Journal of Tau Alpha Pi
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Journal of Tau Alpha P1

Executive Director/Secretary
Editor Frederick J. Berger

Tau Alpha P1 Journal is the official publication of Tau Alpha Pi, National Honor Society of Engineering Technologies. Write Professor Frederick J. Berger (Executive Secretary), Editor, P.O. Box 266, Riverdale, New York 10471. The opinions expressed are those of contributors and do not necessarily reflect those of the editorial staff of Tau Alpha Pi.

Statement from the Executive Secretary

Once again it is my pleasure to greet the members of Tau Alpha Pi and again to welcome the publication of our informative Journal. The journal reflects the activities of the society and all its chapters, and the 1979 issue continues to publish highly professional articles and even more items of interest from faculty members. All chapters are asked to start collecting and forwarding news items for our 1980 issue. It is advisable to maintain a follow-up record of graduating members (alumni members) and it would be interesting news to read about their success. We also welcome articles from other chapter advisers. Please send all correspondence to the official headquarters: P.O. Box 266, Riverdale, New York 10471.

I would like to take this opportunity to express my gratitude for and appreciation of the many letters of thanks that I received for prompt handling of inquiries and chapter materials. Your executive secretary has the privilege to thank individual members who have rendered special service. Limited space does not enable me to single out by name each deserving one. At this time, however, I should like to mention and thank Professor James P. Todd of Xi Alpha Chapter (California State Polytechnic University/Pomona) for his assistance in the induction ceremony of Xi Beta, Xi Delta chapters and for an excellent job as the west coast coordinator and adviser to the Executive Council; Professor Sol Lapatine of Beta Zeta Chapter for his continued help to the Executive Council; Prof. Joseph DeGuilmo of Omicron Delta Chapter for his service to the Executive Council and for furthering the interest of Tau Alpha Pi. We are especially grateful to Dr. Lillian Gottesman for work she has done with the editing, for contributing to the "Books of Interest," and for making this issue of the Journal an outstanding one. I welcome and congratulate sponsors and faculty advisers who graciously assumed these positions and wish them success: Prof. Edward M. Willis (Eta Beta Chapter, University of North Carolina at Charlotte); Prof. Allen Escher and Prof. J. E. Turner (Zeta Beta Chapter, DeVry Institute of Technology, Maryland); Prof. Fred Emshousen (Ri Alpha Chapter, Purdue University, West Lafayette, Indiana); Prof. Howard Paynter (Rho Gamma Chapter, Metropolitan State College, Colorado);
Prof. George Alexander (Omega Alpha Chapter, New Mexico State University); Prof. Earl E. Schoenweeter (Xi Alpha Chapter, California State Polytechnic University/Pomona); Dr. James D. McBrayer (Gamma Delta Chapter, Franklin University, Ohio); Dr. Gerald E. McGlothin (Upsilon Alpha Chapter, Northern Arizona University); Dr. Robert C. Thornton and Dr. Rene Mulders (Xi Beta Chapter, Northrup University, California); Prof. Wallace Reynolds, Prof. Fred S. Friedman, Prof. William J. Phaklides, Dr. Willis A. Finchum, and Prof. William R. Backer (Xi Delta Chapter, California State Polytechnic University, St. Luis Obispo); Prof. Ira Jay Scheer and Barry Baron Brey (Gamma Epsilon Chapter, Ohio Institute of Technology); Prof. Joseph DeGuilmo (Omicron Delta Chapter, Hudson County Community College Commission, Stevens Institute of Technology, New Jersey); Dr. Richard C. Denning, Dr. Clarence M. Head (Sigma Beta Chapter, University of Central Florida); Prof. James G. Weatherly (Alpha Kentucky

Chapter, Murray State University, Kentucky); Prof. Bhupendra P. Shah (Alpha District of Columbia Chapter, University of the District of Columbia, Washington, D.C.). During the 1978-1979 year ten new affiliate chapters were installed and, in addition, the constitutions and by-laws of five prospective chapters were approved. Tau Alpha Pi in its short existence has grown significantly to 66 chapters. The society's growth is no reason for complacency. There are still many E.C.P.D. accredited institutions that do not have Tau Alpha Pi chapters. The honor society is an important element in the professional life of the students and the institutions to uplift the status of the technology program. It is the duty of all of us to inform, publicize, and recruit.

During this year it was my pleasure and privilege to have been invited to partake in the initiation and chartering ceremonies of Alpha District of Columbia Chapter (University of District of Columbia); Omicron Delta Chapter (Stevens Institute of Technology); Sigma Beta Chapter (University of Central Florida). At the

University of Central Florida, I had the pleasure to congratulate ten alumni charter members, and Dr. Denning is to be congratulated for having the foresight to honor his alumni in this manner. I suggest that every chapter institute alumni membership and urge faculty advisers to make greater strides in this area. Please bear in mind that our goal remains to inspire students to achieve and maintain scholarly growth. Students may be assisted and encouraged if initiations were held once each semester or trimester rather than once a year. Since admission is limited to the highest four percent, more qualified students would be reached rather than overlooked with more frequent initiations. In order to make the chapter more visible on the campus, I suggest that chapters make a large display of the emblem of the society or perhaps contract locally for a large casting of the emblem (the gear and compass portion) and display it on the campus outside the Engineering Technology Building. I should appreciate some feedback regarding this project so that I may pass it on to other chapters for consideration.

I look forward to seeing many of you at the A.S.E.E. Annual Conference on June 25-28 at Baton Rouge, Louisiana.

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Engineering Technology Definitions: Yesterday, Today, and Tomorrow

Yesterday

Before establishing the definition, it seems desirable to provide a brief history of engineering. This will demonstrate that although "we've come a long way, baby," the rate of change in engineering is progressing at a breathtaking pace, particularly when compared to the early history.

Three developments in engineering in the nineteenth century have changed the course of history and altered the quality of human life. The first was the expansion of the Industrial Revolution. The second was the emergence of civilian engineering as a profession, distinctly emphasizing the importance of technical and scientific education as prerequisites for the practice of engineering. The third and most important development, however, was the introduction of applied science as a new method of approach to the achievement of engineering advances.[1]

Men who earned a living from the practice of engineering, or "professional engineers, " had begun to appear in France during the seventeenth century. The first schools for instruction in engineering were established by the French in the in the eighteenth century. However, these institutions largely employed the apprenticeship method of instruction and only occasionally were general theoretical lectures given. After the French Revolution, these schools began instruction in such basic sciences as mathematics, physics, and chemistry.[2]

The rise of engineering science in the eighteenth century was typical of the Age of Reason with its emphasis on the use of the scientific method. This drastically altered the practice of engineering and the concept of technical education in the nineteenth century. For example, when it became apparent that a structure scientifically designed to perform a specific function was more economical than one designed on the basis of experience, engineering science began to develop rapidly. It also became clear that technical schools were far more competent for teaching the new science than was the age-old institution of apprenticeship.[3]

The U.S. Military Academy at West Point was founded in 1802, and in 1817 became the first school in the United States to offer an engineering program. Norwich University in Vermont was established in 1819 and is reported to have offered engineering in the early days. Rensselaer Polytechnic Institute was founded in 1824 and it granted its first engineering degree in 1835.~

In 1806, shortly after the military academy at West Point was founded, Webster's Dictionary defined "engineer" as follows:

engineer, n. One who directs engines or artillery.

engineer, v.1. To manage engines.[5]
There was no definition for “engineering” in the 1806 Dictionary.
Engineering instruction was confined to civil engineering in the early years. A school of mines was founded at Columbia University in 1864, and in 1865 M.I.T. opened, offering programs in mechanical, mining, and civil engineering and in what was called “practical chemistry.” With the passage in 1862 by the United States Congress of the Morrill Act, an “Act donating Public Lands. to the several States and Territories which may provide Colleges for the benefit of Agriculture and the Mechanic Arts,” the number of engineering schools in the United States

was increased by more than five times. “These schools trained men who could apply the increasing wealth of scientific knowledge to practical problems, and they had a large part in transforming the industrial, economic and social life of the nation.”[6]
In October of 1 933, ECPD adopted the “Minimum Definition of an Engineer.” A careful review of the definition indicates that ECPD did not attempt to define engineer at all but merely framed the minimum qualifications required for licensing for professional registration.
As a means of improving the quality of education for technicians, in 1945 ECPD set up a program for accrediting technical institute-type curricula. Since the work of the technician overlapped that of the engineer, clear recognition and identification of the roles became necessary. The 1953 ECPD Annual Report set forth specific definitions of “professional engineer” and “engineering technicians.” In 1961 ECPD adopted the following definition:

Engineering is the profession in which a knowledge of mathematical and natural sciences gained by study, experience and practice is applied with judgment to develop ways to utilize economically the materials and forces of nature.[7]

It is interesting to note that ECPD at this time adopted seven paragraphs attached to this definition to clarify words and phrases. In 1962 ECPD modified the definition by adding a terminal phrase, “for the benefit of mankind.” That definition is still the current definition utilized by both ECPD and the American Society for Engineering Education (ASEE). In 1962, also, ECPD created the Engineering Technology Committee to perform the functions of accreditation for the Council. ~n 1963 ECPD adopted the following definition:

Engineering technology is that part of the engineering field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum closest to the engineer.

(a) Engineering technology is identified as a part of the engineering field to indicate that it does not by any means encompass the entire field and also to differentiate it from other types of technology in areas such as medicine and the biological sciences. The engineering field is viewed as a continuum extending from the craftsman to the engineer. Engineering technology falls, in the continuum, between the craftsman and the engineer and closer to the engineer than the craftsman.
b) Engineering technology is concerned primarily with the application of established scientific and engineering knowledge and methods.
(c) Technical skills such as drafting are characteristic of engineering principles and methods. Engineers graduated from scientifically oriented curricula may be expected to have acquired less of these skills than previously and the engineering technician will be expected to supply them.
(d) Engineering technology is concerned with the support of engineering activities whether or not the engineering technician is working under the immediate supervision of an engineer. It may well be that in a complex engineering activity he would work under the supervision of an engineer, a senior engineering technician, or a scientist.
In 1967 ECPD accredited the first baccalaureate engineering technology program.

Today

The 1963 definition of engineering technology based on associate degree programs has remained unchanged.

Tomorrow

In the spring of 1977 an ASEE ad hoc committee was appointed to review the published definition of "engineering technology." After considerable deliberation the committee members concluded that in order properly to define engineering technology the definition of engineering would also have to be considered. The resulting document which was formulated has been refined through six drafts and widely circulated to representatives of engineering and engineering technology from both education and industry. The extensive favorable reaction to the definition from all segments indicates that the ASEE approval at this time would be a most appropriate, positive step toward verifying the relationship between the various components of the engineering profession. The definitions as developed by the ASEE committee follow:

Definition
Engineering is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize economically the materials and forces of nature for the benefit of mankind.

Scope
The scope of the engineering profession in industry, government, and business is extremely broad. It includes research, development, design, production, construction, administration, testing, maintenance, and sales. There is a wide spectrum of technical personnel within the engineering profession.

Academic Programs

To embrace this total spectrum, academic institutions offer associate, baccalaureate, and advanced degree programs in engineering and engineering technology, as well as other programs in related areas. Graduates of these programs have the opportunity to advance in their careers depending upon their ability, personal characteristics, and professional development as well as their initial and continuing academic preparation. Undergraduate academic programs in engineering and engineering technology overlap considerably and programs with similar titles will vary from one institution to another. However, the following characteristics are usually found.

Baccalaureate Engineering programs are characterized as including advanced mathematics through differential equations, basic physical science, engineering science, and engineering design courses which emphasize research, conceptual design, systems, and development.

Baccalaureate Engineering Technology programs are characterized as including applied mathematics through differential and integral calculus, applied sciences, and technical courses which emphasize the application of technical knowledge and methods to current day-to-day industrial problems. **Associate Engineering Technology** programs are characterized as including mathematics through the elements of calculus, applied sciences, and applied technical courses in a specific technical discipline which emphasize technical support of engineering activities.

Placement of graduates from these different types of programs varies considerably depending upon the region in which the programs are offered and the specific needs of industry at a particular time. However:

The baccalaureate-engineering graduate would most likely aspire to an entry-level position in conceptual design, systems engineering, or product research.

The baccalaureate engineering technology graduate would most likely aspire to an entry-level position in product design, technical operations, product development, production, or technical service and sales.

The associate engineering technology graduate would most likely aspire to an entry-level position in support of engineering activities.[8]

Dr. Walter E. Thomas, Dean
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Western Carolina University

NOTES

1. Richard Shelton Kirby, et al., Engineering in History (New York: McGraw-Hill, 1956), pp. 327-28.
2. Ibid.
3. Ibid.

4. "Engineering Education," Encyclopedia Britannica, Vol. 8 (1968), p. 392.

5. Noah Webster, A Compendious Dictionary of the English Language (A facsimile of the first 1 806 edition), Bounty Books, A Division of Crown Publishers, p. 103.

6. Ibid., p. 393.

7. Annual Report, Engineers' Council for Professional Development (1961), p. 18.

8. Weidhass, Thomas, Rath, and Ungrodt, American Society for Engineering Education ad hoc committee report (sixth draft), 1978.

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Engineering Technology: It's Origin and Development

The transfer of technology from the old world to the new brought about innumerable changes not only in technology itself but also in the development of several aspects of the American way of life. By mid-nineteenth century, America had taken the lead in technological innovation. Although a great deal of American development was based on European skill, a distinct pattern of manufacturing easily identifiable as the "American system" had evolved before the Civil War.[1] The social transformations caused by this process elicited apprehension and a general spirit of competition. This "rising industrial consciousness" among Americans hastened adjustment to a new social framework and supported the spread of practical education and technical literature.[2]

The increased emphasis on technology also resulted in a general curiosity about science and natural philosophy with an attendant demand for popular education. The multitude of scientific and literary societies formed in the first part of the nineteenth century gave evidence of the intensity of this interest.

A combined response on the part of skilled artisans to both their perception of threatened displacement and their enthusiasm over science and education can be found in the beginnings of organized industrial education in America. The mechanics' institute movement in the United States has often been dismissed as an enthusiastic fad which was never very successful when compared to the movement in England. Though many mechanics' institutes did give way to the popularity of lyceums and lectures, those created during the earliest part of the movement, the third decade of the nineteenth century, were symptomatic of the response of one class of people to a new order which promised both excitement and anxiety.

