"Technically Speaking—Why All Americans Need to Know More About Technology" was published this year by the National Research Council (NRC) and the National Academy of Engineering (NAE). It pays high compliments to the evolving curriculum conceptualizations produced by, among others, industrial arts and technology education leaders and science, technology, and society leaders and to their respective professional organizations, The International Technology Education Association and the National Association of Science, Technology, and Society (Epsilon Pi Tau is the official honorary for these organizations).

Their work provided a meaningful framework and strongly influenced the NRC/NAE document, which also speaks directly to all readers of this journal. It observes that members of all technology professions have a significant stake in the issues and challenges of fostering curriculum experiences that would result in all Americans knowing more about technology. And it suggests how the various professions in technology will benefit, become enriched, and be better able to serve society when all citizens are truly technologically literate.

The Special Section articles are based on presentations at the 88th Mississippi Valley Technology Teacher Education Conference, November 8–10, 2001, in Chicago. Because the editors view the history of the profession to virtually parallel human existence, the original session title "Roots of the Profession" is not used. This in no way lessens the importance or quality of what is presented here. While they may not be roots of the profession, the works reported here, with the first undertaken in the late 1940s and others continuing to the end of the last century, are truly roots of a new and compelling movement. We trust that all readers will appreciate its use.

The editors invite submissions that describe similar efforts in technology, science, technology and society, and engineering that have been undertaken in the United States and in other nations. We expect that such materials will not only create an archive, of sorts, but will exemplify meaningful conceptualizations and healthy borrowing of concepts. Above all, they will show that there are commonalities in curriculum and educational procedures along with concepts and procedures that are unique to national traditions and social customs. **JS**

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A Curriculum to Reflect Technology

It is best to review some background and professional leadership contributions behind the development and introduction of *A Curriculum to Reflect Technology* (Warner et al., 1947/1965). This review will acquaint the reader with the evolutionary process that led to the proposal of a new curriculum and the use of the word *technology* in discussions of the industrial arts profession. It was accomplished by William E. Warner, who is recognized as one of the great leaders of the industrial arts profession.

Warner received his doctoral degree from Columbia University in 1928. Columbia was *the* place to go for an advanced degree in education at that time. Its faculty included many of the American leaders and advanced thinkers in education who believed in student activities as an excellent method and important part of education. Warner worked with professors such as Frederick G. Bonser, John Dewey, Ira S. Griffith, Lois Mossman, Charles R. Richards, James E. Russell, and David Snedden. Warner was able to relate his studies to industrial arts as part of his degree requirements. He often said that he was the first person in the United States who received his advanced degree with an emphasis in industrial arts.

He also started the industrial arts PhD graduate program at Ohio State in 1925 and immediately attracted candidates for advanced degrees from throughout the country who were leaders, department chairs, and administrators in the field. As these men graduated, they formed a network that Warner depended upon to assist and participate in studies and curriculum development, to promote the profession, and to serve as his sounding board.

In 1929 Warner organized the industrial arts and industrial vocational education honorary fraternity Epsilon Pi Tau (EPT). Warner worked with his graduate students and corresponded with his network of leaders to develop the purposes of the fraternity, its constitution and by-laws, and the initiation ritual. He felt it was time for industrial arts to have an honorary fraternity to recognize outstanding upper division undergraduates as well as graduate students. He also felt that it would elevate the prestige of the profession.

From 1929 to 1932, Warner directed *The Terminological Investigation of Professional and Scientific Terms in Vocational and Practical Arts Education* (Western Arts Association, 1933). The research was done primarily by Herbert H. Hutchinson and Elroy Bolllinger as part of their graduate work under Warner's direction. This study was sponsored by the Western Arts Association whose membership included art teachers as well as practical arts teachers. The membership supported the concept of a broad approach to their discipline as part of general education for all students. The terminology study defined many terms that were often used interchangeably by educators; an example from our field includes such words as manual training, manual arts, and industrial arts. While the study established definitions, Warner was also establishing terms describing programs and their differences and establishing industrial arts as a broadly conceived and important program of general education. The terminology study made quite an impact, and educators and board members grew to better understand program differences. Warner served as president of the Western Arts Association in 1932 and was on its council until 1937.

