1.3.59

PRELIMINARY REPORT OF THE TECHNICAL PLANNING COMMITTEE OF THE ENGINEERS JOINT COUNCIL, SUBMITTED ON NOVEMBER 17, 1961

AREA OF STUDY

In the beginning of 1961 the Technical Planning Committee was formed. The charge to the Committee was to suggest action that may lead to the avoidance of duplicative effort, reduction in total number of meetings, and better service to engineers generally. The Committee was also expected to provide leadership in bringing the societies together in new technical areas of common interest at an early stage to provide maximum service with minimum duplication.

Thus, in an atmosphere of concern about duplication of efforts, overlapping schedules, doubtful economics, vested interests, society growth and splintering, the Committee was challenged with increasing the efficiency and effectiveness of the flow of technical information. The Technical Planning Committee is not alone in its concern with this area of technical society activity. Other Committees of similar nature have been formed and close cooperation with them has been maintained so that any benefits to be derived from their conclusions would automatically be included in the final report of this Committee. The groups studying possible actions were:

1. Pendray & Company for the Guggenheim Foundation - "Technical Meetings in the Flight Sciences." This study included ASME, SAE, AIChE, IRE, ARS, IAS, ISA and AIEE.

2. Ad Hoc Planning Committee consisting of representatives from ARS, IAS, SAE, ASME and EJC as an invited guest.

3. Long-range Planning Committee of the IAS.

4. Aircraft Industry Association - A study of the scientific and technical societies in the aero-space field. (APPENDIX A)

SCOPE OF THE PROBLEM

Originally, the charge to the Committee was loosely interpreted as a study of the opinion, "There are too many technical society meetings." The Committee must bluntly admit that it has not been able to study or resolve this interpretation of the question. The reasons are:

a. There is no available record of the total number of meetings. The money and time resources of the Committee would not permit a study of sufficient size to determine the trend in the number of meetings. Such data as exist are fragmentary, covering small segments of the total technical society spectrum and/or limited periods of time.

b. Some categorization of the objectives of society meetings would be necessary to determine their worthwhileness. It became clear that certain types of meetings - i.e., annual meetings - are sacrosanct and would not fall within the Committee's influence, since no plan of action would change the number of these meetings greatly. Also, meetings of narrow range of interest can be evaluated only by a minority.

c. Viewpoints vary with the individual. For example, the high-level speaker who is called upon frequently and repetitively may easily arrive at the conclusion that "there are too many meetings."

Previous studies have shown that from the very origin of technical societies one of the principal objectives was the reading and discussion of professional papers and the publication of the knowledge thus obtained. (APPENDIX B) It is indicated, by this objective, that meetings can be more fruitfully studied in the context of the total process of information flow, rather than as a separate activity. (FIGURE 1) When viewed in this context, it is hazardous to isolate one form of activity and arrive at the opinion that "there are too many meetings."

Government, Industry and Education generate new knowledge which is circulated within the society machinery. The factors determining the number of meetings are, obviously, very complex.. The motivations and the pressures that create or cause a demand for dissemination of knowledge are many. Five major interlocking meeting-generating forces can be identified: the educational system, the society structure, publication policies, industry demands and foreign relationships. The effectiveness of the motivation can be quickly recognized. If the problem were simply "too many meetings," holding no meetings at all and printing the various papers directly would be a complete solution. This process has no validity because of the pressures acting on the society.

Various trends indicate that there has been an increase in the number of meetings. (APPENDIX C) Information flow is undoubtedly reflected in the trends pictured in FIGURE 3. The U. S. population has been increasing over the past 10 years at the average rate of 1.5% per year. Technical societies have increased at the rate of 2.25%. Industrial laboratories, growing at the rate of 5% per year, have been creating much information of interest and value to the members of technical societies. The technical working force closely matches this output, since it has been growing at the rate of 6.5% per year, and the technical society membership follows again at the average rate of 7% per year. The output of standards also has been on the rise with ASTM standards, for example, increasing 5.5% per year and ASA's output going up at the average rate of 7.5%. Research and development dollar expenditures have been increasing at an average rate of 13%. If technical society membership and the professional working force have been growing at twice the rate of that of the number of technical societies, it could be concluded that the number of meetings per society to serve this growing interest in the flow of knowledge would be more than doubled.

It has been noted previously that the society mechanisms have an inherent obligation to the author of the paper to print his works in some publication. In reverse, the growth rate of publications would indicate that the number of meetings had increased. From FIGURE 4, the number of scientific journals appears to rise at a prodigious rate.