The early mechanics' institutes were usually modeled after already existing scientific and philosophical societies. Most of them had libraries, reading rooms, and collections of scientific apparatus. Members met to give papers and hear lectures for both self-improvement and mutual instruction. The earliest appeals to form mechanics' institutes were directed toward skilled workers and artisans rather than factory operatives. Initial congregating was generated not always by mechanics, but often by prominent manufacturers and industrialists who had a vested interest in seeing that skilled laborers were trained and accessible. The fact that mechanics willingly congregated in these institutes indicates they too had a vested interest in receiving scientific instruction. They realized the demand in the future would be for scientifically trained rather than shop-trained mechanics.

Although the role of the mechanics' institute has been debated and has undergone considerable adaptation, the technical colleges of today—the direct descendants of the mechanics' institute—still have much in common with their predecessors. The goal is still to provide scientific knowledge as applied to practical problems, the technical institute still caters primarily to local industry, and the status of the technician is still a matter of concern to educators.

During the post-Civil War period, educators recognized the need to change the format of industrial education. They seemed to agree technical personnel could no longer be educated in the shop by an apprenticeship system. A type of

formal education was needed. However, three distinct schools of thought emerged.[3] One group, interested primarily in scientific education, sought to create centers for scientific research. Another, more concerned with the development of industrial leadership, discussed the possible inclusion of business education in the scientific training of industrial leaders.[4] A third, identifying the problem of industrial personnel that had been ignored or abandoned by other educators, was responsible for initiating manual training programs and industrial education in the secondary schools. The debate between these three groups resulted in the development of a hierarchy of industrial schools.

At the top were colleges and universities which excluded all training in applied science and became centers for scientific research and included universities such as Harvard and Cornell.

To meet the popular demand for schools which offered training in applied science, in 1862 Congress passed the Morril (Land Grant) Act. The Act supplied each state with revenue from land sales to endow at least one college where agriculture and mechanic arts would be taught. Many of these institutions became engineering colleges providing a vehicle for the professionalization of engineers. As these schools gained recognition in the hierarchy of industrial education, some secondary schools became more specialized to prepare recruits for these colleges.

While the engineering colleges and secondary schools attempted to define their role in the hierarchy of national industrial education, the mechanics' institutes sought to determine the type of education they should be providing. Since most mechanics' institutes were privately endowed and were geared toward local industry, they were largely ignored in national discussion of industrial education. Changes were initiated by individuals within the ranks of the institutes.

Later, the manual training movement gained acceptance in mechanics' institutes, but its popularity was short-lived. By the turn of the century, numerous segments of society were demanding new methods of education. The values of business and industry had permeated nearly every field of American thought, especially education. Businessmen asked educators to tackle the problem of promoting industry through education. Organized labor demanded more democratic education and a better adjustment of schoolwork to meet its needs. Reformers and philanthropists sought educational reform as an avenue to social reform. The most notable trend in education during this time was a new emphasis on trade training and the establishment of public trade schools.

Business played a major role in promoting trade training; large corporations formed their own schools while smaller companies and individual manufacturers unable to finance their own programs, strongly supported public trade schools. Such support actually served a two-fold purpose for manufacturers: educating skilled workers and thwarting trade unions.[6]

While considerable argument over trade training developed, the nation was also becoming obsessed with business ideology and "efficiency." Attempting to promote efficiency in industry, Frederick W. Taylor invented his system of "scientific management." Businessmen were delighted with the prospects of scientific management and the theory was applied not only to industrial management but to education as well. Labor unions were extremely critical of Taylor's theory and its tendency to reduce the labor force. They began to direct their attention toward improving efficiency through their own organizations and by adaptation of the apprenticeship system. Social reformers were also critical of

scientific management, for its methods were often dehumanizing and restricted the economic mobility of the worker.

During the early part of the twentieth century the National Society for the Promotion of Industrial Education was organized to secure governmental support for technical education.[7] The efforts of the NSPIE resulted in the passage of the Smith-Hughes Act in 1917, and the creation of the Federal Board for Vocational Education. Although the Act did provide federal financial support for vocational education, it seemed far more beneficial to trade-training advocates. All programs. were to be initiated on the state level and submitted to the federal board for approval, thus encouraging localism. All plans were further limited by the provisions that: "The controlling purpose of such education shall be of less than College grade and shall be designed to meet the needs of persons over 14 years of age who are preparing for a trade or industrial pursuit or who have entered upon the work of a trade or industrial pursuit 8

The trade school system with its emphasis on training for efficiency was a great blow to the working class. Educators concerned with social reform and labor union spokesmen had lost the battle for control of educational policy-making. By the end of the nineteenth century, practical meant profitable. As a result, technical education lost some of its ability to deal with dynamic social and political issues.[9]

In 1931, the Society for the Promotion of Engineering Education sponsored a study of technical institutes conducted by William Wickenden and Robert Spahr. They found that: "The several branches of technical education had grown up independently of each other in the United States and with little if any unifying philosophy. With the exception of state land-grant colleges and universities and the more recent vocational schools, which owe their unity and type of purpose to the conditions imposed by the grants of aid from the federal government, each school had grown up around some local situation or some dominating personality."[10] Further, they reported that such localism had prevented technical institutes from achieving any recognized status as a group. As a result, faculty members suffered a sense of professional isolation and graduates had been handicapped by lack of nationally accepted credentials. In an attempt to deal with these problems, many technical institutes became colleges. The SPEE hoped that the results of its study would provide a basis for unification on the parts of directors and teachers at the institutes.

As the Second World War approached, expanding national defense industries encountered a large deficit in technically trained personnel. Because graduates of four-year college engineering courses could not be supplied in time to meet the demand, intensive technical courses like those provided in technical institutes would have been the best answer. Unfortunately, legislation had required that this training be conducted by degree-conferring non-profit institutions. There was no accepted accreditation for qualified technical institutes. At the very time when intensive technical training programs were most needed, the technical institutes were excluded from the field of training unless they participated under the supervision and sponsorship of a degree-conferring college.[1] 1

This situation led the Engineers' Council for Professional Development Subcommittee on Technical Institutes to compile a report in March 1944, which included positive steps toward remedying those problems. Concerning unification and recognized accreditation, the subcommittee report stated: In view of the diversification of the field of activity of technical institutes, it is suggested that as a basis of procedure, each program, within stated boundaries, be judged on its own merits as to quality and that it should be recognized and accredited in terms of its own purpose, scope, duration and content.

In the late 1950's, another crisis stemming from a shortage of engineering technicians developed. Although originally attributed to a shortage of scientists and engineers, the Report of the Task Force on Technical Institute Curricula sponsored by the President's Committee on Scientists and Engineers and the American Society for Engineering Education found in 1958 that the problem actually stemmed from "an increased use of technicians in the expanding technological age, coupled with a growing shortage of qualified technicians in several major occupational areas."[12]

Another study in 1958, the National Survey of Technical Institute Education, conducted under the auspices of the Technical Institute Division of ASEE, found that another factor was involved: "Status seemed to be the all-pervasive problem which showed up in the residue of most Survey conferences. . .status of the graduate engineering technician; status of the whole technical institute idea in the national patterns of technological manpower and of higher education, as seen and understood--or misunderstood--by parents, prospective students, secondary and collegiate educators, professional engineers, and others including, paradoxical as it may seem, a very large segment of American industry."[1] 3 As industrial educators had learned over a century earlier, status was not an easy problem to deal with.

The repercussions of rapid industrialization on the American social order were far more difficult to cope with than were technological innovations themselves.

The role of the mechanic and artisan was especially subject to readjustment, reevaluation and redefinition. Technology did not replace the mechanic but did emphasize his technical skill rather than his individual craftsmanship. Adjustment to this new situation was slow, painful and confusing. Often the avenues of adjustment open to the mechanic were dictated by those outside his community of fellow artisans. The history of technical education in America reflects the process of adaptation experienced by mechanics and technicians.

Anne Van Camp
Formerly with Ohio College of Applied Sciences
University of Cincinnati

NOTES

1. John F. Sawyer, "The Social Basis of the American System of Manufacturing," lournal of Economic History, 14 (1954), p. 370.
2. Ibid., p.371.
3. Berenice Fisher, Industrial Education (Madison: University of Wisconsin Press, 1967), p. 51.
4. Ibid., p. 52.
5. Lewis F. Anderson, History of Manual and Industrial School Education (New York: Appleton and Co., 1926), p. 196.
6. Fisher, p. 125.
7. Ibid., pp. 129-1 30.
8. Ibid., p. 135.
9. Bruce Sinclair, "The Promise of the Future: Technical Education," Nineteenth Century American Science: A Reappraisal, ed. George Daniels (Evanston: Northwestern Press, 1972), p. 272.

10. William F. Wickenden and Robert H. Spahr, A Study of Technical Institutes

(Lancaster: Lancaster Press, Inc., 1931), pp. 1-2.
11. Engineers' Council for Professional Development, "Report of Subcommittee on Technical Institutes" (March 1944), p. 10. (OMI Collection).
12. Report of the Task Force on Technical Institute Curricula, jointly sponsored by the President's Committee on Scientists and Engineers and the ASEE. (Printed by the Ohio College of Applied Science, 1958). (OMI Collection).
13. G. Ross Henninger,"Problems and Potentialities of the Technical Institute," pp. 3-4. (OMI Collection).

Request For Publication

The publication committee of Tau Alpha Pi is interested in receiving articles on Engineering Technology for possible publication in the Tau Alpha Pi Journal. Individuals who have articles or ideas on Engineering Technology which they feel would be of interest to other Engineering Technology educators and students should call or send two copies of their work to: Professor **Frederick J. Berger, Editor, Tau Alpha Pi Journal, P.O. Box 266, Riverdale, New York 10471, Telephone: 212-884-41 62.**

Papers on new and innovative programs, the employment picture, utilization of technology graduates, instructional innovations, and book reviews will be given priority.

Please pass this request on to other colleagues at your campus so that they too may participate in furthering the professional status of the Engineering Technology students and the profession.

Parts of the Journal will be going to the printer during the first week of April. We need the articles and your news to insure that your chapter's activities will be included and given national recognition when the Journal is published.

If pictures are to included, they should be black and white on glossy paper.

Engineering Technology at Purdue

World War II created immediate need for the expertise of trained scientists and engineers and for a greater degree of specialization. The resulting need for support personnel was realized by the Engineering, Science, Manpower War Training Act (ESMWT) which provided the training of such personnel with special technological skills. The technicians being trained by universities, including Purdue, played a significant support role in the years following World War II, the period during which the cold war and scientific competition between the U.S. and Russia necessitated intensified scientific research efforts in America.

By about 1955, engineering students at Purdue experienced the shift in the direction of Space Age needs, with emphasis on math and science and de-emphasize on applied instruction in such laboratory courses as foundry, welding, heat treating, electricity, and the amount of drafting.

This new role for the engineers who, because of their more theoretical and scientific training, worked primarily in research, creative design, and systems development, left a void for personnel in manufacturing industries at a time when a booming economy created greater demand for consumer products. Purdue leaders, recognizing this void, established an associate degree program (1961) in engineering technologies. Several years later, the program was expanded to include a four-year baccalaureate. It should perhaps be noted that Purdue was in the forefront of technological training as early as 1943 when it offered diplomas for technical training not on college level.

Graduates of technological programs have become known as engineering technicians (two year) and engineering technologists (four year). It would be helpful to define these terms within context.

The engineering technologist is typically a practical person interested in economically applying established engineering principles as well as organizing processes and people for industrial production. The technologist is interested in the improvement of existing products, processes, and procedures. He has an engineering technology baccalaureate degree and differs from the scientist and engineer in these ways: the scientist is typically a researcher who is interested in the discovery and categorization of knowledge, while the engineer is primarily a designer or innovator of new products, processes, procedures, or systems.

The engineering technician is a key member of this team (scientist, engineer, technologist, technician) assisting in the practical aspects of their efforts and differs from the craftsperson because of his knowledge of applied engineering, theory, and methods. Technicians are broadly trained in mathematics and science and in the fundamentals of either electrical or mechanical devices and systems. The~1 are trained to operate and maintain sophisticated engineering and scientific equipment, and are skilled at gathering and interpreting data and in using instruments.

The engineering technologist and the engineering technician do interesting and enjoyable work in many areas of manufacturing, sales, technical writing, field service, quality control, and similar engineering related activities. The technologist ordinarily will deal with components and systems. Some become technical supervisors. The technologist's role evolved during the 1960's and will continue to evolve in the coming decades as a technically trained "organizer-doer." In research and development the technologist may be the liaison between scientist or engineer on the one hand and the technician or craftsperson on the other.

The objectives of the Purdue program are four-fold:

1) To graduate students who have the skills and knowledge to become successful in a variety of technically oriented positions, as technicians and technologists, within Indiana's and the nation's businesses and industries.

2) To graduate students with a broad general education including the ability and motivation to continue the learning process throughout their lifetimes.

3) To instill and nourish in students the desire to serve society and to adopt high moral and ethical standards in that service.

4) To serve disciplines within the University by providing service courses that will broaden and enhance the education of their students.

Our students are best prepared to enter manufacturing industries and public utilities although they find employment in other areas. (A 22 member industrial advisory committee works closely with the departments to keep the program up-to-date and in line with the needs of industry.) The department is not in the business of training scientists, engineers, tradesmen or craftsmen.

The entrance requirement is an upper-two-thirds quality high school student. This means usually an SAT-Math plus SAT-Verbal of at least 850. Our typical student has a composite score of 980 and a high school rank of 66°Io tile.

Most of our students have the qualifications to be successful in a number of programs and they are frequently admitted to various scholastic and leadership honoraries on campus. Tau Alpha Pi, the Engineering technology Honorary, is one of the most selective on campus, admitting only the top 4% to membership. Our students are also very active in the student chapter of the Institute of Electrical and Electronic Engineers (IEEE), and the American Society of Manufacturing Engineers (ASME). Well over 90% of our students are from the state of Indiana.

The latest information indicated that about 55% of our beginners graduate from the University with 5O% graduating from our curriculum. This compares favorably with University averages, especially since we accept qualified students on a first come-first-serve basis without the rigid screening that some departments employ.

We have developed strong relationships with Indiana and Midwest industries. This, along with the excellent services of the Purdue Placement Office and help from our alumni, has resulted in an excellent placement situation. Each graduate enjoys many attractive job offers. We are especially proud of our continual record of 100% placement of those seeking employment in the field studied. The placement record of the 1978 four-year graduate indicates an average starting salary of $16,000 per year with about 50% taking jobs in Indiana. Although Purdue's is a two-plus-two program, nearly all of the A.A.S. students continue for the B.S. degree.

Even in the economic "down" years of 1972 and 1973 Purdue's graduates enjoyed a good placement situation. Starting salaries have increased dramatically over the years with our average four-year technologist receiving $10,600 in 1970, $11,000 in 1973, $13,000 in 1976, and $17,000 in 1979.

