to face a vast body of relatively scattered and ill-integrated material.

Phillips's ingenious solution to this difficulty causes the appeal of her book to transcend the interests of those concerned only with Old World prehistory or even just archeological science. Her solution is to select a set of recent studies over the last decade that exemplify for her the best innovations in European prehistoric research. She intends to make available to the wider public the methodological advances, the new theories, and some new information. Thus a