A NEW PERSPECTIVE

The Committee now sees as its challenge and problem the providing of a plan of action, the result of which would be more meetings of the right kind, at the right place. This reorientation evolved from:

a. Consideration of the small amount of useable data.

b. Conclusions drawn in similar studies.

c. Identification of the activity of "meetings" as an integral part of information flow.

d. Review of the growth rates of selected factors contributing to the increase in and dissemination of technical knowledge.

Our PLAN OF ACTION has three parts:

a. Identifying the interest patterns of the technical, scientific and professional society members.

b. Developing a program for designing meetings including intersociety identification language to fit the interest patterns.

c. Centralizing and mechanizing the planning of meetings.

PLAN OF ACTION

Retrieval of technical information is a problem which is occupying the attention of technical societies, government, business and many others. The Committee recognized many similarities in the problem with which they were faced and the difficulties in the retrieval field. This recognition reinforced the concept that the planning of meetings was a portion of the over-all system of information flow. Fortunately, much of the planning done for information retrieval is directly applicable to the planning and control of technical meetings. (APPENDIX D)

> (Extract from APPENDIX D - "Information Dissemination," The American Engineer, November 1, 1961. The problem of information retrieval is like Jonah swallowing the whale. "Information retrieval is like picking a pebble out of an avalanche. As surely as the first dislodged rock in an avalanche can pull down the side of an entire mountain, so has the volume of scientific publications grown at a geometric rate, with the engineering profession at the bottom of the hill, becoming buried ever deeper in the mounting volume of information.")

Identifying the Interest Patterns of Technical, Scientific and Professional Society Members:

It seems reasonable to assume that members attend technical society meetings that fall within their interest patterns. Thus, to plan meetings the interest patterns must be identified. (FIGURE 5) The minimum number of variables required to satisfy the description of a member's interest patterns are: (a) proficiency, (b) function, and (c) area of application. (APPENDIX J) The standards for interest pattern identification have been developed by the Engineering Specialties Advisory Committee. Standard terms are agreed upon to insure uniformity.

Proficiencies consist mainly of engineering curricula accredited by ECPD. Areas of applications, as the name implies, are designed to identify broad areas of engineering work within which engineering proficiencies are applied. The composition of this list is based mainly on clearly identifiable interest patterns of groups; e.g., (1) names of technical societies, (2) names of large segments of technical societies and, as a minimum dimension, (3) names of committees within a technical society. As developed, the listings of areas of applications are those which are derived from member societies of EJC, plus IRE. The list can be expanded.

The function is an activity performed by engineers which attempts to identify the method by which the proficiencies are applied; e.g., consulting, research, teaching, sales, etc. No standard has been developed for this as yet. However, the value of all of these listings is the fact that they will be reproducible by reference to standard sources. It is proposed that Engineering Specialties listing as developed for the Manpower Commission be used as the exclusive and bounding dimensions for describing the subject matter of meetings.

Leadership is now being exhibited in the designing and planning of meetings by recognition of interest patterns. APPENDIX K illustrates the ASME separation of technical meetings from those concerned with administration. APPENDIX L spells out the ASCE concept of designing meetings to patterns.

Program for Designing Meetings to Fit Interest Patterns:

The Committee has carefully avoided the use of the word "Quality" with respect to technical meetings. In the present state of social understanding and communication, the quality of a meeting, or the papers from which the meeting is composed, is not definable. It is an elusive, subjective opinion which is covered by Likert's Formula. (FIGURE 6) Professor Likert of Michigan has noted many times that success, satisfaction, quality, etc., is the ratio of realization to expectation. Both factors in this formula are personal.

Therefore, the Committee has resorted to an analogy to illustrate that some identification of papers and meetings would be helpful in satisfying the spectrum of human expectations and realizations that come from attending a technical meeting.

Color is a subjective experience. Recent technical writings on this suggest a mathematical solution, but through the years the identity of color has been crudely specified by various methods - a prominent one being the Munsell System. The three dimensions of color - hue, chroma and saturation - are comparable to dimensions that might be applied to papers which in the aggregate make up meetings. These dimensions might be termed: (a) the subject, (b) the scope, and (c) the level of sophistication. (FIGURE 7)

Details of these dimensions are shown in FIGURE 8. The subject would come directly from the listing of the areas of interest previously described. The overall subject herein depicted as covering 360 degrees may be devoted to a comprehensive subject, such as chemistry, or the entire 360 degrees can be devoted to a small segment of a subject; i.e., very specific. In the words of the information retrieval experts, the subject may consist of the principal wording, together with "enriched co-ordinates." A system has been developed by the American Institute of Chemical Engineers in their Chemical Engineering Thesaurus which is described as "a wordbook for use with the concept co-ordination system of information storage and retrieval." A standard thesaurus for any particular discipline of engineering can be developed and should be developed in order to provide a standard language to be used in describing the subject of papers and meetings.