From 1969 to 1978 the placement situation for four-year graduate breaks down as follows:

PLACEMENT SUMMARY OF FOUR-YEAR ELECTRICAL TECHNOLOGY GRADUATES

Job Title	Percent of Graduates (N=300)
Engineer (Jr. Engineer, Engineering Trainee)	16%
Field Service Engineer (Tech. Rep., Customer Engineer)	**14%**

Technical Sales	9%
Product, Process, Development, Application, Component, Packaging Engineer	8%
Manufacturing, Production, Quality Assurance, Test Engineer	8%
Electrical or Electronics Engineer	7%
Power, Sub-Station, Distribution, Transmission, Relay Engineer	6%
Project, Jr. Project, Project Design, Product Development Engineer	5%
Technician/Technologist	4%
Senior Technical Associate	4%
Maintenance Supervisor, Plant Engineer, Electrician	4%
Design Engineer	3%
Management Trainee	2%
Research Assistant	2%
Technical Writer	2%
Computer Programmer, Computer Systems Engineer	1%
Instructor	1%
Clinical or Biomedical Engineer	1%
Others	3%

PLACEMENT SUMMARY OF FOUR-YEAR MECHANICAL ENGINEERING GRADUATES

Job Title	Percent of Graduates (N=270)
Engineer (Engineer, Jr. Engineer, Engineering Trainee, Engineering Analyst, Engineering Coordinator, Assistant Engineer, Chief Engineer, HVAC)	7.4%
Engineer (Product Development Engineer, Project Engineer, Assistant Project Engineer)	13.3%
Engineer (Research)	1.4%
Engineer (Industrial)	2.9%
Engineer (Mechanical)	1.4%
Engineer (Design, Assistant Design)	4.8%
Engineer (Test)	1.0%
Engineer (Manufacturing, Production, Production Control, Process, Method, Cost)	19.6%
Maintenance (Maintenance Supervisor, Plant Engineer, Assistant Plant Engineer)	7.4%
Aviation (Pilots, Flight Instructors, Military, etc.)	2.6%
Manager (Assistant Manager, Management Trainee, Engineering Manager, Product Manager)	5.1%
Draftsman	1.4%
Sales	5.9%
Quality Assurance	1.0%
Field Service Engineer (Technical Representative, Customer Service)	4.4%
Technician/Technologist	4.4%
Other	13.7%

The Purdue engineering technologist has found his place in industry (primarily in the manufacturing areas) and is being recruited by a wide variety of firms.

Our alumni are reached several times each year through our Alumni Newsletter and are-asked to report their

current employment situation (among other things). We maintain an up-to-date record of the address, job title, salary and company affiliation of all of our graduates.
Engineering technology is very healthy in the Midwest and around the country and promises to be even more so as we advance into an ever-growing technological era.

Dr. Stephen R. Cheshier, Head of Electrical Engineering Technology and Dr. Harris T. Travis, Acting Head of Mechanical Engineering Technology

Industrial Requirements of Engineering Technologists

In January 1972, ASEE published the "Engineering Technology Study" final report. The objective of the baccalaureate program in engineering technology was two-fold: (1) to assist engineers and (2) to act independently in support of engineering activities, such as supervisors and foremen, technical sales, etc. "The engineering technologist performs many of the same kinds of activities as an engineer but at a different and often latter stage in the procession from concept to product."

General Electric has had considerable success with technology graduates by following the objectives given seven years ago. Various parts of our company and others in industry are getting more accustomed to placing technology graduates in challenging jobs which are matched to the skills they have obtained from educational institutions.

Then what are we looking for when we hire technologists for industry? There are four major components: (1) the college staff, (2) the courses given, (3) the skills a student possesses, both from college and through work experience, and (4) the mobility of the student. A technique used by many of my colleagues is to visit the college to meet its staff and review the courses and texts used before recruiting the students. This technique saves students from anxious times waiting for answers about prospective jobs when the visit indicates that the company should not actively recruit at that college. This step makes one aware of the staff's credentials in teaching applied technology. A staff with a substantial amount of industrial experience and active industrial advisory board will generally keep up with the rapid changes in science and engineering. It may be tempting to add adjunct staff who work for industry and teach part-time. These should, however, account for only a minor portion of the total staff.

Colleges which meet ECPD curriculum requirements give us in industry additional confidence in the colleges where we do our recruiting.

Math and Basic Sciences	22.5 credit hours
Communications, Humanities, and Social Sciences	22.5 credit hours
Technical Specialties and related Technical Studies	45 credit hours
Other	30.0 credit hours
	120.0 credit hours

Additional courses which are of value to us are:

Computer Programming	Interpersonal Communications
Decision Analysis	Probability & Statistics
Engineering Drawing and Reading	Union Relations

Marketing (Field Engineering)	39%
Manufacturing	32%
Engineering	27%
Finance (Computer Technology)	2%
	100%

Industry, via its recruiters, will be searching for "hands on" skills acquired either through schooling or through work experiences, including those obtained

in the armed forces. Students typically discount their work experiences, so most employers have to draw these out. "Hands on" skills are relatively more important in technology jobs than in engineering or science jobs.

Finally, mobility is an important parameter. Colleges cannot be expected to teach this, but many of us associated with industry know it is vitally important. Many of the jobs available for technologists require moves at various times. This is particularly true in field service. The technologists must report for company schooling in its products, and then move to locations where customers need the service. In our company, this could be almost anywhere in the world.

These are the four factors that meet industrial needs. Some may say these are similar to what industry wants to see in engineers. Yes, but the emphasis is different with technologists. The teaching staff's industrial experience and the student's "hands on" skills are of prime importance.

Now let's take a look at what General Electric is doing in the field. The latest data available to me show that our offers to technologists represent 10% of our total offers to technical bachelor's degree holders. This distribution is similar to the proportions available in the student population at large, as reported by the Engineering Manpower Commission. The majority of the four-year technology graduates are distributed in three functional areas within the General Electric Company.

The technologists, both at the associate and bachelor's level, are getting offers for exciting jobs in the industrial sector or our economy. At present, the supply and the demand seem to be reasonably well balanced. After getting the first job, what then happens to the graduate? In General Electric, training programs are the answer for nearly 80% of the new graduates. These training programs vary in length from three months to two years, depending on the particular job. After all this, the technologist is finally ready to handle the job.

These are the qualifications that some of us are looking for in a technologist. I am confident that our objectives in industry are similar to those in education - to provide career progress for people.

Henry D. Coghill
General Electric Company
Corporate Research and Development
Schenectady, New York

Engineering Technology Degrees

Technology programs continue to be an increasingly important source of technological manpower. The Engineering Manpower Commission Survey of Degrees in 1978 reported on the basis of data received from over 300 institutions, including 135 ECPD accredited curricula in engineering technology, 164 bachelors and 16,099 associate degrees in engineering technology. Participation by women and minorities in various technology disciplines differs little from the participation of these groups in individual engineering curricula.

The breakdown by curriculum is given in table 1, Electrical, electro-mechanical, electronics and related programs have the most graduates at all levels, while the civil and related technologies (architecture, civil, construction, and drafting) and mechanical and related fields come next. The heading "engineering science" in this table includes students completing the first two years of an undergraduate engineering program, many of whom would be expected to transfer to an upper division school to complete a four-year program. This should not be interpreted to mean that these are the only two-year graduates who transfer into engineering or other four-year programs. Many graduates of other specific technology curricula continue their studies toward a bachelor's degree in engineering.

The pattern in individual technology is similar to engineering technology at the associate level. At the bachelor's level, industrial technology without further indication as to specialty is more generally the case. The reported number of degrees awarded in industrial technology at the associate level is 6,660, and at the bachelor's level, 2,202.

Table 1. Technology Degrees by Curriculum and Level, 1978

	Engineering			Industrial		
	Cert.	*Assoc.*	*Bach.*	*Cert.*	*Assoc.*	*Bach.*
Air Conditioning	94	405	25	104	290	5
Aircraft	—	311	115	144	213	51
Architectural	30	911	119	23	351	23
Automotive	60	446	52	282	595	74
Chemical	—	257	9	—	76	—
Civil	22	1,394	631	64	180	—
Construction	1	458	429	92	296	85
Computer	17	605	127	177	610	49
Drafting	140	521	72	31	675	56
Electrical	66	1,989	1,095	132	270	16
Electromechanical	—	364	85	7	112	—
Electronic	188	3,795	1,451	94	1,422	116
Engineering Science	—	1,295	348	—	27	8
General	2	66	629	—	36	—
Industrial Technology	16	589	459	205	587	1,572
Marine	—	—	44	—	—	57
Mechanical	10	1,915	1,184	155	151	12
Mining	—	153	11	—	113	—
Materials	7	16	36	42	31	11
Nuclear	—	69	14	—	—	—
Other	8	540	229	32	625	67
Total	661	16,099	7,164	1,584	6,660	2,202

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A Brighter Picture

Technology graduates of the class of '78 encountered one of the most favorable job markets since the heydays of the 1960's, according to the results of the 19th annual placement survey conducted by the Engineering Manpower Commission of the Engineers Joint Council. While there is no single measure of success in the placement of new graduates, several indicators verify that 1978 was a good year.

Starting salaries continued to move upward. The averages varied from 5.7 percent for associate degree technology graduates to 12.2 percent for bachelor degree technology graduates, while the cost of living rose by 7.7 percent during the year. These results are summarized in Table 2 and shown graphically from 1963 to date in Figure 1.

TABLE 2
AVERAGE MONTHLY STARTING SALARIES
1977-1978

	1978	1977	% Incr.
TECHNOLOGY GRADUATES			
AS	916	867	5.7
BS	1246	1111	12.2
CONSUMER PRICE INDEX (July)	196.7	182.6	7.7

Source: Technology starting salaries from the Engineering Manpower Commission placement survey. Consumer price index from Monthly Labor Review, U.S. Department of Labor.

AVERAGE MONTHLY STARTING SALARIES OFFERED TO TECHNOLOGY GRADUATES 1963–1978

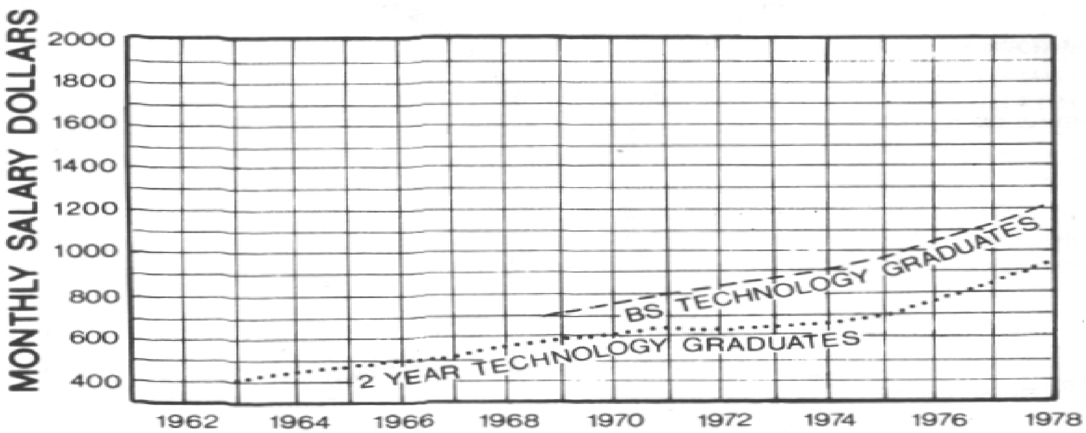

FIGURE 1

The job prospects for engineering technology graduates improved from 19 and like last year their placement status was almost equal to the engineering graduates. Table 3 shows how the graduates of associate and bachelor technology programs were reported in the survey.

In contrast to the other groups covered by the EMC survey, associate degree technicians showed a very spotty pattern when broken down by curricula and accreditation status. Some fields such as mechanical and architectural technology were weak in the schools having programs accredited by the Engineers' Council for Professional Development but strong elsewhere. Generally, the strongest fields were manufacturing and aerospace technology, with civil and industrial technology also doing better than the average. Starting salaries at this level varied widely around a mean of about $11,000 with the averages for most fields falling between $10,000 and $11,800. I n general, salaries for technicians were about six percent higher than a year ago.

TABLE 3
PLACEMENT STATUS OF
1978 TECHNOLOGY GRADUATES

	Tech. Assoc.	Degree Bach
Newly Employed	58%	71%
Returning to Job	7	11
Full-Time Study	20	2
Other Plans	5	2
Considering Job Offers	3	4
No Offers or Plans	7	10

Two-Year Associate Degree:

As of their date of graduation, 65% of the 1978 two-year associate degree graduates were employed as compared with 64% in 1977. Of these, 58% were newly employed and 7% were returning to a job previously held. In addition, 20% of the 1978 graduates opted to continue their education on a full-time basis. Only 7% had no offers or plans. Figure 2 shows a placement comparison between 1977 and 1978 graduates of two-year programs.

PLACEMENT STATUS OF TWO-YEAR ASSOCIATE DEGREE GRADUATES

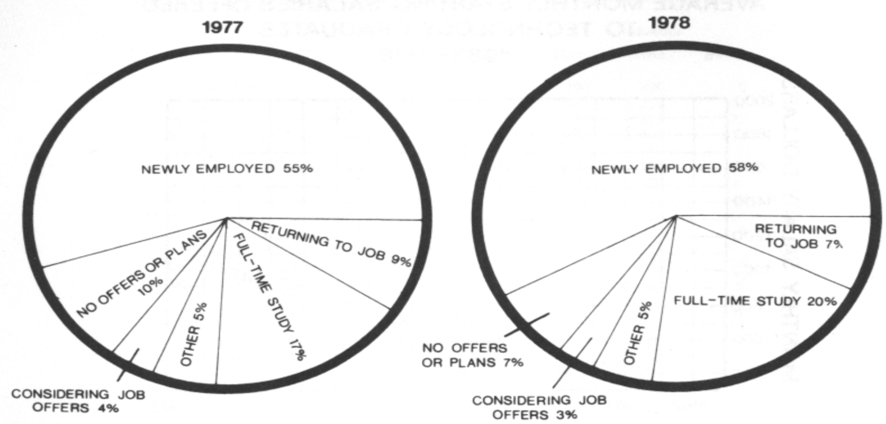

FIGURE 2

An eleven-year history of the components of the placement status is shown in Figure 3.