In 1934 *A Prospectus for Industrial Arts in Ohio* by the State Committee on Coordination and Development was published. Warner, as chairman of the committee, was a prime mover in the coordination, support, and improvement of the industrial arts program in Ohio. The members of the committee included Frank C. Moore of Cleveland, Elmer W. Christy of Cincinnati, Fred C. Whitcomb of Oxford, and William E. Warner as chair. The prospectus defined a broad industrial arts concept as an important part of general

education utilizing a multiple activity facility called the general shop. The prospectus was approved by the Ohio State Department of Education. The state director of education, Dr. B. O. Skinner, stated that "the Prospectus is written for the progressive teacher, supervisor, administrator, board member, parent, and interested layman, all of whom are concerned with trends in this study of the industries for educational and social ends." The prospectus paved the way for Warner to promote the concept of the general shop for junior and senior high schools. Warner and his graduate students supported and assisted school districts in the development of new facilities. For years Warner had been writing and speaking about the broadly planned program of industrial arts being provided in a facility called the general shop. As programs were being developed and facilities were being planned for Ohio schools, a new title was being used. In 1930 the new demonstration school on The Ohio State campus included a laboratory of industries. The term *laboratory of industries* was used extensively as new facilities were planned and built throughout Ohio. Warner conceived this title as better representing the broad program approach. Oberlin, Ohio, opened its new laboratory of industries in 1935; Grove City, Ohio, opened in 1933; New Albany, Ohio, opened in 1936; Gahanna, Ohio, opened in 1937; Clinton County, Ohio, developed and opened facilities for junior and senior high as well as for adult education in 1937; and Greenhills, Ohio, opened in 1938. Other laboratories of industries were also planned in Ohio, including Troy, Newark, Napoleon, and Reynoldsburg—all part of program expansion in Ohio. Visitors from many other states and some foreign countries came to see the facilities as well as learn about the program. Grove City's laboratory of industries, for example, had 4,000 visitors from 36 states during the four-year period from 1935 to 1939. Other programs had almost the same number of visitors including visitors from England and China. The development and expansion of the Ohio industrial arts program after the prospectus was adopted was very impressive and the envy of many other states.

In 1933 Warner went to Washington, DC, and had a discussion with the U.S. commissioner of education. He was urging the commissioner to support, at the national level, the broad concept of industrial arts, similar to the Ohio concept. This meeting resulted in a national conference in 1934. At this conference the U.S. Office of Education Conference Committee on Industrial Arts Education was designated. Two persons from Ohio were appointed to the committee. Warner and Elmer W. Cristy, director of industrial arts for Cincinnati, Ohio, were chosen. In 1937 the conference committee published a booklet titled *Industrial Arts: Its Interpretation in the American Schools* edited by Proffitt. This was the first federal publication developed for the industrial arts profession. The program concepts and philosophy were quite similar to the Ohio prospectus. Warner had a great deal of influence in the writing of this national document. Of course, a broad program concept as part of general education was recommended. Warner was consistent in his support of a broadly conceived program of industrial arts as an important part of general education.

Warner also led the development and organization of the American Industrial Arts Association (AIAA). Before AIAA was organized, industrial arts teachers had a choice of attending the National Education Association (NEA) national conference where the industrial arts leaders were able to organize sessions. The other choice was to attend the trades and industries sessions of the American Vocational Education Association (AVA). The leaders at the NEA meetings were presenting the concept of a broad program of industrial arts as an important part of general education. The sessions at the AVA most often dealt with the problems of the trades and industries teachers and rarely discussed industrial arts. If they discussed industrial arts at all, they described the role and objectives of industrial arts as being pre-vocational. Industrial arts was to develop basic skills and recruit students for vocational education. Contrast this approach to the industrial arts program and the nine objectives introduced and explained in detail in the Ohio prospectus. The titles of the nine objectives were (a) vocational interests, (b) exploratory experiences, (c) consumer knowledges and appreciations, (d) aesthetic/artistic expressions, (e) personal/social traits, (f) common technical knowledges and abilities, (g) guidance and counseling responsibilities, (h) manipulative functions, and (i) vocational connections and professional considerations. One can immediately conclude that there was a great deal of disagreement inherent in the differing approaches. (The profession still has problems growing out of this basic disagreement.) Warner concluded that the only way to advance a broad concept of industrial arts was to organize an association of industrial arts teachers, administrators, teacher educators, business/industry representatives, and board members.