Scope is visualized as a scale of "complexity." For consideration, the key submitted has (a) advanced technology, (b) contemporary technology, (c) systems, (d) products, (e) materials, (f) environment. This scale identifies the treatment of the subject; i.e., the degree of coverage - the breadth of subject matter which the meeting is designed to embrace. This, at the present time, has been arbitrarily developed and it may take more terms to match the interest patterns. The scope differentiates between a "picture-window" view and a macroview.

The level of sophistication is the scale which heretofore generally has been lacking in designing meetings. This provides a dimension that describes the meeting in terms of the ability of the participants or attendees to comprehend the subject matter. Every editor of a technical publication knows that half of his audience find the articles to be too complicated and half find them lacking in substance. Many examples can be cited where attendees at meetings have been disappointed because they anticipated a high-level paper full of mathematics and found that, instead, it was devoted to a product or description. The use of the scale level of sophistication would alleviate the interscheduling of mismatched meetings.

The scale as submitted is geared to the categories that correspond roughly to academic proficiency compounded with experience. The "forward look" is provided by having a level of sophistication exceeding the academic level represented by the present PhD.

For example, a meeting could be designed on the subject of gyroscopes as they are employed in systems and pitched at a level which would be most acceptable to PhDs. Or, a meeting could be designed on gyroscopes having only to do with the ball bearings and their method of maintenance, this to be designed for the level of sophistication and interest represented by technicians.

Such a system can be developed to describe the entire spectrum of possible meetings in the same sense that an identification system such as the Munsell can be used to identify the complete spectrum of color.

Educational institutions, in effect, now use such a system for designing their "meetings," (i.e., the flow of information through the classroom.) APPENDIX M is self-explanatory, since the subject, scope and levels of sophistication are indicated. If educational meetings can be designed, technical meetings can be designed also.

Mechanizing the Planning of Meetings:

The Committee conceives a central source as a control for the scheduling of meetings. This is necessary in order to (a) give feedback to the many sources where meetings are designed, (b) prevent duplication, (c) reduce overlap in terms of character of the meeting, (d) improve timing of meetings, and (e) control geographic dispersion. Preliminary attempts by the Committee to construct a pattern of meetings have resulted in the belief that the use of a computer or some mechanical information retrieval mechanism is indicated.

Much literature is available on the subject of information retrieval. (APPENDICES D and G) A rough parallel is the scheduling procedure used by the airlines in determining reservations in planning their flight schedules. Consultation with representatives from computer manufacturers indicates that such an elaborate system would not be needed, since information retrieval need not be instantaneous; i.e., there could be a time lag between input and output. The need for identification of the interest pattern and a program for designing the meetings is obvious when considered in the context of the central source concept.

This portion of the suggested program is in its early stages of study, but those familiar with the use of computers for information retrieval believe that a standard product would probably fit the needs of the technical societies for scheduling their meetings. The size is dependent, of course, on the number of technical societies participating. The Committee has restricted its concept to those societies which constitute EJC and IRE.

ECONOMICS AND MOTIVATIONAL POTENTIALS

The Committee believes that it has described above a procedure which would theoretically help to attain all of the objectives delineated in the charge to the Committee. The "bell" has been designed. But, how to put the bell on the "cat" is still to be determined. Throughout its study, the Committee has been impressed by the lack of interest in cooperative effort except where there have been strong common interest patterns; i.e., the ARS and the IAS. Assuming that there will be more and more meetings and they are better and better attended, it seems obvious that the value of the information flowing through these channels more than offsets the value of the influences which tend to deter the number of meetings. The value in making the meetings better, in terms of dollar economics or in terms of motivation for cooperation, is yet to be determined. Another facet of this problem is indicated by the policy of the American Chemical Society which is determined not to cooperate since their own internal problems of properly utilizing the flow of information are of such magnitude that any cooperative efforts are simply considered to be a dilution of the dollars, manpower and time available to them.