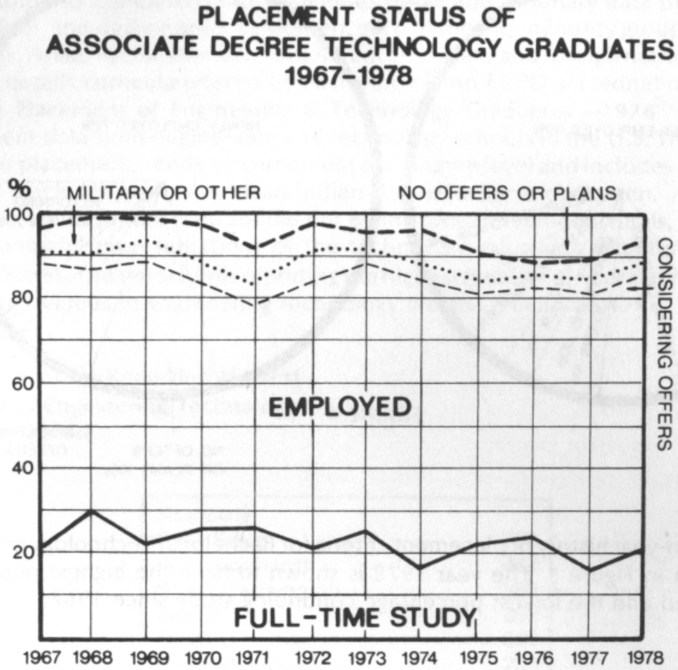

FIGURE 3

Four-Year Bachelor's Degree:

Four-year graduates, as of their graduation date, were 82% employed. Of this number 11 % were returning to a job previously held. Only 2% were planning to start graduate school and 10% had no job offers or other plans as of graduation. Figure 4 shows a comparative analysis for four-year bachelor of technology programs for the years 1977 and 1978.

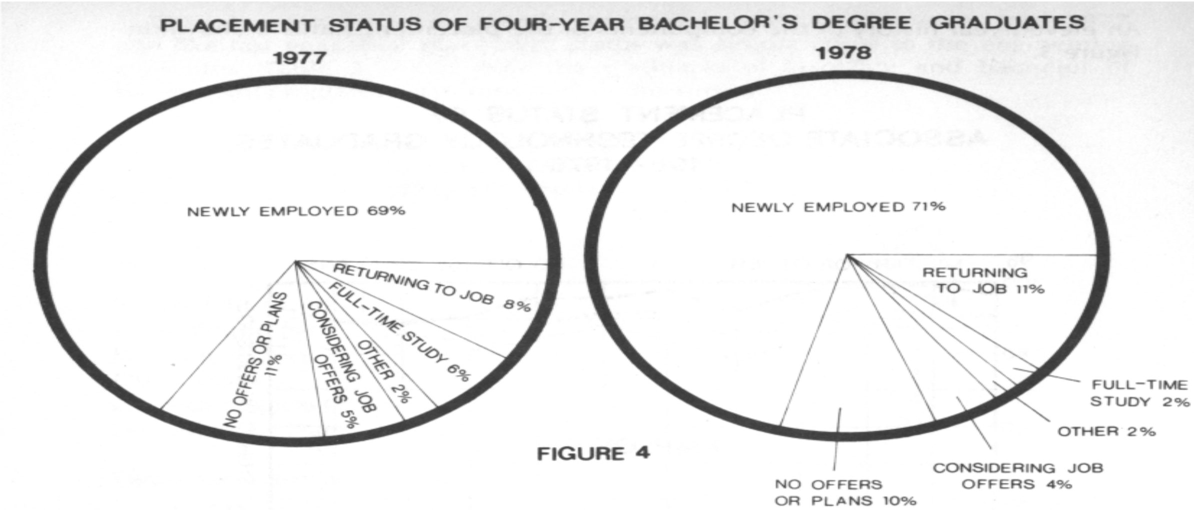

FIGURE 4

An eleven-year history of placement criteria for Bachelor of Technology graduates is shown in Figure 5. The year 1978 is shown to have the highest percentage employed and the lowest percentage continuing study since 1967.

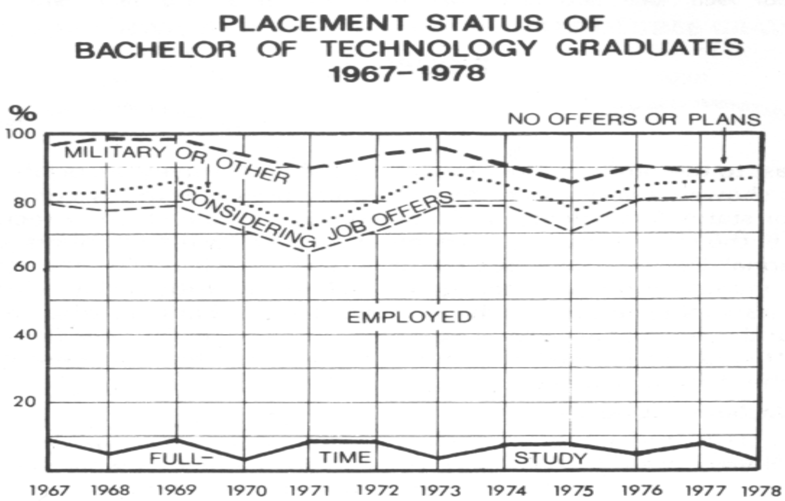

FIGURE 5

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The complete EMC report on "Engineering and Engineering Technology Degrees-1978" was published in December 1978. It consists of three parts: Part I includes detail and summary degree data by school, curriculum, and degree level for all students combined; Part II includes detail and summary data by school, curriculum, and degree level for women, each of the four minority groups (Black, Hispanic, Asian/Pacific Islanders and American Indian) and foreign nationals; and Part III details curricula offered by each school and ECPD accreditation.

"The Placement of Engineering & Technology Graduates --1978" presents placement data from engineering and technology schools in the U.S. The report analyzes placement trends by curriculum and degree level and includes information for Black, Hispanic, American Indian, Asian/Pacific and Women.

The figures reported here should not be mistaken for national totals, but they are meaningful representations of the technology education structure in the United States. The ten schools reporting the highest number of baccalaureate and associate degrees in engineering technology are given in Table 4.

Table 4. Schools Reporting Highest Number of Engineering Technology Degrees, 1978.

Associate	
Penn State	708
Wentworth Inst.	463
SUNY-Farmington	380
Erie CC	305
Ohio Inst.-Ohio	300
Mohawk Valley	285
New York City CC	280
Miami-Dade CC	280
SUNY A&T-Alfred	270
Queensboro	264
Bachelor's	
Louisiana Tech.	313
Southern Tech.	302
Houston CC	215
Devry-Chicago	208
Okla. State	195
Ohio Inst.-Ohio	180
Texas A&M	173
Rochester Inst. Tech.	153
Miami Ohio	152
Pa. State Capitol	150

Table 5 gives survey results of technology degrees awarded by individual schools:

The reports here duplicated are available from the Publications Department, Engineers Joint Council, 345 E. 47 St., N.Y.C. 10017.

Patrick J. Sheridan, Manager
Manpower Activities of Engineers' Joint Council

Table 5. Engineering Technology Degrees by School and Degree Level, 1978.

State and School	Engineering Technology Cert.	Engineering Technology ASET	Engineering Technology BSET	Engineering Technology MSET	Industrial Technology Cert.	Industrial Technology ASIT	Industrial Technology BSIT
ALABAMA							
ALABAMA	-	-	15	-	-	-	-
ALABAMA A&M U	-	-	90	-	-	-	12
JC CALHOUN	-	43	-	-	-	7	-
ARIZONA							
ARIZONA ST U	-	-	57	-	-	-	26
DEVRY INST-PHOENIX	-	225	121	-	-	-	-
GLENDALE COMM. COLL	-	2	-	-	-	24	-
NORTHERN ARIZONA	-	-	29	-	-	-	-
PIMA COMM	-	-	-	-	12	128	-
PHOENIX	-	26	-	-	-	-	-
ARKANSAS							
ARKANSAS LITTLE ROCK	-	25	-	-	-	-	-
PHILLIPS CO COMM COLL	-	-	-	-	-	28	
STHN ARKANSAS U TECH	-	-	-	-	-	70	-
CALIFORNIA							
CAL POLY ST SLO	-	-	137	-	-	-	35
CAL ST POLY POM	-	-	127	-	-	-	-
CAL ST SACRAMENTO	-	-	14	-	-	-	-
CAL MARITIME	-	-	36	-	-	-	57
COGSWELL	-	33	20	-	-	-	-
CITY COL OF SF	2	58	-	-	61	65	-
DESERT	-	16	-	-	-	20	-
GROSSMONT	-	58	-	-	-	5	-
NORTHROP	-	9	29	-	-	-	-
ORANGE COAST	-	122	-	-	-	-	-
PACIFIC UNION	-	-	-	-	-	7	2
SIERRA	8	-	-	-	-	60	-
WEST VALLEY	-	134	-	-	-	-	-
COLORADO							
COLORADO TECH	-	61	40	-	-	-	-
MESA COLORADO	-	9	-	-	-	-	-
METROPOLITAN ST	-	29	50	-	-	-	-
STHN COLORADO	-	33	41	-	-	13	-
CONNECTICUT							
CENTRAL CONN ST	-	-	-	-	-	-	50
CONNECTICUT U	-	-	6	-	-	-	-
HARTFORD TECH	-	199	-	-	-	-	-
NORWALK ST TECH	-	156	-	-	-	-	-
THAMES VALLEY	-	104	-	-	-	54	-
WARD TC HARTFORD	-	45	16	-	-	-	-
WATERBURY ST	-	141	-	-	13	-	-
DISTRICT OF COLUMBIA							
WASH TECH INST	-	44	-	-	-	33	-
DELAWARE							
DEL TECH DOVER	-	17	-	-	-	-	-
DEL TECH GEORGE	-	25	-	-	-	-	-
DEL TECH NEWARK	-	110	-	-	-	-	-
FLORIDA							
BREVARD CC	-	5	-	-	-	171	-
BROWARD CC SO	-	6	-	-	-	17	-
EMBRY RIDDLE	-	-	10	-	-	-	-
FLORIDA	-	-	33	-	-	-	-
FLORIDA A&M	-	-	47	-	-	-	-
FLORIDA KEYS CC	-	-	-	-	40	48	-
FLORIDA INTERNATIONAL	-	-	81	-	-	-	111
FLORIDA TECH U	-	-	70	-	-	-	-
GULF COAST CC	-	-	-	-	-	98	-
HILLSBOROUGH CC	-	26	-	-	-	26	-
LAKE SUMTER CC	-	7	-	-	-	-	-
MIAMI-DADE CC	-	280	-	-	-	-	-
MIAMI-DADE NORTH	-	224	-	-	-	-	-
OKALOOSA WALTON	-	39	-	-	-	-	-
NORTH FLORIDA U	-	-	-	-	-	-	21
PENSACOLA JC	-	-	-	-	-	2	-
SOUTH FLORIDA	-	-	33	-	-	-	-
ST PETERSBURG	-	116	-	-	-	-	-
GEORGIA							
BERRY	-	-	-	-	-	-	10
DEKALB CC GA	-	69	-	-	-	-	-
DEVRY ATLANTA	-	32	-	-	-	-	-
FORT VALLEY ST	-	6	4	-	-	-	-
GEORGIA SOUTHERN	-	-	34	-	-	-	-
SAVANNAH	-	-	14	-	-	-	-
SOUTHERN TECH	-	169	302	-	-	-	-
WALKER TECH	-	15	-	-	-	-	-

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

State and School	Engineering Technology Cert.	ASET	BSET	MSET	Industrial Technology Cert.	ASIT	BSIT
IDAHO							
IDAHO ST	130	–	–	–	–	–	–
RICKS	–	36	–	–	–	–	–
ILLINOIS							
AERO SPACE INST	–	–	6	–	–	–	–
BELLEVILLE	–	14	–	–	–	55	–
BRADLEY	–	–	51	–	–	–	–
DEVRY CHICAGO	–	223	208	–	–	–	–
DUPAGE	–	121	–	–	–	50	–
EASTERN ILLINOIS	–	–	–	–	–	–	11
ILLINOIS ST	–	–	–	–	–	–	126
LAKELAND	–	36	–	–	42	–	–
LINCOLN LAND CC	–	–	–	–	–	33	–
MORAINE VALLEY	–	5	–	–	–	24	–
MORRISON	–	46	–	–	–	–	–
NORTHERN ILLINOIS	–	–	62	–	–	–	–
OLIVE HARVEY	–	57	–	–	–	133	–
PARKLAND	–	6	–	–	–	–	–
PARKS	–	24	–	–	–	–	–
RICHLAND CC IL	–	–	–	–	–	2	–
STHN IL CARBONDALE	–	–	69	–	–	–	78
THORTON CC IL	–	–	–	–	–	28	–
TRITON	–	42	–	–	–	131	–
WABASH VALLEY	–	–	–	–	–	100	–
WESTERN ILLINOIS	–	–	–	–	–	–	47
INDIANA							
INDIANA ST	–	–	–	–	–	6	77
INDIANA ST EVANSVILLE	–	18	–	–	–	–	–
IUPU FORT WAYNE	–	49	13	–	–	–	–
PURDUE	–	124	108	–	–	–	–
PURDUE CALUMET	–	81	48	–	–	–	–
PURDUE INDIANAPOLIS	–	97	39	–	–	101	82
PURDUE NORTH CENTRAL	–	114	1	–	–	–	–
PURDUE OTHER	–	28	35	–	–	–	–
IOWA							
CLINTON CC IA	–	–	–	–	–	13	–
DES MOINES AREA	–	28	–	–	–	28	–
HAWKEYE	–	51	–	–	–	–	–
IOWA ST	–	–	–	–	–	–	31
IOWA VALLEY CC	–	20	–	–	–	–	–
IOWA WESTERN	–	19	–	–	–	–	–
KIRKWOOD CC IA	–	30	–	–	–	–	–
NORTH IOWA AREA	–	–	–	–	–	57	–
NORTHERN IOWA	–	–	–	–	–	–	12
SCOTT CC IOWA	–	–	–	–	–	13	–
SOUTHEASTERN CC IOWA	–	31	–	–	–	–	–
WESTERN IOWA TC	–	23	–	–	–	–	–
KANSAS							
EMPORIA KS ST	–	–	–	–	–	–	6
JOHNSON CITY KS	–	3	–	–	–	8	–
KANSAS ST	–	–	38	–	–	–	–
KANSAS ST PITTS	–	–	83	–	–	–	77
KANSAS TECH	–	48	–	–	–	–	–
PRATT CJC KS	–	–	–	–	–	10	–
SCHWEITER TECH	–	16	–	–	–	–	–
WICHITA	–	–	2	–	–	–	–