As part of the 10th anniversary celebration of Epsilon Pi Tau, Warner invited leaders to a "national conference" at the American Association of School Administrators (AASA) conference in Cleveland, Ohio, on February 27 and 28, 1939. The first day of the conference, leaders interested in industrial arts spoke on six major topics: (a) bases of the program; (b) the prospective of teaching; (c) the curriculum spread and viewpoint; (d) the physical setting: housing, equipment, and supplies; (e) administrative policies and practices; and (f) developing the American program. After considerable discussion of the topics presented, the leaders then proposed and approved a draft of a constitution of a new organization, the AIAA. Warner was elected as the first president, and Heber A. Sotzin of San Jose, California, was elected as the vice president. The first official meeting of the AIAA was held in San Francisco at the July 1939 meeting of the NEA. In July 1940 the second meeting of the AIAA was held in Milwaukee, again as part of the NEA conference. In 1941 a meeting was held in Atlantic City as part of the AASA at which time a constitution was adopted. In 1943 AIAA became a department of the NEA, which was a significant event in gaining national recognition. Warner was a major leader in the activities of AIAA, serving as president for two years and then as chair of the liaison and advisory board as well as chair of the executive committee. He essentially was the major leader in AIAA activities and served in that capacity until he went into military service in 1943. After he returned from World War II, he again served as the leader of AIAA. In 1944, at a special meeting of the leadership, it was decided that in the future AIAA would hold independent national meetings. The first national meeting after the war was held in March 1947 in Columbus, Ohio, at The Neil House. No national meetings had been held in 1943, 1944, and 1945. It was at

the 1947 meeting that *A Curriculum to Reflect Technology* was introduced.

An important part of every graduate student's experience at Ohio State was the leadership forum series. The forum series, scheduled every Wednesday evening for all graduate students, was organized as a graduate seminar where students and professional leaders could present ideas for discussion. In addition to student presentations, professional leaders were invited to speak on special topics. Often the same person would speak several times on the same topic. Warner would then ask the leader to produce a report or brochure to be published by Epsilon Pi Tau.

The forums were the place during 1946 and 1947 where the six graduate students who were writing the sections of a detailed proposal to be called *A Curriculum to Reflect Technology* had an opportunity to organize and present their drafts of their section and have it discussed by the other graduate students as well as by visiting teachers and industrial arts leaders. It was very helpful, for this process and exposure forced or encouraged the writers to carefully prepare for their presentation. It also helped to prepare for questions and counter concepts that might be part of any discussion.

Their product was to be presented at the first national conference of the AIAA after World War II. The six graduate students were Joseph E. Gary, Carlton J. Gerbracht, Harold G. Gilbert, Paul L. Kleintjes, John P. Lisack, and Kenneth Phillips. All had been in military service, were in their late 20s, and were enrolled in the graduate program in 1946.