The airlines publish monthly a complete catalog of airpline schedules for all airlines. A publication resulting from the above program might be summarized in a monthly booklet indicating the meeting schedules for all technical societies. Such a concept has met with negative response, since there is no society which has an interest pattern extending across a very wide spectrum. The industrial firm of Deutsch & Shea made a market survey for a similar compendium, thinking of large industrial companies as the principal customers. Their market survey was negative and the project was abandoned.

This portion of the report is included to illustrate the fact that the concept of the program includes making it work with such a high degree of speed and precision that its true value would be reflected to the members of the societies in terms of making dollars available and generating a true spirit of cooperation.

SUMMARY (FIGURE 9)

In summary, the Committee's Report consists of:

1. Charter of Committee reoriented.
2. Meetings are an integral part of information flow system.
3. Basic methodology of information retrieval suggests useful techniques.
4. System of meeting specifications developed.
5. Centralized meeting programming possible with computers.
6. Economics and motivational potentials need evaluation.

Respectfully submitted,
Technical Planning Committee

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O. S. Knight
J. J. Manning
G. A. Marston
E. C. Shuman
B. R. Teare
W. B. Wilkins
C. F. Savage, Chairman

CHARTS

FLOW OF KNOWLEDGE

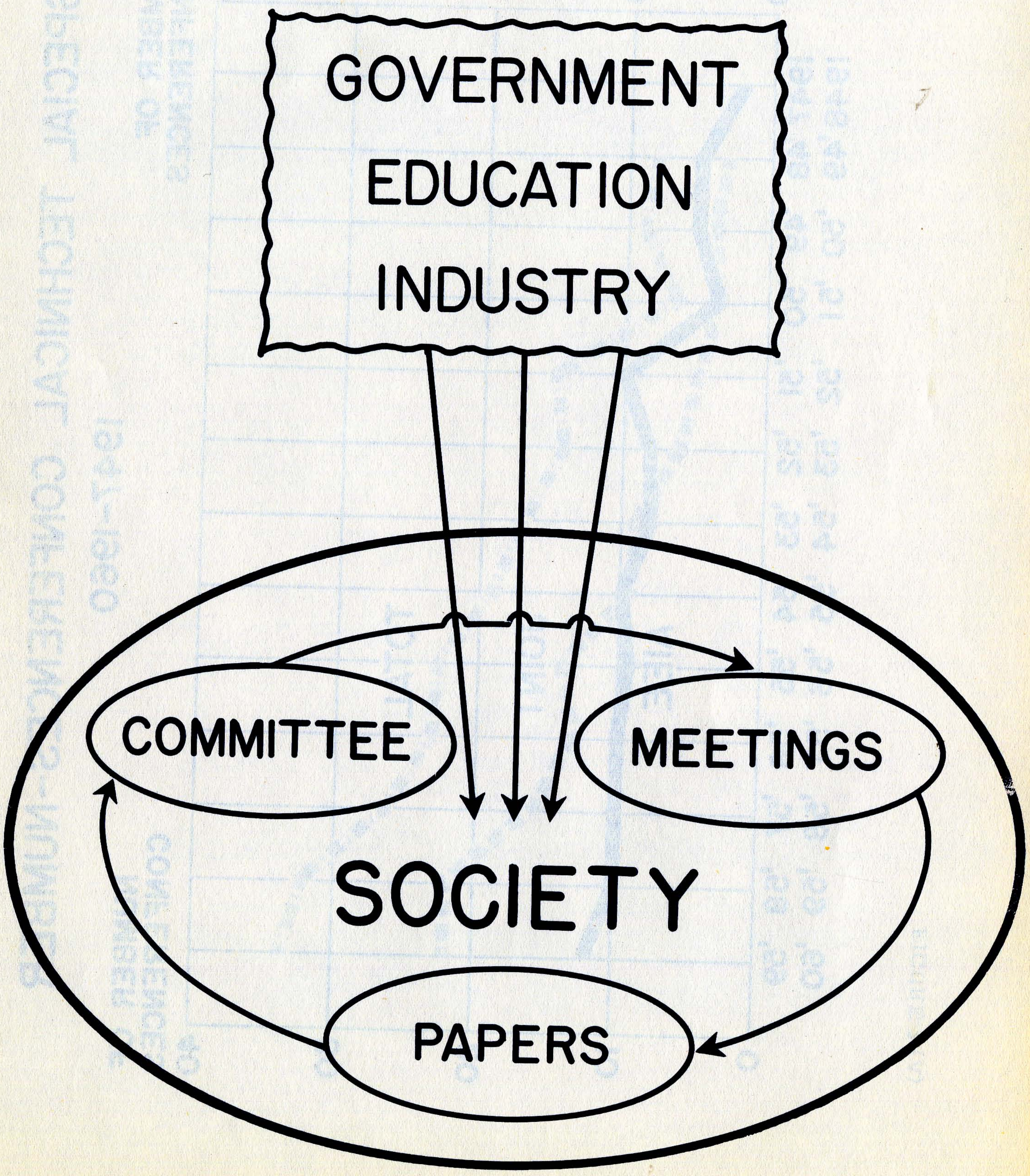


FIGURE 1

SPECIAL TECHNICAL CONFERENCES-NUMBER
1947-1960

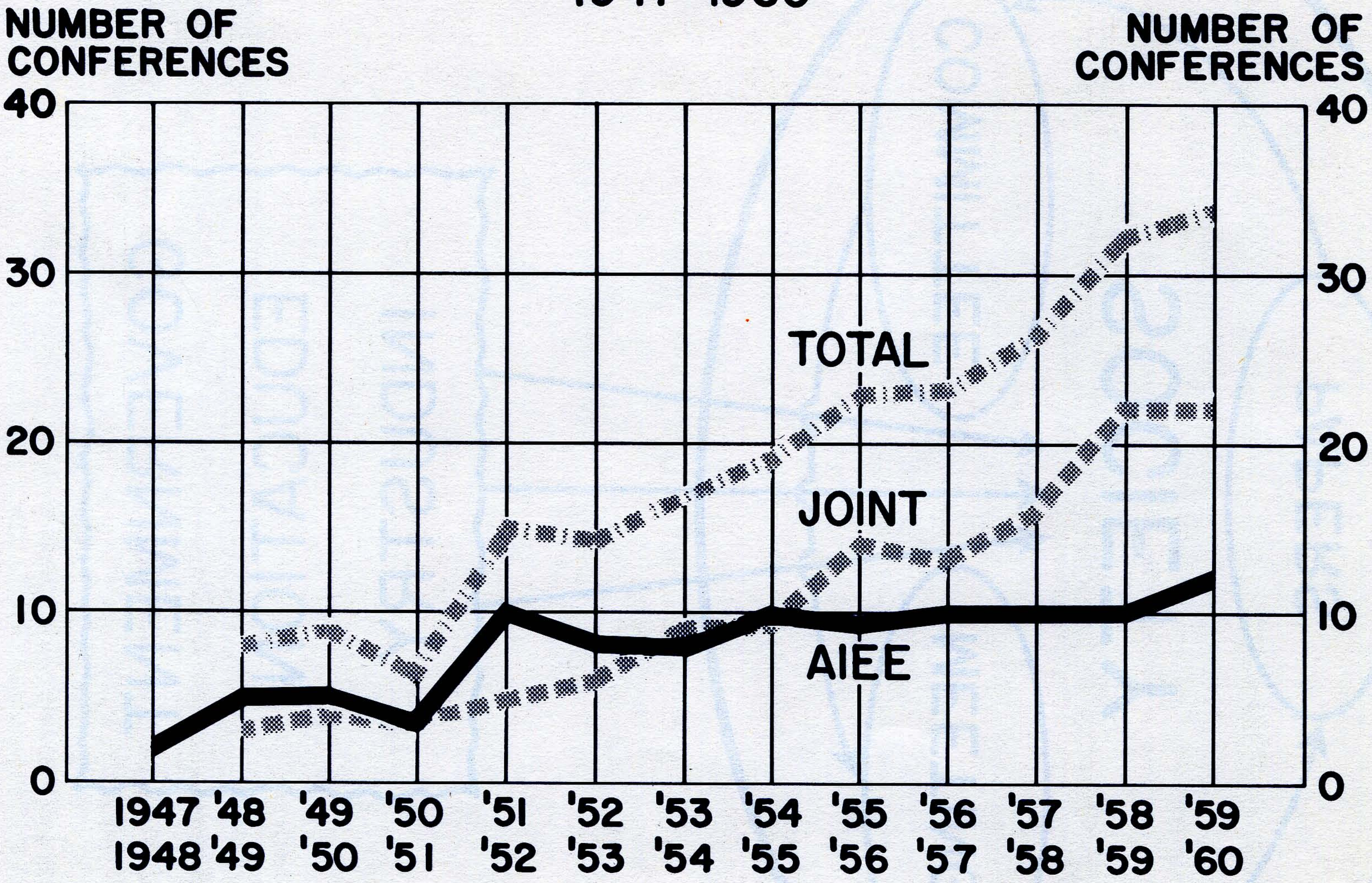


FIGURE 2 (A)