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

	Engineering Technology				Industrial Technology		
State and School	Cert.	ASET	BSET	MSET	Cert.	ASIT	BSIT
KENTUCKY							
LEXINGTON TI KENTUCKY	–	49	–	–	–	–	–
LOUISVILLE	–	46	–	–	–	–	–
MURRAY ST	–	6	21	–	–	1	–
WESTERN KENTUCKY	–	–	52	–	–	–	–
LOUISIANA							
LOUISIANA STATE U EUNICE	–	5	–	–	–	–	–
LOUISIANA TECH	–	36	313	–	–	–	–
NORTHWESTERN ST LA	–	–	11	–	–	5	21
MAINE							
MAINE	–	80	117	–	–	–	–
MARYLAND							
CAPITAL INST	15	28	46	–	–	–	–
ESSEX CC MD	6	–	–	–	–	–	–
MARYLAND	–	–	4	–	–	–	–
MONTGOMERY	–	52	–	–	–	–	–
PRINCE GEORGE	–	48	–	–	19	51	–
MASSACHUSETTS							
BLUE HILLS TECH	–	60	–	–	–	–	–
BRISTOL CC MASS	19	40	–	–	–	–	–
CAPE COD CC	–	1	–	–	–	–	–
CENTRAL NEW ENGLAND	–	–	95	–	–	–	–
FITCHBURG ST	–	–	–	–	–	–	25
FRANKLIN INST	–	70	–	–	–	–	–
LINCOLN NORTHEASTERN	–	67	95	–	–	–	111
LOWELL	–	31	40	–	–	–	43
MASSASOIT CC	–	29	–	–	–	–	–
MOUNT WACHUSETT	–	25	–	–	–	–	–
NORTHEASTERN	–	100	101	–	–	–	–
NORTHERN ESSEX	–	40	–	–	–	–	–
NORTH SHORE	–	–	–	–	–	33	–
SE MASS	–	–	48	–	–	–	–
QUINSIGANMOND CC	–	32	–	–	–	–	–
SPRINGFIELD TECH	–	18	–	–	–	–	–
WENTWORTH	–	463	79	–	71	–	–
MICHIGAN							
ANDREWS	–	3	6	–	–	2	–
BAY DE NOC MI	–	6	–	–	–	6	–
DELTA	–	24	–	–	–	–	–
EASTERN MICHIGAN	–	–	–	–	–	21	–
GOGEBIC CC	–	1	–	–	–	30	–
GRAND RAPIDS CC	–	–	–	–	19	45	–
HENRY FORD CC	–	233	–	–	–	–	–
JACKSON CC MI	–	14	–	–	–	17	–
KALAMAZOO VALLEY	–	4	–	–	7	50	–
KELLOG CC	–	33	–	–	–	–	–
KIRKWOOD CC MI	–	2	–	–	–	10	–
LAKE MICHIGAN CC	–	3	–	–	–	22	–
LAKE SUPERIOR	–	45	40	–	–	5	–
LAWRENCE TECH	–	72	–	–	–	–	–
MICHIGAN TECH	–	116	–	–	–	–	–
MID-MICHIGAN CC	–	14	–	–	–	–	–
MONROE CO CC MI	–	–	–	–	–	32	–
MONTCALM CC	–	–	–	–	28	4	–
MOTT CC MI	–	–	–	–	–	49	–
NORTH CENTRAL MI	–	–	–	–	–	3	–
SOUTH WESTERN MI	15	–	–	–	–	28	–

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

State and School	Engineering Technology Cert.	ASET	BSET	MSET	Industrial Technology Cert.	ASIT	BSIT
ST CLAIR CO CC	–	–	–	–	12	41	–
WASHTENAW	–	20	–	–	6	66	–
WAYNE CITY CC MI	–	–	–	–	–	2	–
WAYNE ST U	–	–	52	–	–	–	–
WESTERN MICHIGAN	–	–	104	33	–	–	7
WESTERN ST	–	–					
MINNESOTA							
ANOKA RANSEY CC	–	40	–	–	–	–	–
MANKATO ST	–	–	–	–	–	8	–
NORTH HENNEPIN	–	10	–	–	–	–	–
NORTHWESTERN ELE INST	–	–	–	–	–	163	–
ROCHESTER CC MN	–	37	–	–	–	–	–
SOUTHWEST ST MN	–	–	15	–	–	–	–
ST CLOUD ST	–	–	35	–	–	–	–
MISSISSIPPI							
COANHOMA JC	–	–	–	–	–	10	–
COPIAH LINCOLN	–	–	–	–	–	28	–
JACKSON ST MS	–	–	–	–	–	–	12
JONES CITY JC MS	–	–	–	–	–	76	–
MERIDIAN JMS	–	–	–	–	–	16	–
MISS GULF ST	–	–	–	–	–	4	–
MISS STATE	–	–	25	–	–	–	10
NORTHWEST MJC	–	–	–	–	–	10	–
S. MISS	–	–	–	–	–	–	38
TOUGALOO	–	3	–	–	–	–	–
MISSOURI							
CENTRAL MO	–	–	–	–	61	31	80
JEFFERSON MO	–	43	–	–	40	–	–
LONGVIEW CC MO	–	56	–	–	–	–	–
MO INST TECH	–	35	31	–	–	–	–
MO WESTERN ST	–	9	9	–	–	–	3
NORTHEAST MO ST	–	–	–	–	–	–	42
NORTHWEST MO	–	–	–	–	4	–	8
SOUTHEAST MO ST	–	–	–	–	–	–	25
SOUTHWEST MO ST	–	–	–	–	–	2	71
ST LOUIS CC FLO	–	93	–	–	–	22	–
ST LOUIS CC FOR PARK	–	57	–	–	–	21	–
MONTANA							
MONTANA ST	–	–	50	–	–	–	–
NORTHERN MONTANA	–	–	–	–	–	28	14
NEBRASKA							
KEARNY ST	–	–	–	–	–	–	9
NEBRASKA CURTIS	–	7	–	–	–	–	–
NEBRASKA OMAHA	–	21	28	–	–	12	3
WESTERN NEBRASKA TECH	–	–	–	–	–	52	–
NEW HAMPSHIRE							
NEW HAMPSHIRE	–	–	15	–	–	–	–
NEW HAMPSHIRE INST	–	89	–	–	–	–	–
NEW JERSEY							
ATLANTIC CC NJ	–	–	–	–	–	8	–
CAMDEN CITY CC NJ	–	29	–	–	–	–	–
CUMBERLAND	–	–	–	–	–	10	–
FAIR DICK TEA	–	–	83	–	–	–	–
KEAN	–	–	–	–	–	–	29
MERCER	–	91	–	–	–	51	–

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

	Engineering Technology				Industrial Technology		
State and School	Cert.	ASET	BSET	MSET	Cert.	ASIT	BSIT
MIDDLESEX CO NJ	–	95	–	–	–	–	–
NEW JERSEY TECH	–	–	136	–	–	–	–
OCEAN COUNTY NJ	–	28	–	–	–	–	–
SALEM CC NJ	–	–	–	–	11	35	–
SOMERSET CO TECH	–	–	–	–	–	22	–
TRENTON ST	–	–	73	–	–	–	–
NEW MEXICO							
EASTERN NEW MEXICO	–	13	–	–	–	–	–
NAVAJO CC	–	1	–	–	–	1	–
NEW MEXICO	–	19	34	–	–	–	–
NEW MEXICO ST	–	24	–	–	–	–	–
NORTH AMERICAN TECH INST	–	9	–	–	–	–	–
NEW YORK							
ACAD AERONAUTIC	–	126	–	–	–	81	–
ADIRONDACK CC	–	–	–	–	–	37	–
BRONX COMM COL.	–	59	–	–	–	–	–
BROOME	–	150	–	–	–	–	–
CAYUGA CC	–	25	–	–	–	–	–
CCNY	–	–	38	–	–	–	–
CORNING CC	–	53	–	–	–	–	–
DUTCHESS CO COLL	–	86	–	–	–	2	–
ERIE CC	–	305	–	–	–	–	–
HUDSON VALLEY	–	172	–	–	–	220	–
MOHAWK VALLEY	–	285	–	–	194	–	–
NASSAU CC	–	79	–	–	–	–	–
NIAGARA CO CC	–	67	–	–	–	–	–
NY CITY CC	–	280	–	–	–	125	–
NY INST TECH OW	–	7	131	–	–	–	–
ONONDAGO	–	62	–	–	–	–	–
ORANGE CO CC	3	45	–	–	–	–	–
PAUL SMITH ART	–	–	–	–	–	331	–
QUEENSBORO CC	–	264	–	–	–	–	–
ROCHESTER NATIONAL DEAF	–	23	–	–	–	26	–
ROCHESTER TECH	–	–	153	–	–	–	–
SCHENECTADY	–	29	–	–	–	–	–
SUNY A&T ALFRED	–	270	–	–	–	125	–
SUNY BINGHAMTON	–	–	50	–	–	–	17
SUNY A&T COBLES	–	–	–	–	–	28	–
SUNY BUFFALO	–	–	52	–	–	–	80
SUNY CANTON	–	166	–	–	–	–	–
SUNY FARMINGTON	–	380	–	–	–	–	–
SUNY A&T MORRIS	–	228	–	–	20	–	–
TECH CAREER INST	–	112	–	–	–	–	–
ULSTER CITY CC	–	–	–	–	–	10	–
WESTCHESTER CC	–	161	–	–	–	–	–
NEVADA							
NEVADA	–	11	–	–	–	–	–
NORTH CAROLINA							
ALAMANCE	–	25	–	–	–	43	–
ANSON TECH NC	–	–	–	–	–	3	–
BEAUFORT TECH NC	–	–	–	–	–	6	–
BLUE RIDE TNC	–	–	–	–	–	14	–
CAPE FEAR	–	–	–	–	–	56	–
CATAWBA VALLEY	–	45	–	–	–	–	–
CENTRAL CAROLINA	–	21	–	–	–	–	–
COLL OF ALBEMARLE	–	–	–	–	–	10	–
DAVIDSON CITY NC	–	4	–	–	–	–	–
EAST CAROLINA	–	–	–	–	–	–	34

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

State and School	Engineering Technology Cert.	ASET	BSET	MSET	Industrial Technology Cert.	ASIT	BSIT
FAYETTEVILLE TECH	–	31	–	–	–	–	–
FORSYTH	–	36	–	–	–	–	–
GASTON	–	39	–	–	–	–	–
GUILFORD	–	35	–	–	–	27	–
JOHNSTON TI NC	–	–	–	–	–	4	–
MARTIN CC NC	–	–	–	–	–	15	–
NASH TECH NC	–	5	–	–	–	–	–
NORTH CAROLINA A&T	–	–	–	–	–	–	43
NORTH CAROLINA CHARLOTTE	–	–	79	–	–	–	–
PITT TECH	–	16	–	–	–	29	–
ROANE-CHOWAN	–	12	–	–	–	–	–
ROBESON INST	–	–	–	–	186	–	–
ROWAN TECH	–	38	–	–	–	–	–
SAND HILLS CC	–	22	–	–	–	–	–
SURRY CC NC	–	9	–	–	–	–	–
WAKE TECH INST	–	74	–	–	–	–	–
WESTERN PIEDMONT	–	10	–	–	–	–	–
WILSON CITY TECH	–	7	–	–	–	–	–
WILKES	–	–	–	–	–	32	–
WESTERN CAROLINA	–	–	–	–	–	–	72
NORTH DAKOTA							
NORTH DAKOTA	–	–	–	–	–	–	12
NORTH DAKOTA SCH SCI	–	–	–	–	–	322	–
OHIO							
AKRON	–	135	59	–	–	–	–
BELMONT TECH OHIO	–	15	–	–	24	–	–
CLARK TECH OHIO	–	41	–	–	–	–	–
CLEVELAND ST	–	–	45	–	–	–	–
COLUMBUS TECH	–	91	–	–	–	–	–
DAYTON	–	45	61	–	–	–	–
FRANKLIN OHIO	–	16	25	–	–	–	–
HOCKING	–	51	–	–	–	–	–
JEFFERSON CO OHIO	–	38	–	–	–	–	–
KENT ST TRUMBUL	–	30	–	–	–	–	–
KENT ST TUSCAR	–	20	–	–	–	–	–
LAKELAND CC	20	50	–	–	–	–	–
LIMA TECH OHIO	–	18	–	–	–	–	–
MARION TECH OHIO	–	10	–	–	–	–	–
MIAMI OHIO	–	21	152	–	–	–	–
MUSKINGUM ATC	–	35	–	–	–	–	–
NORTHWEST TECH OHIO	–	25	–	–	–	–	–
OHIO	–	–	–	–	–	–	21
OHIO APPLIED SC	–	117	64	–	–	36	–
OHIO INST OH	–	300	180	–	–	–	–
OWENS TECH OHIO	–	41	–	–	–	–	–
SHAWNEE ST OHIO	–	26	–	–	–	–	–
SINCLAIR CC	–	58	–	–	–	–	–
SOUTHERN ST OHIO	–	1	–	–	–	–	–
STARK TECH OHIO	–	70	–	–	–	–	–
TERRA TECH OHIO	–	63	–	–	–	–	–
TOLEDO	–	93	40	–	–	–	–
WASH TECH OHIO	–	17	–	–	–	–	–
YOUNGSTOWN	–	104	54	–	–	–	–
OKLAHOMA							
CAMERON	–	–	–	–	–	41	–
NORTHEASTERN A&M	–	29	–	–	37	–	–
OKLAHOMA ST	–	157	195	–	–	–	–
OKLAHOMA ST TECH CITY	–	100	–	–	–	–	–
OKLAHOMA ST TECH OK MU	213	–	–	–	436	–	–