Dr. Warner was the organizer and chairman of the convention. National publicity was given to the convention by a nationwide mailing of the March issue of *The Industrial Arts Teacher*. The announced title of the convention in this issue was "New Developments in Industrial Arts Education," but when the convention program was printed, the title was changed to "Reconstruction in Industrial Arts Education." The featured presentation at this convention was to be the new curriculum; however, when Warner opened the general session of the convention, with about everyone at the convention in attendance, he spoke about *A Curriculum to Reflect Technology*. His general introductory statements were followed by the graduate students introducing a draft outline of the five curriculum areas, plus personnel organization and management. This was the introduction of the concept of the industrial arts program being developed or evolved into the curriculum areas of communications, construction, manufacturing, power, and transportation with personnel management being an important teaching and learning strategy of each area. The graduate students assumed that a concept was being introduced that would lead to study, consideration, and discussion by the profession as they had been doing in the forum sessions as part of their graduate work. However, the reaction of many of the men in the room was one of great upset and anger. They shouted their objections and a few stomped from the room. Perhaps, some of the reaction was due to the fact that the audience at the meeting were generally older men who had worked very hard keeping the industrial arts program operating during the war. Now, after working under very difficult conditions, a group of young graduate students, who had no idea how difficult it had been to keep the program alive, were telling them that what they had been doing needed to be changed. Change is difficult under the best of conditions. It is unfortunate that the members of the profession generally reacted as they did, for even though some of the national leaders wrote supportive and thoughtful articles about *A Curriculum to Reflect Technology*, the concept was really never considered or discussed generally until about 30 years later, in the 1980s.

The outline of the major sections of *A Curriculum to Reflect Technology* is included here because many have not seen the outline that was presented at the 1947 AIAA conference.

The Management Organization

The effective development of the industrial arts/technology program requires that the time and effort of every participant be well organized just as in any complex enterprise. This is possible through the establishment of a personnel management organization within the laboratory.

This section is then organized under the following heads:

The Need for Organization

Types of Organization

1. Line
2. Functional
3. Committee
4. Multiple
5. Line and Staff

A Proposed Personnel Organization

1. Organization Chart
2. Job Specification Index
3. Cumulative Personnel Record Card
4. Activities Chart or Record

A Curriculum To Reflect Technology

I. The Communications Division

Composition & Duplication
Graphic Arts—Sound Recording
Drawing, Sketching
Drafting, Blueprinting
Letterpress
Photography
Intagliography
Planography
Duplicating
Sound Recording
Transmission & Reception
Mechanical-Electrical
Telegraphy
Telephone
Radio (CD, MOD)
Teletype
Facsimile
Television
Multi-Channel Methods
Radar
Interpretation
Visual, Sound, and Codes
Historical
Signal Flags
Lights
Sound Devices

II. The Construction Division

Homes
Highways, Including Bridges and Tunnels
Factories and Public Buildings
Airports
Waterways
Single Fabrication, Housing, Public Works, Industrial, National Defense….

III. The Power Division

Sources—Natural, Electrical, Thermal
Generation—Solar, Hydro, Biological, Combustion, Nuclear Fission, Electrical
Transmission—Hydraulic, Pneumatic, Mechanical, Electrical
Utilization—Manufacture, Construction, Transportation, Communications

IV. The Transportation Division

Land—Highways, Railroads
Air—Heavier than Air, Lighter than Air, Navigation, Meteorology, Airports, Aerodynamics, Space
Sea—History, Carrier Types, Ship Construction, Power Plants, Propulsion Units, Small Boat Building, Model Making, Terminals, Routes, Organization, Documents

V. The Manufacturing Division

Major Areas—Food, Textile, Rubber, Chemical, Cellulose Fiber, Leather, Metal, Ceramic, Miscellaneous
Areas of Study—History, Materials, Fabrication, Consumption, Applications

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A Curriculum to Reflect Technology

Dr. Warner was never able to develop the same type of support and enthusiasm for the concept of *A Curriculum to Reflect Technology* as he had been able to generate for *A Prospectus for Industrial Arts in Ohio*. He believed that the program should be a multiple-activity program with a facility designed to develop problem-solving abilities, encourage inventiveness and basic management skills, and generally reflect

the same nine objectives that were described in the Ohio prospectus. He encouraged the development of a laboratory of industries to reflect the industrial technology that was emerging so rapidly. The profession was not ready and the vision of *A Curriculum to Reflect Technology* was never fully realized. However, much of the curriculum development that followed was strongly influenced by this proposal of curriculum development. It certainly indicated a direction.

Warner's contributions to the profession were phenomenal. He died in 1971 at the age of 74.

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