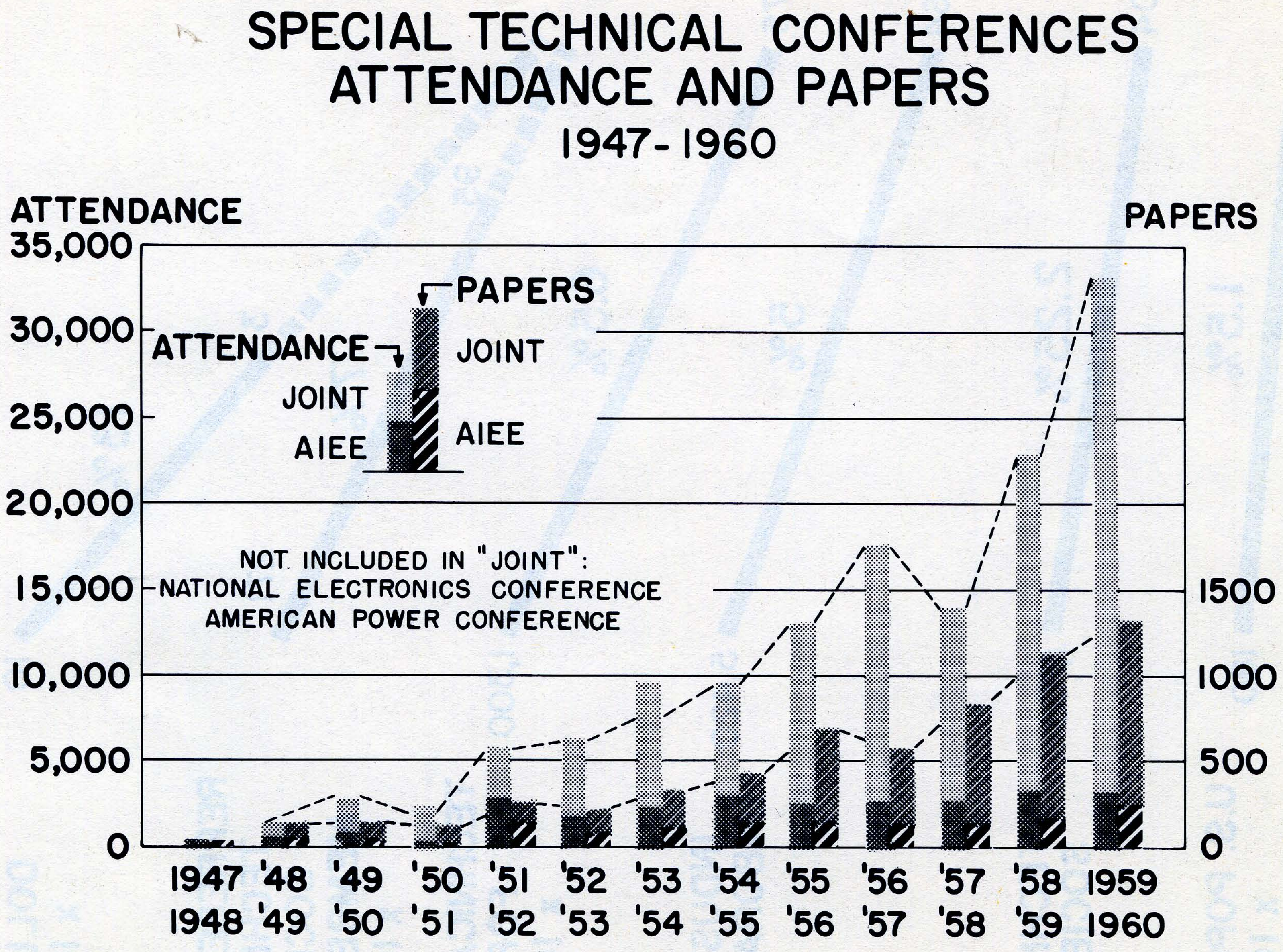

SPECIAL TECHNICAL CONFERENCES
ATTENDANCE AND PAPERS
1947-1960
ATTENDANCE
PAPERS
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1500
1000
500
0
PAPERS
ATTENDANCE
JOINT
JOINT
AIEE
AIEE
NOT INCLUDED IN "JOINT":
NATIONAL ELECTRONICS CONFERENCE
AMERICAN POWER CONFERENCE
1947 1948
'48 '49
'49 '50
'50 '51
'51 '52
'52 '53
'53 '54
'54 '55
'55 '56
'56 '57
'57 '58
'58 '59
1959 1960