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

State and School	Engineering Technology Cert.	ASET	BSET	MSET	Industrial Technology Cert.	ASIT	BSIT
OREGON							
BLUE MONT CC	-	12	-	-	-	-	-
CLACKAMAS CC	-	-	-	-	30	72	-
CLATSOP CC OR	-	3	-	-	-	11	-
LINN-DENTON CC	-	14	-	-	-	5	-
OREGON INST TECH	-	117	104	-	-	118	55
OREGON ST	-	-	53	-	-	-	-
UMPQUA CC	-	15	-	-	-	9	-
PENNSYVANIA							
GANNON	-	-	7	-	-	-	6
LEHIGH	-	6	-	-	-	59	-
LUZERNE CC	-	11	-	-	1	14	-
NORTHAMPTON CO	-	45	-	-	-	-	-
PA ST CAPITOL	-	-	150	-	-	-	-
PA TECH PITT	-	-	-	-	-	207	-
PENN ST	-	708	-	-	-	-	-
PITT BRADFORD	-	12	-	-	-	-	-
PITT JOHNSON	-	-	87	-	-	-	-
PITT TECH PA	-	12	-	-	-	-	-
POINT PARK	-	-	28	-	-	-	-
SCRANTON	-	-	1	-	-	-	-
SPRING GARDEN	-	71	120	-	-	-	-
TEMPLE	-	40	105	-	-	-	-
TRIANGLE IN PA	-	230	-	-	-	-	-
WILKES	-	4	-	-	-	-	-
WILLIAMSPORT CC	10	12	-	-	23	13	-
RHODE ISLAND							
RHODE ISLAND IS JC	-	44	-	-	-	-	-
SOUTH CAROLINA							
AIKEN TECH SC	-	11	-	-	-	-	-
CLEMSON	-	-	35	-	-	-	-
DENMARK TECH	-	14	-	-	-	-	-
FLORENCE DARLGT	-	39	-	-	-	-	-
FRANCIS MARION	-	-	12	-	-	-	-
HORRY MARION	-	4	-	-	-	-	-
MIDLANDS TECH	-	98	-	-	-	-	-
PIEDMONT TECH SC	-	19	-	-	-	4	-
SOUTH CAROLINA ST	-	-	32	-	-	-	-
SPARTANBURG	-	9	-	-	-	17	-
SUMTER TECH	-	9	-	-	-	-	-
TRI-COUNTY TECH	-	39	-	-	-	34	-
TRIDENT TECH SC	-	62	-	-	-	-	-
SOUTH DAKOTA							
LAKE TECH SD	-	-	-	-	-	83	-
MITCHELL TECH	153	-	-	-	-	-	-
SD SPRINGFIELD	-	153	36	-	-	-	-
SOUTH DAKOTA ST	-	13	-	-	-	-	-
TENNESSEE							
AUSTIN PEAY ST	-	-	-	-	-	-	16
CHATTANOOGA ST	-	40	-	-	-	-	-
CLEVELAND ST CC	-	-	-	-	-	65	-
DYERSBURG CC	-	-	-	-	-	1	-
EAST TENN ST	-	-	-	-	-	-	71
JACKSON ST TN	-	15	-	-	-	-	-
MEMPHIS ST	-	-	77	-	-	-	-
MIDDLE TENN	-	-	-	-	-	-	20
NASHVILLE TECH	-	114	-	-	-	-	-

Table 5 (continued). Technology Degrees by School and Degree Level, 1978.

	Engineering Technology				Industrial Technology		
State and School	Cert.	ASET	BSET	MSET	Cert.	ASIT	BSIT
ROANE ST CC TN	-	30	-	-	-	-	-
ST TECH IN ST TN	-	136	-	-	-	79	-
TENN MARTIN	-	-	22	-	-	-	-
TENN TECH	-	-	-	-	-	-	42
VOLUNTEER TN	-	7	-	-	-	-	-
TEXAS							
AMARILLO	-	31	-	-	-	-	-
BEE COUNTY	-	11	-	-	-	33	-
DELMAR	-	29	-	-	-	-	-
DEVRY TEXAS	-	39	24	-	-	28	-
HOUSTON CC	-	2	215	-	-	2	-
KILGORE	-	-	-	-	-	101	-
LE TOURNEAU	-	34	46	-	-	-	-
MAINLAND	-	-	2	-	-	27	-
SAN ANTONIO	-	-	-	-	-	104	-
SAN JACINTO	-	-	-	-	-	152	-
TEXAS A&M	-	-	173	11	-	-	-
TEXAS SOUTHERN	-	17	-	-	-	-	-
TEXAS ST TDCH HARL	-	-	-	-	-	51	-
TEXAS ST TECH WACO	-	-	-	-	-	249	-
TEXAS TECH	-	-	56	-	-	-	-
TYLER JC	-	15	-	-	-	116	-
UTAH							
BRIGHAM YOUNG	-	11	53	1	-	2	25
UTAH ST	-	-	-	-	45	-	33
UTAH TECH	-	-	-	-	142	119	-
UTAH TECH SL CITY	-	-	-	-	-	166	-
WEBER ST	12	133	53	-	-	-	-
VERMONT							
NORWICH	-	-	6	-	-	-	-
VERMONT TECH	-	151	-	-	-	-	-
VIRGINIA							
DABNEYS LANCTR	-	9	-	-	-	-	-
DANVILLE	-	126	-	-	-	-	-
JOHN TYLER	-	14	-	-	-	6	-
LORD FAIRFAX	-	10	-	-	-	-	-
NORFOLK ST	-	-	-	-	-	11	23
NORTHERN VA CC	-	28	-	-	-	34	-
OLD DOMINION	-	-	73	-	-	-	-
PAUL D CAMP CC	-	16	-	-	-	-	-
PIEDMONT VA CC	-	15	-	-	-	-	-
RAPPAHANNOCK CC	-	12	-	-	-	-	-
SOUTHSIDE VA CC	17	17	-	-	-	-	-
SOUTHWEST VA CC	-	43	-	-	-	-	-
TIDEWATER CC	-	9	-	-	-	-	-
VA WESTERN CC	-	88	-	-	-	-	-
VPI	-	-	97	-	-	-	-
WESTERN SHORE U	-	7	-	-	-	-	-
WYTHEVILLE CC	38	38	-	-	-	-	-
WASHINGTON							
HIGHLINE CC	-	10	-	-	-	-	-
WASHINGTON ST	-	-	-	-	-	3	-
YAKIMA VALLEY	-	7	-	-	-	29	-
WYOMING							
WESTERN WYOMING	-	13	-	-	-	-	-
WEST VIRGINIA							
BLUEFIELD	-	70	18	-	-	-	-
PARKERSBURG	-	5	-	-	-	35	-
WV TECH	-	53	-	-	-	-	-
WISCONSIN							
MILWAUKEE ENG	-	166	124	-	-	-	-
MILWAUKEE TECH	-	166	-	-	-	-	-
MORAINE PARK	-	-	-	-	-	24	-
NORTH CENTRAL TECH	-	-	-	-	-	84	-
WESTERN WISC	-	-	-	-	-	69	-
WISC CENTER SYS	-	12	-	-	-	-	-
WISC PLATTEVILLE	-	-	-	-	-	-	36
*WISC STOUT	-	-	-	-	-	-	174
DEGREE TOTAL	661	16099	7164	45	1584	6660	2202

*Also granted 11 MSIT degrees in 1978.

Business and Technical Writing—Meeting Today's Needs and Tomorrow's Challenges

An Essential Course

If your technology curriculum does not include a course in business and technical writing, then it should. Three recent studies convey some typical responses about the importance of the course. One 1976 study surveyed graduates of three universities—University of Colorado, Bowling Green State University, and Southern Illinois at Edwardsville—who had performed well in business and technical writing. Seventy-nine percent of those graduates reported that they did significantly more writing on the job than they did in college. Ninety-three per cent believed that success on the job related directly to communications training. Ninety-six percent believed that business and technical writing should be required of all majors. Eighty-nine percent of the respondents reported that the need for writing ability increased as an individual is promoted and that at least 25% of their job time was spent writing.[1] A 1978 survey of successful engineers produced similar results. The respondents reported spending 24% of their time writing. Fifty percent reported that writing was very important to their position, while 47% reported that writing ability helped their advancement. Sixty-two percent reported that a subordinate's writing ability becomes a factor when that individual is evaluated, and 25% stated that writing ability was a "critical" evaluation factor.[2] Responses gathered by the Texas A&M English Department revealed that corporations consider good writing skill Is essential. The department sent letters to a number of business and manufacturing firms asking how they perceived the role of communications in their work. The following responses are typical:

Our recently hired college graduates seem to have their greatest communication problems in not being able to write concisely. There are several positions in our company that are filled by experienced people who were hired on the merit of their writing ability. Some of their positions are in Codes and Standards, Engineering, Environmental Affairs and Public Relations.
(from El Paso Natural Gas Company)

Usually it takes the willing graduate from one to two years to develop the necessary communication skills required in his position to function effectively. This process is costly to the employer in terms of supervision time and loss of production during this period. Any effort on the part of the education institution to prepare the graduate to reduce this development period will help the industry as well as the graduate himself.
(from H.B. Zachry Company General Contractors)

While few of us would disagree with the importance of good communications to the individual who anticipates advancement, the importance of business and technical writing stems from a more immediate concern—our own student's writing problems. In a questionnaire I submitted to the University of Houston College of Technology faculty during the 1978 fall semester, more than 7001o reported that students had severe writing difficulties in the following areas: sentence brevity and clarity, sentence and paragraph organization, ability to make content fit situation, knowledge of correct report style and format. Several faculty members stated that their student's expression skills are so poor--indecipherable in many cases—that they are no longer requiring essay responses because of the evaluation problem that bad writing presents. Thus, a business and technical writing course serves two purposes: (1) it helps the student prepare literate, readable, organized class assignments; (2) it familiarizes him with kinds of writing he will be confronted with on the job.

Business and Technical Writing vs. Freshman English

First, I want to dispel the idea that business and technical writing should be a substitute for freshman composition, or that freshman composition provides sufficient writing instruction for the technology student. Freshman English teaches analysis, support, organization, style, and mechanics. The essays freshmen traditionally write—definition, description, analysis, cause and effect—teach the student concepts of organization which are also used in business and technical writing but in a more specific, applied way. Thus, business and technical writing differs from freshman English in that it applies basic rhetorical skills learned in freshman composition to specific, pragmatic kinds of job-related communication—memos, letters, long and short reports. Furthermore, business and technical writing is built on the premise that the student has at his command an adequate knowledge of his field. Freshman English, in contrast, makes no such assumption and tries to sharpen a student's writing skills to enable him to do well on writing assignments he will face as he pursues his college courses before he takes business and technical writing. This difference is, I believe, fundamental to the premise underlying business and technical writing. The course should be limited to seniors who have completed most of the courses in their majors. This type student benefits most from the course. Knowing his field, he is familiar with current problems and issues in his specialization which can become subjects for position papers, analytical papers, feasibility reports, proposals, procedure reports, and instrument reports—all typical assignments in business and technical writing.

Topics for a Business and Technical Writing Course

While the course is not a letter-writing course, some instruction in correspondence principles is clearly important, as most students, after they graduate, will do a certain amount of memo writing.[3] Teaching students the meaning of tone (writer attitude), how to create tone and control it, is essential to teaching effective writing and is inextricable to teaching students how to write for different audiences. Because tone is critical to the good letter or memo, correspondence provides an ideal setting for teaching tone. Furthermore, correspondence instruction can be applied to the letter of application and resume, one of the most important topics in the course.
In addition, a business and technical writing course should be built around the long technical report which can involve many different writing assignments. Generally, I have students select a problem in their fields and write a proposal in a memo addressed to me, discussing subject, purpose, background, procedure, tentative report outline, facilities available, preliminary problems, conclusions, faults of the proposal, merits of the proposal. After the proposal is assigned, we devote a week to library instruction to familiarize students with major journals and reference materials in their fields.[4] Once the student has chosen a topic and written a proposal, he cannot change topics later in the semester. As in a job situation, he must be fully responsible for his proposal and its credibility—that the

problem can be analyzed by the methods proposed.

During the semester, the student submits one or two progress reports in memo form. Then, at the end of the semester, he submits the complete report in formal style—title page, letter of transmittal, table of contents, descriptive abstract, summary, notes, appendices—which familiarizes the student with the entire report machinery. Consequently, the long report requires an extensive chunk of time, as all report components, such as documentation and abstracting, must be taught. But once report-related topics have been covered, remaining class time should be given to as many of the following topics as possible: generalized or detailed description of mechanism, description of process, sets of directions, position papers. A final topic, one which can be conveniently included in the long report instruction time, is graphic presentation. Students should learn how and when to use graphics, what information is best suited to a particular type of graphic expression, and what the standard conventions governing graphics are.

Throughout the semester the instructor must continually emphasize the importance of correct, clear writing and the specific methods of achieving it. Students need frequent practice reworking weak sentences and paragraphs to eliminate poor syntax, redundancies, dead phrases, pompous phrasing—all of which contribute to ineffective writing. In addition, the instructor can use the fog index and other readability formulas as interesting, effective approaches to sentence and paragraph analysis.

Meeting the Communication Challenge

In addition to meeting the needs of students whose writing skills grow progressively worse, the writing teacher must try to prepare students for communication demands that will be placed on them. These demands currently seem to be in directions that so far are relatively untouched by current business and technical writing curriculum. The graduates surveyed by Cox, for example, listed the following topics as ones they would like to see covered in future courses: analysis of media, effective use of meeting, how to praise and reprimand, how to slant writing, how to use visual aids, how to conduct a visual briefing, how to give oral financial statements, how to chair a meeting, how to interview, how to conduct question and answer sessions. Interestingly enough, the American Business Communication Association Ad Hoc Committee on Evaluation of the Basic Courses has advocated that "the proportions of time devoted to platform speaking, interpersonal or small group communication, interviewing, dictating business messages, non verbal communication and psychology of communication should be increased."[5] This concern for broadening the scope of the course is evident in a December, 1978 article by Inman and Krajewski, who argue for "a broader focus on business communication ... the discipline cannot be viewed as written communication only."[6] The authors note that "a separate course in data communications should be developed" because of the changes that word processing and storage and retrieval systems are having on communications and writing in general. "The use of computers, xerography, videotape, television, and other technologies in concert, will offer infinite possibilities for information processing."

Ultimately, the challenge facing those planning technology curriculum is how to meet the increasing communication requirements, both oral and written, of students going out into industry. Initially, the challenge is to convince students that success on the job is closely related to effective communication skills. The course should help students become aware of their weaknesses and needs- in writing, speaking, and listening and motivate them to want to remedy these weaknesses. As a senior course, business and technical writing is the last opportunity students have to develop skills needed to cope with the paperwork explosion that modern technology has created for business and industry.

One has only to casually pursue newspapers and magazines to review how severe the communication crisis is, both in education and in industry. Because of the increasing number of topics that need to be covered in the course, we have only two choices in structuring the curriculum: (1) decrease class size to 20 students or less to allow practice in oral communication skills; or (2) an additional course in oral communication which covers topics which can be handled in a class room setting, giving slide presentations, delivering financial or technical information orally, making sales presentations, conducting interviews, conducting question and answer sessions, controlling tone when praising and reprimanding.

Clearly, the mandate is this: to advance, one must write well. Thus, our responsibility is to provide instruction to help the technology student apply his technical expertise through clear, effective communication and to provide him with the basic communication tools he needs for career advancement.