FIGURE 2 (B)

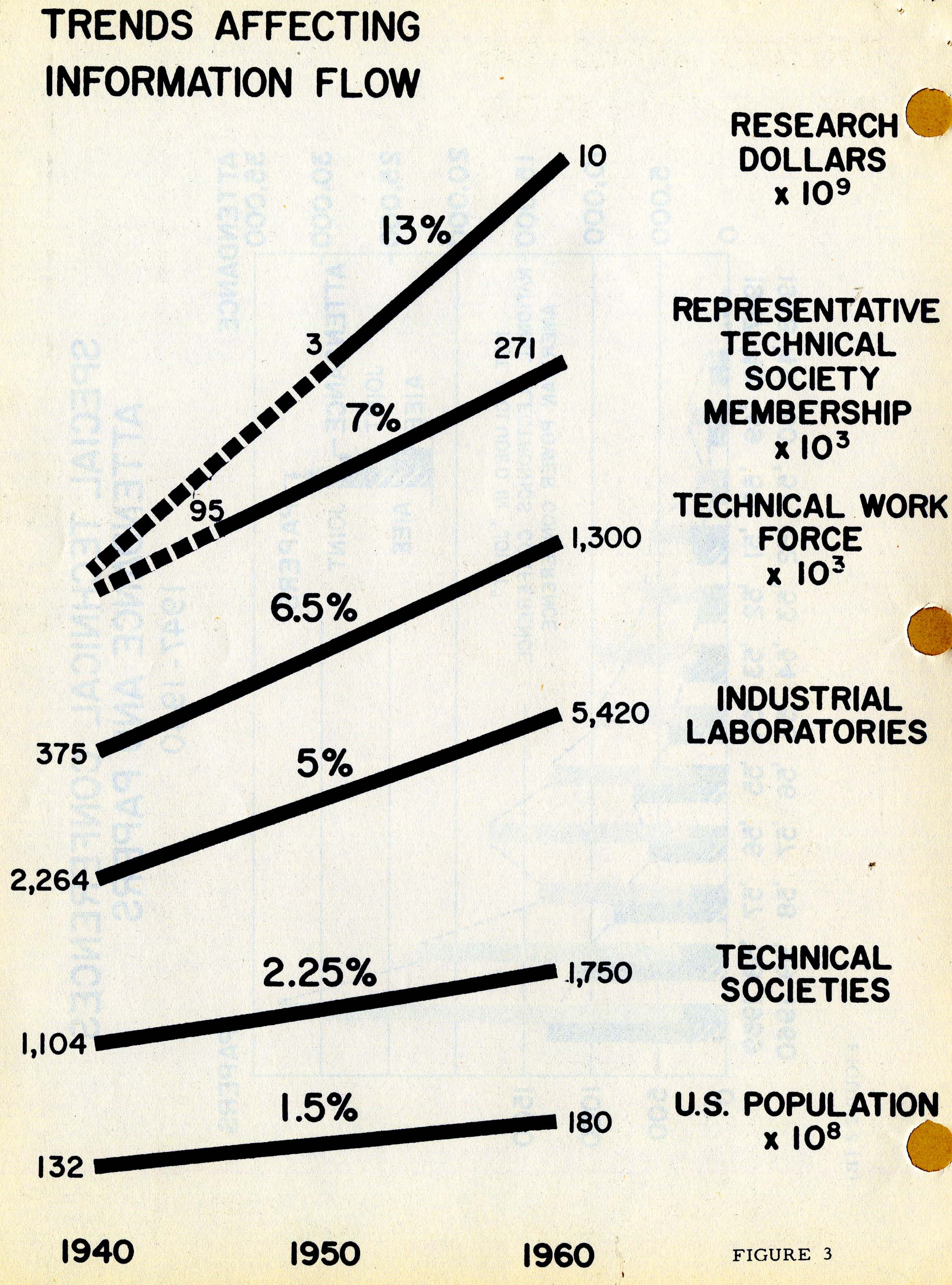

TRENDS AFFECTING INFORMATION FLOW
RESEARCH DOLLARS x 10^9
10
13%
3
REPRESENTATIVE TECHNICAL SOCIETY MEMBERSHIP x 10^3
271
7%
95
TECHNICAL WORK FORCE x 10^3
1,300
6.5%
375
INDUSTRIAL LABORATORIES
5,420
5%
2,264
TECHNICAL SOCIETIES
2.25%
1,750
1,104
U.S. POPULATION x 10^8
1.5%
180
132
1940
1950
1960