Dr. Elizabeth Tebeaux
10 Stonewall Jackson
Con roe, Texas 77301
Formerly College of Technology
University of Houston

NOTES

1. Homer Cox, "The Voices of Experience: The Business Communication Alumnus Report," Journal of Business Communication, 13 (1976), 35-46.
2. Richard M. Davis, "How Important is Technical Writing? — A Survey of the Opinions of Successful Engineers," Journal of Technical Writing and Communication, 8 (3) (1978), 207-216.
3. According to Cox's study, graduates indicated that they wrote memos and letters more frequently than reports: memos 32% of the time, letters 3^9%, short reports 26%, long reports 13°I~. Davis' survey indicated the course should include grammar and syntax, mechanics, style, tone, clarity, letters and memos, audience analysis, organizing reports, information retrieval, developing and writing drafts and finished documents.
4. For a workable method of incorporating library instruction into proposal writing, see my article, "The Importance of Following Up Library Instruction," Journal of Technical Writing and Communication, 9 (1) 1979, 27-32.
5. Thomas H. Inman and Lorraine Krajewski, "A Futuristic View of Business Communication,"ABCA Bulletin, December, 1978, 17.
6. An interesting appraisal of this situation in industry is made by Joseph A. Rice, "Johnny, the Grad You Hired Last Week, Can't Write," Supervisory Management, 21 (September, 1976), 14-21.

Technological Innovation in Cooperative Education at UNCC

The Department of Engineering Technology of The University of North Carolina at Charlotte (UNCC) and the Data Design Organization of the Western Electric Corporation are engaged in a cooperative education program which will enable employees of the company to earn a Bachelor of Engineering Technology (B.E.T.) degree in Computer/Electronics Engineering Technology. The program involves both on-campus and off-campus study, as well as use of several forms of electronic instructional aids.

The UNCC Department of Engineering Technology offers an ECPD accredited Computer/Electronics Engineering Technology program leading to the B.E.T. degree. Students are admitted to the program after they have earned an Associate of Applied Science degree in Electronics Engineering Technology at a technical institute or community college. Recent admittees have come from 25 North Carolina institutions, as well as from institutions in other states and other countries. A student who has completed all prerequisite course work upon admission will earn his B.E.T. degree after 64 semester hours (4 semesters) at UN CC.

The Data Design Organization, located in Winston-Salem, North Carolina, is responsible for preparation of technical documents for the Bell System Laboratories, Operating Companies, and its own divisions. The documents include Bell System Practices and Task Oriented Practices which are used by technicians throughout the Bell System for operation and maintenance of many complex electronic systems. The company has found that B.E.T. graduates are well qualified to document the Bell System equipment and procedures. By contracting with UNCC to offer the Computer/Electronics B.E.T. program to certain new employees, the company is able to recruit capable and ambitious men and women. These employees must possess an A.A.S. degree in Electronic Engineering Technology and must meet all other criteria for admission to the U NCC B.E.T. program in order to be accepted for this Western Electric program.

The first class of 25 students was admitted to the program in Spring 1978, and a second class of 28 students was admitted for the Spring 1979 semester. The program involves off-campus instruction for six spring and fall semesters and on-campus instruction for three summer sessions. During the three-year program, the students will complete the same course work as UNCC's full-time students.

During the spring and fall semesters, the students meet twice a week at the Western Electric facility in Winston-Salem. During the first session, they view video-taped presentation of lectures in two technical subjects. The video tapes were made the previous week during the live presentation of the lecture to UNCC's full-time students. During the second session of each week they receive a live lecture on the same two subjects by visiting members of the U NCC faculty. Hence, the students receive half their instruction live and half video-taped. A

• direct telephone line between the University and the Western Electric facility enables students to ask questions concerning the video-taped lectures. UNCC uses several TV cameras, including an overhead camera, in taping the lectures. UNCC and Western Electric are presently considering use of an "Electronic Blackboard." This device will permit an instructor at UNCC to write on a chalkboard with immediate transmission of his board work and voice to the

Winston-Salem facility, where it will be viewed on television monitors. If the device is adopted, its use will replace the videotaped lectures.

During the summer sessions, the Western Electric students travel by bus to the UNCC campus for two days each week. They take all of their laboratory courses, certain technical courses involving specialized equipment, and all their non-technical courses during these summer sessions.

This venture in cooperative education will enable about 50 employees of Western Electric to earn a B.E.T. degree in Computer/Electronics Engineering Technology while they support themselves and their families. It has enabled Western Electric to recruit qualified technicians who are ambitious to continue their education and to improve their value to the company. It is accomplishing both of these laudable objectives with a minimum increase in faculty and facility resources on the part of the University of North Carolina at Charlotte.

Edward M. Willis, Prof.
Acting Chairman, Engineering Technology
University of North Carolina at Charlotte

Books of Interest

Eisenberg, Anne. Reading Technical Books. Englewood Cliffs, New Jersey:
Prentice-Hall, Inc. 1978.

A guide to the reading of technical materials is much needed in today's world of technology. Where as books on the approaches to technical writing are numerous, technical reading has been neglected. Anne Eisenberg's textbook fills that void. Reading Technical Books is well organized and comprehensible. Its reading selections excerpt from the content of physics, chemistry, electrical and mechanical texts, metallurgy, industrial arts, data processing, and other sources used in technical courses. The first six chapters introduce the reader to basic patterns of technical reading materials: definition, example classification, contrast, cause-effect, and the application of these fine points to determining the main idea(s) of the selection. The next several chapters aid the reader in utilizing these six pointers in note taking, vocabulary building, and further development of technical reading skills. To aid the reader, there is included in each chapter an abundance of helpful questions, appropriate diagrams or illustrations, and exercises.

Sherman, Theodore A., and Simon S. Johnson. Modern Technical Writing, 3rd ed. Englewood-Cliffs, New Jersey: Prentice-Hall, Inc., 1975.

Sherman and Johnson provide the technical fields with a thorough reference guide to technical writing. They include discussion of writing style and organization in general, commenting on diction, sentence structure, organization, and mechanics. They deal in detail with the special problems of technical writing in

the preparation of technical articles, proposals, business correspondence, reports, and even oral reports. Effective utilization and presentation of tables, figures, charts, and graphs are extensively illustrated. Examples of writings are from actual documents, and the exercises at the end of each section aim to test the reader's skills. Recognizing that grammatically correct English is essential to appropriate technical writing, the authors include a "Handbook of Fundamentals" so as to provide convenient access to basic grammar and usage. The volume is comprehensive and practical.

Lillian Gottesman
Prof. and Chairperson
• English
Bronx Community College (CUNY)

Pearsall, Thomas E., and Donald H. Cunningham. How to Write for the World of Work. New York: Holt, Rinehart and Winston, 1978.

Pearsall and Cunningham in How to Write for the World of Work cover many types of technical and business writing. The book contains two units. One sets down uses and examples of employment letters, customer relation letters, and information reports, and explains how to accomplish each of them. The second unit emphasizes the principles underlying report-writing, occupational writing, reviews, and documentation. The basic theme of the book is that every piece of writing should communicate specific information to a specific reader for a specific purpose. The text gives ample treatment to major types of correspondence, report writing, and oral reporting that a person might expect to use on the job. Each chapter includes an introduction, a conclusion, and suggestions for applying knowledge. The text contains an extensive "Writer's Guide" with accompanying marking symbols, covering all major marks of punctuation, abbreviations, capitalization and common mechanical errors. There is a selective bibliography and information on metric conversion tables and on the proper use of the library.

Frederick J. Berger
Prof. and Exec. Sec., Tau Alpha Pi

Chapter News

ALPHA ALPHA (Southern Technical Institute): Alpha Alpha has an active membership of 24, and 22 additional qualified students have been invited to membership. Two members were honored for academic excellence: Bill Winters and Sheila Frazier were elected to appear in the 1978-1979 edition of Who's Who among American Universities and Colleges. Bill Winters received two other awards: "Engineering Technology Student of the Year" from the Engineers of Greater Atlanta; and "Industrial Engineering Senior of the Year" from the American Institute of Industrial Engineering, Greater Atlanta Chapter. The Alpha Alpha Chapter will continue operating a used textbook store which provides books for students. Proceeds will go for a scholarship fund designed to assist an academically successful but financially needy student. Officers: Bill Winters (President); Rickey Powers (Vice-President); Alan Layfield (Secretary-Treasurer); David Steele (Public Relations).

ALPHA BETA (DeVry Institute of Technology--Atlanta): Alpha Beta continues to provide DeVry students with files of practice tests so that students can diagnose their weaknesses and improve their scholastic performances. Officers: Steve Kittel (President); Luke Peters (Vice-President); Pete Fair (Secretary-Treasurer).

BETA ALPHA (Academy of Aeronautics): The eighteen members of Beta Alpha have been active in assisting students in many ways. They have provided tutorial help to freshman during final exams and academic advisement to freshman undecided about appropriate curriculum. They have established a library consisting of course texts that are made available to students on loan basis. In addition, they established a Great Teacher Award. Future plans call for setting up a Contingency Fund to help students in temporary need of carfare or lunch money, with the understanding that a student may draw on such help only once. The chapter plans also to have a workshop on exam-taking techniques in an effort to promote the academic success of fellow students. In order to make the chapter more visible to the college community, the members are planning to wear sweaters bearing the Society's emblem. Officers: Owen Fred Palmer (President); E. Lonnie Bolbasis (Vice-President); Henry Baez (Treasurer).

BETA GAMMA (Queensboro Community College); Beta Gamma provides a student assistance program for Civil Technology, Electrical Technology, Mechanical Technology, and Pre-Engineering students on the campus. Members of the chapter devote ten hours during the semester to help other students. The student assistance program is the first step towards helping to advance students' academic achievement in all technology courses. Officers: John Li (President); Ed Hanzel (Secretary); Maria Higgins (Treasurer).

BETA DELTA (Bronx Community College of the City University of New York): Beta Delta members served as ushers at the inauguration ceremonies of President Roscoe C. Brown, Jr., who was installed as Bronx Community's third president. In addition, they are in the process of developing criteria for the selection of colleges and universities where they can further their formal education. They are working also on the most effective format for résumés. The Tau Alpha Pi medallion in recognition of scholarship and leadership qualities was presented by the

Executive Secretary, Professor Frederick J. Berger, to Mr. Jose Torres, who plans to continue his education in the field of electrical technology.

BETA EPSILON (Hudson Valley Community College): Beta Epsilon initiated thirty students in October, 1978. Since its inception in 1975, the chapter initiated 161 students. Future plans call for greater involvement in college and community activities. Officers: Thomas Jablonski (President); Keneth Lenseth (Vice-President); Anthony Frazzo (Secretary and Public Relations Officer).

BETA **ZETA** (College of Staten Island): Beta Zeta held several guest-lecture programs. Included in these were speakers from Consolidated Edison, C.W. Post, Loral Electronics, General Electric Narda Microwave, and Tektronics. In addition, chapter members visited local industrial and commercial facilities, such as Grumman Corporation. The chapter initiated its new members on January 9, 1979. Professor Federick J. Berger, Executive Secretary, was privileged to attend and deliver the keynote address. In attendance were President Volpe, who delivered and inspiring talk; Dr. Cardegnas, Vice-President; Dr. Weiner, Chairman of Electrical Technology; Prof. Tufano, Chairman of Mechanical and Civil Technology; and about 1 5 representative faculty. Officers: Alice Christensen (President); James Soussounis (Vice-President); Marien C. Monti (Treasurer); George Falcone (Secretary); Jeffrey Birch (Public Relations).

BETA THETA (Broome Community College): Beta Theta initiated eight students and honorary member. The initiation was attended by Terry A. Cline, Vice-President of Academic Affairs, who was the principal speaker. Officers: John C. Barron (President).

BETA IOTA (Rochester Institute of Technology); Beta Iota held its first initiation ceremonies in May, 1978 and admitted twenty-nine members. Officers: Richard S. Bird, Jr. (President); Daniel Tarshus (Vice-President); Patrick Polasek (Secretary); Mark Johnson (Treasurer).

Beta Delta chapter (Bronx Community College); Prof. Frederick J. Berger presents Tau Alpha Pi Medallion to Mr. Jose Torres.

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GAMMA BETA (University of Dayton): Gamma Beta initiated 36 new members. The initiation and banquet were scheduled for March 23. The chapter would welcome suggestions on how to make initiation ceremonies more newsworthy and prestigious. Officers: James Globig (President); John Gutwein (Vice-President); Michael Holleran (Secretary-Treasurer); Kristen Keller (Public Relations).

GAMMA EPSILON (Ohio Institute of Technology): Gamma Epsilon initiated twenty-one students on March 28, 1979. Since its inception in 1978, the chapter initiated 47 students of whom nineteen are now alumni members. Gamma Epsilon is proud to announce its first lady member Martha Fisher who is majoring in electronic technology. Future plans call for greater involvement in college and community activities. Officers: Michael John Warfield (President); Mark Blood (Vice-President); John B. Wronosky (Secretary); Timothy Dimeglio (Treasurer).

DELTA ALPHA (Wentworth Institute of Technology): Delta Alpha admitted Wentworth's B.S.

degree students to Delta Alpha. The chapter initiated a tutoring program on campus. It raised $394 dollars for the "New England Home for Little Wanderers," an orphanage. It plans social functions with other honor societies in the Boston area. It will conduct blood drives on campus in conjunction with the American Red Cross. Officers: Michael Pedersen (President); Richard Hamm (Vice-President); Amy Rathbun (Secretary); John Russo (Treasurer).

DELTA BETA (Northeastern University): Delta Beta is in the process of designing its banner. It plans to become more involved in college and community activities. Officers: George M. Rogers (President); Gary L. Snell (Vice-President); Thomas P. Shipione (Vice-President); Thomas A. Wriblewski (Treasurer); Dave Beinado (Secretary).

EPSILON ALPHA (Missouri Institute of Technology): Members of the chapter have been offering free tutoring services and study-hints seminars to all interested students on campus. Officers: Conrad Proft (President); Jeff Brower (Secretary-Treasurer).

ZETA ALPHA (College of Technology, University of Houston): Zeta Alpha developed an instrument to be used in student evaluations of faculty. This instrument records student responses to twenty-four items relating to instructional activities in classroom and Laboratories and renders possible a computer printout of the ratings of faculty performance. This information (plus other relevant information) was used to select a faculty member for the Teaching Excellence Award. Faculty and students responded to the utilization of this instrument with interest and enthusiasm. The chapter will share information with interested persons. The chapter expects to continue this project and would welcome suggestions as to how to improve the process. Officers: Stephen J. Williamson (President); Ikey D. Penny (Vice-President);Johnny F. Gor (SecretaryTreasurer).

ZETA BETA (DeVry Institute of Technology): Zeta Beta installed its officers: Bill Wesson (President); Richardo Salazar (Vice-President); Steven Trinkle (SecretaryTreasurer).
ZETA DELTA (Texas Tech. University): Zeta Delta established an initiation week in

order to bring the chapter members closer together and to select those new initiates who proved to have the required leadership and character qualifications. The chapter plans to institute a tutoring service. It hopes to construct a plaque with the Tau Alpha Pi emblem. It seeks to improve the Engineering Technology Library system. Officers: Barry Barrs (President); Lee Whetsel (Vice-President); Tim Still (Secretary).

LAMBDA BETA (Thames Valley State Technical College): Lambda Beta installed new officers: Carleen Murphy (President); Norman Picard (Vice-President); James Bovia (Secretary-Treasurer). The chapter plans fall and spring induction ceremonies and the chapter banquet in May, 1979.

LAMBDA GAMMA Hartford State Technical College); Lambda Gamma is a new chapter chartered in April, 1978. It plans to assist in the orientation program for incoming freshmen. Officers: Anthony J. Rickie (President); Joseph E. Seymour (Vice-President); Deborah A. Napier (Secretary-Treasurer).

MU BETA (Clemson University): Mu Beta holds review sessions for all interested engineering technology students. The topics covered include basic engineering technology course work and relevant mathematics and science. Officers: Scott Ci If ii Ian (President); Avinash Kotecha (Secretary-Treasurer).

Xl ALPHA (California Polytechnic, University, Pomona): Xl Alpha reports that one of its members, Rodger C. Tracy, who graduated from Cal Poly in 1973, was named School of Engineering 1978 Distinguished Alumnus of the year. A Senior Sales Engineer with the Hewlett-Packard Company, Rodger Tracy was named Outstanding Salesman of 1977. Rodger Tracy was one of the charter members of the chapter. Officers: Robert Ramsey (President); Christina lorio (Vice-President); Lance Underwood (Secretary-Treasurer).

Omicron Delta Chapter (Stevens Institute of Technology); Chartering March 3, 1979.
Back row left to right: Prof. Joseph DeGuilmo, Zoltan Szoloszy, Prof. Frederick J. Berger, John W. BeckJ r., Nicholas Matropierro, viet T. Nguyen, Jairo J. Florez, Dr. Joseph J. Moeller, Jr.
Front row left to right:Eugene Victori, Hector S. Abelairas, Naranbhai R. Patel, Raul Sevillano, Luis vega, Horst Gllch.

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OMICRON DELTA (Hudson County College--Stevens Institute of Technology):
Omicron Delta was established at Hudson County Community College, Stevens Institute of Technology, on March 3, 1979. It initiated 12 members, who named Dr. Joseph J. Moeller, Jr., director of the electronics technology programs and assistant dean for educational development at Stevens, honorary member to the Society. He delivered the keynote address, and was followed by Professor Frederick J. Berger, Executive Secretary of Tau Alpha Pi, who granted the charter, initiated the members, and addressed the guests. Professor De Guilmo, who is faculty adviser and sponsor, and Mr. Zoltan Szollosy assisted. The reception was well attended by about fifty guests, including faculty, initiates, and their friends. Reports of the ceremonies appeared in the Jersey Journal. Officers: John Beck (President); Luis Vega (Secretary-Treasurer).

Pi ALPHA (Purdue University): P1 Alpha publishes a monthly "Engineering Technology Newsletter" to inform students of latest developments. It prepares a resume' book on graduating engineering technology students which is utilized by industry in its search for personnel. The chapter publicizes the significance of the society by maintaining an extensive display cabinet in a major corridor. It coordinates the annual banquet and induction ceremony each spring. After the fall semester, chapter members select the recipient of the $1000 department teaching award. Seventeen students were inducted last spring. The plaque that initiates receive in addition to the certificate and key is constructed by the chapter. Future plans call for information of current activities and for even greater visibility within the School of Technology. Officers: Robert Ertel (President); Paul Manicke (Vice-President); William Skidmore (Secretary-Treasurer).

Pi Alpha Chapter (Purdue University, West Lafayette); Large Wooden emblem displayed in Tau Alpha Pi showcase.

RHO ALPHA (Colorado Technical College): Rho Alpha is sponsoring trips to the NCR semiconductor process control facility in Colorado Springs and to the solar energy manufacturing plant in Denver. In addition, the chapter invited several guest speakers during the year. On February 2, 1978 the chapter admitted its first two female members: Sue Medoris, who received her A.A.S. in Engineering Technology in March, 1978, and was awarded a part-time scholarship by Colorado Tech. College; she is employed by Digital Equipment Corporation. Debbie Risvold received her A.A.S. in Solar Engineering Technology in March, 1978, and was awarded a full scholarship by Colorado Tech. College. Officers:
John Schnase (President); Kirk Bailey (Vice-President); Richard Taylor (SecretaryTreasurer).

RHO BETA (University of Southern Colorado): Rho Beta initiated sixteen new members on February 9, 1979, and installed its officers: Michael Roy Eckley (President); Mary McKinley (Vice-President); Richard Castro (Secretary-Treasurer).

SIGMA BETA (University of Central Florida): Sigma Beta was established on April 20, 1979. On this date the initiation and chartering took place. Thirty-one members were initiated, including faculty advisers and alumni members. Dean Kersten is an honorary member. The banquet was well attended by about 70 guests. It was an impressive event. The invocation was delivered by). W. Hubler. The major addresses were delivered by Dean Kersten; Dr. R. C. Denning, sponsor of Sigma Beta chapter; and the Executive Secretary of Tau Alpha Pi. Officers: Edward L. Arcemont (President); Michael L. Johns (Vice-President).

CHI ALPHA (Vermont Technical College): Chi Alpha participates in college activities by providing the structure of the Electrical Engineering Technology curriculum. Officers: Ronald Piro (President); Richard Fisher (Vice-President); Gregory Bishop (Secretary-Treasurer).

OMEGA ALPHA (New Mexico State University): Omega Alpha was chartered on May 5, 1978. A news release announcing the event appeared in the Las Cruces Sun News and the El

Paso Times. The ceremonies were conducted by Professor James P. Todd, chairman of the Engineering Technology department at California State Polytechnic University (Pomona), who delivered the address and helped initiate members. On November 5, 1978, the chapter initiated seven new members and an honorary member. Mr. Paul Klipsch, the inventor of the "Klipsch-horn," was the guest speaker. The chapter has been holding free tutoring service two nights a week. It plans a visit to the local high schools to promote the engineering technology program. Officers: Mark D. Stephens (President); Robert C. Tillman (Vice-President and Treasurer); James Moore (Secretary).

ALPHA DISTRICT of COLUMBIA (University of District of Columbia): Alpha was established on May 4, 1979. On this day the initiation of 33 members and chartering took place. The banquet that followed was well attended, and the event was impressive. Prof. Frederick J. Berger delivered the keynote address. Officers: Shelly Hall (President); Inwang-Vine Albert (Vice-President).
President of Alpha - D. C. Shelley Hall presenting certificate and key to charter member Barbara Winblade as Executive Secretary Professor Frederick J. Berger and Sponsor of chapter Prof. B. P. Shah wait to congratulate recipients of key and certificate.

Honor Roll

The officers and members of Tau Alpha Pi National Honor Society hail and greet the following affiliate chapters newly elected during the year of 1980-1981. We congratulate the institutions for having the foresight to. initiate affiliate chapters of Tau Alpha Pi at their respective campuses. We congratulate these charter members and say to them that they should be proud of their designation, for Tau Alpha Pi National Honor Society for students in Engineering Technology is the most selective of all honor societies, accepting only the top 4% of all technical students enrolled at a college or university.
We hope that the charter members will establish a solid and firm foundation so that those who follow them will be able to build upon it. Our best wishes for success in the endeavors of Tau Alpha Pi.

Frederick J. Berger
Executive Secretary
Tau Alpha Pi

GAMMA DELTA CHAPTER
Chartered May 9, 1978, Franklin University; Dr. James D. McBrayer, Sponsor

Charter Members
Larry A. Grove
Linda Cuthrie
David F. Latimer
Gary L. Meyer
David A. Scott
Briam L. Shaffer
Gene W. Thorne
Gary L. Young

GAMMA EPSILON CHAPTER
Chartered November 30, 1978, Ohio Barry Barton Brey, Faculty Advisors.

Charter Members
Donald Joseph Vogt
Ronald W. Wilcox
Thomas C. Dormo
Timothy Dimeglio
John B. Wronsky
Mark L. Blood
Michael John Warfield
Institute of Technology; Ira Jay Scheer,
James W. Kenst
Marc William Reed Salverson
P. Palumbo
James A. Petrucci
Richard Lamar Riney, III
Douglas Karl Oath
Daniel Vincent Hauek

UPSILON ALPHA CHAPTER
Chartered May 19, 1978, Northern Arizona University; Dr. Gerald E. McClothin,
Sponsor.
Charter Members
W. Kent Scarborough Richard W. Hughes
John Roberts
Bob Whitcraft
David Craig

Ronald Dean Fox
Steven A. Miller
Michael Lee Hackett
Kurt B. Tweedy
Duane Arthur Dildine
Ross A. Ouwinga
Wayne A. McKenzie
Glenn Ray Eubank
Leonard Zwik
David Michael Baczewski

Xl BETA CHAPTER
Chartered February 15, 1979, Northrop University; Robert C. Thornton, Sponsor; Rene Mulders, Faculty Advisor.
Charter Members
Timothy Boersma
Jorge Garrido
Hampton Kau
Mames Wasson
loakim Marsellos
John Salmon
Mark Swanigan
Harry Zisko

XI DELTA CHAPTER
Chartered March 28, 1979, California State Polytechnic University, San Luis Obispo; Wallace Reynolds, Sponsor; Fred S. Friedman, William J. Phaklides, Willis Arnold Finchum, William R. Backer, Faculty Advisors.
Charter Members
Bruce Krainbrink
Dennis C. Lashmet
Andrew J. Caratenuto
Larry S. Butland
Nathan Lawson
James R. Ehrenberg
Albert P. Pepe
Thomas Kay
Philip L. Bean
Michael J. Fiorito
Val C. Gibbons
Barbara B. Parton
Jerold D. Peek
Michael C. Desmond
Ted M. Ryan
Kenneth W. Yep

Thomas C. Yu

OMICRON DELTA CHAPTER
Chartered March 3, 1979, Hudson County Community College Commission, Stevens Institute of Technology; Joseph M. DeGuilmo, Sponsor; Dr. Joseph J. Moeller Jr., Faculty Advisor.
Charter Members
Hector S. Abelairas
Eugene Victori
Naranbhai R. Patel
Raul Sevillano
Luis Vega
Ronald Lee Comfort
Charter Members
Richard A. Kinney
Clifford W. Spryka
William R. Wajvoda
Michael Mercier
John W. Beck Jr.
Viet T. Nguyen
Nicholas Matropierro
Horst Gilch
Richard M. Stut
Jairo J. Florez

Pi DELTA CHAPTER
Chartered May 14, 1979, Purdue University Calumet Campus; Dr. Lawrence J. Wolf, Sponsor; Dr. Charles Miller, Thomas Yackish, Phillip Perkins, David Rose, Ralph Bennett, Faculty Advisors; Dr. Row W. Reach, Honorary Member.
Richard A. Sawyer
James C. Russell
Steve A. Wajvoda

SIGMA BETA CHAPTER
Chartered April 20, 1979, Universityof Central Florida; Dr. Richard C. Denning, Sponsor; Dr. Robert D. Kersten, Dr. Clarence M. Head,Trevor Colbouin, Harold L. Griffith, King W. Osborne, J. W. Hubler, Barry Bullard, John C. Debo, Bruce Holbaugh, Faculty Advisors.
Charter Members
Paul D. Zwick
James A. Wattwood
Timothy R. Herb
Eric W. Demmer
Nicholas R. Restivo
Philip E. Hooper

John C. Royal
Gary M. Hopkins
Kenneth R. Wicks
Bernard A. Phillips
Michael C. Schwarz
Bobby R. Mills
Michael K. Johnson
Edward L. Arcemont
Aaron J. Penkacik
Gary L. Karel
Michael L. Johns
Kenneth A. Carper
Charter Alumni Members
Gregory Bielanski
David J. Dibler
Howard F. Dixon Jr.
Roger P. Cauvin
Alan M. Hammock
James R. Howell
Charles Miotke
Nicholas N. Panasis
Jill A. Spence
Kenneth Harland

ALPHA-KENTUCKY CHAPTER
Chartered May 4, 1979, Murray State University; Prof. James C. Weatherly, Sponsor; John R. Farell, Robert W. Jones, Thomas R. Begley, William J. Whitaker, Faculty Advisors; Kenneth W. Winters, Honorary Member.
Charter Members
Jennifer P. Cray
Don Futrell
Mehdi M. Hashemi
Mark K. Donohoo
Donald K. Haneline
Clyde P. Williams
Larry V. Dages
Cregory A. Williams

ALPHA-DISTRICT OF COLUMBIA CHAPTER
Chartered May 4, 1979 University District of Columbia; Prof. Phupendra P. Shah, Sponsor; Dr. Philip Brach, Dr. Edward L. Walker, Prof.J. Bhambri, Faculty Advisors.
Charter Members
Shelley L. Hall
lnwang-Vine Albert
Richard Ford

Derrick T. Jones
Sani Musa
Darrell Shields
Olukayode Fakilede
John F. McMahon
Theodore E. Poliakoff
Frederick Jackson
Melvin D. Pottillo
Augustine 0. Medu
Barbara Winblade
Man mohan S. Arneja
Angelo M. Baamlong
Moses T. Asom
Michael 0. Ingram
John M. Reed
Jagdish P. Bery
Irving Lessin
Arthur H. Bunyan
Richard Hawkshawe
John O.Olateru
Dinesh K. Sharma
William F. Campbell
Abbagan Abbazana Kellumi
Carth A. Licorish
Korede Samson
August J. Nechi
Manickam S. Chettiar
H. Arnold Craft
Knox Tull

Collegiate Chapters of Tau Alpha Pi National Honor Society for Engineering Technology

ALPHA ALPHA CHAPTER
Southern Technical Institute
Clay Street
Marietta, Georgia 30060
Dr. Robert Fischer

AlPHA BETA CHAPTER
DeVry Institute of Technology
828 W. Peachtree Street, N.W.
Atlanta, Georgia 30308
Prof. John Blankenship

BETA ALPHA CHAPTER
Academy of Aeronautics
La Cuardia Airport
Flushing, New York 11371
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