FIGURE 3

TRENDS AFFECTING INFORMATION FLOW

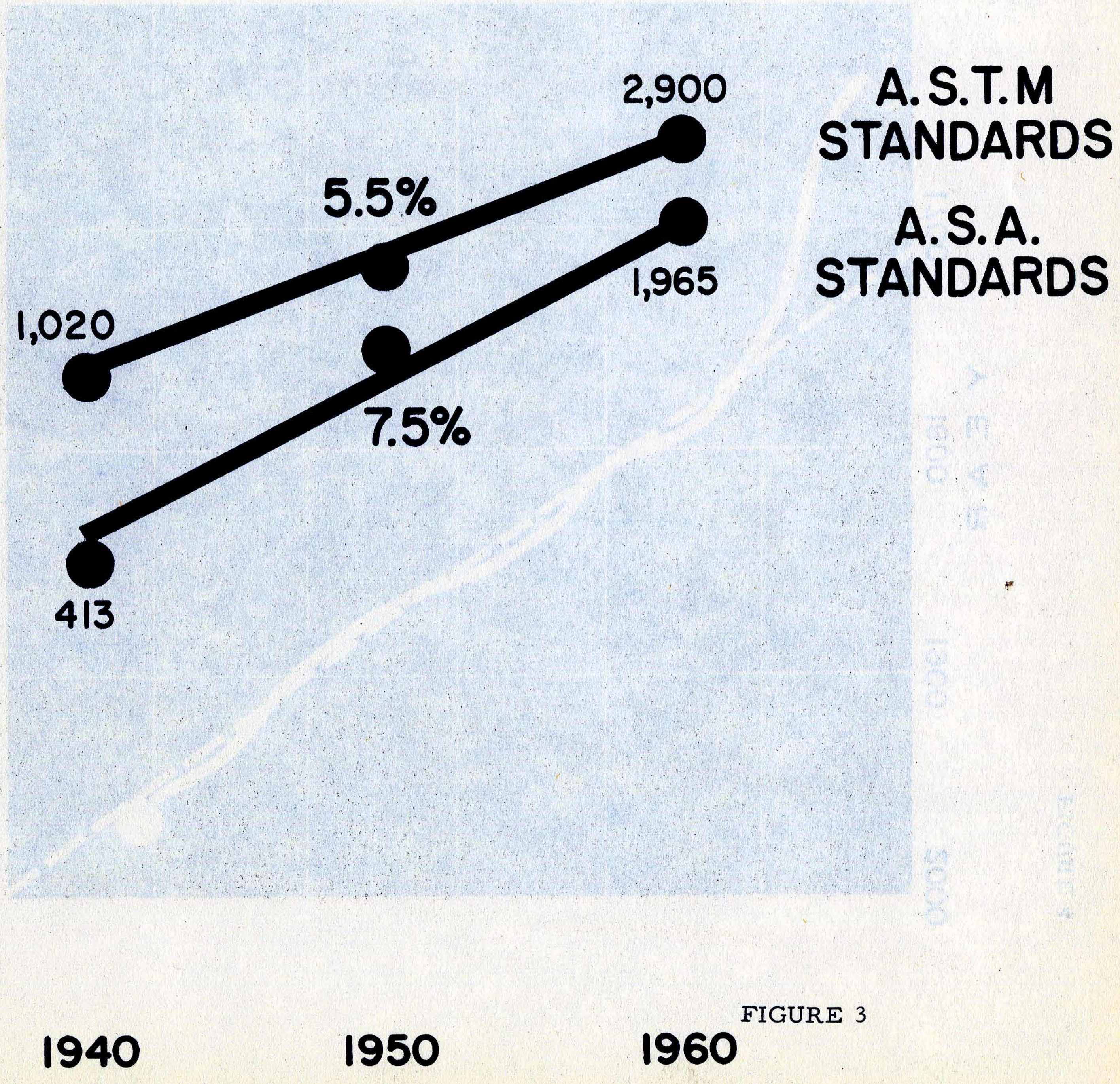
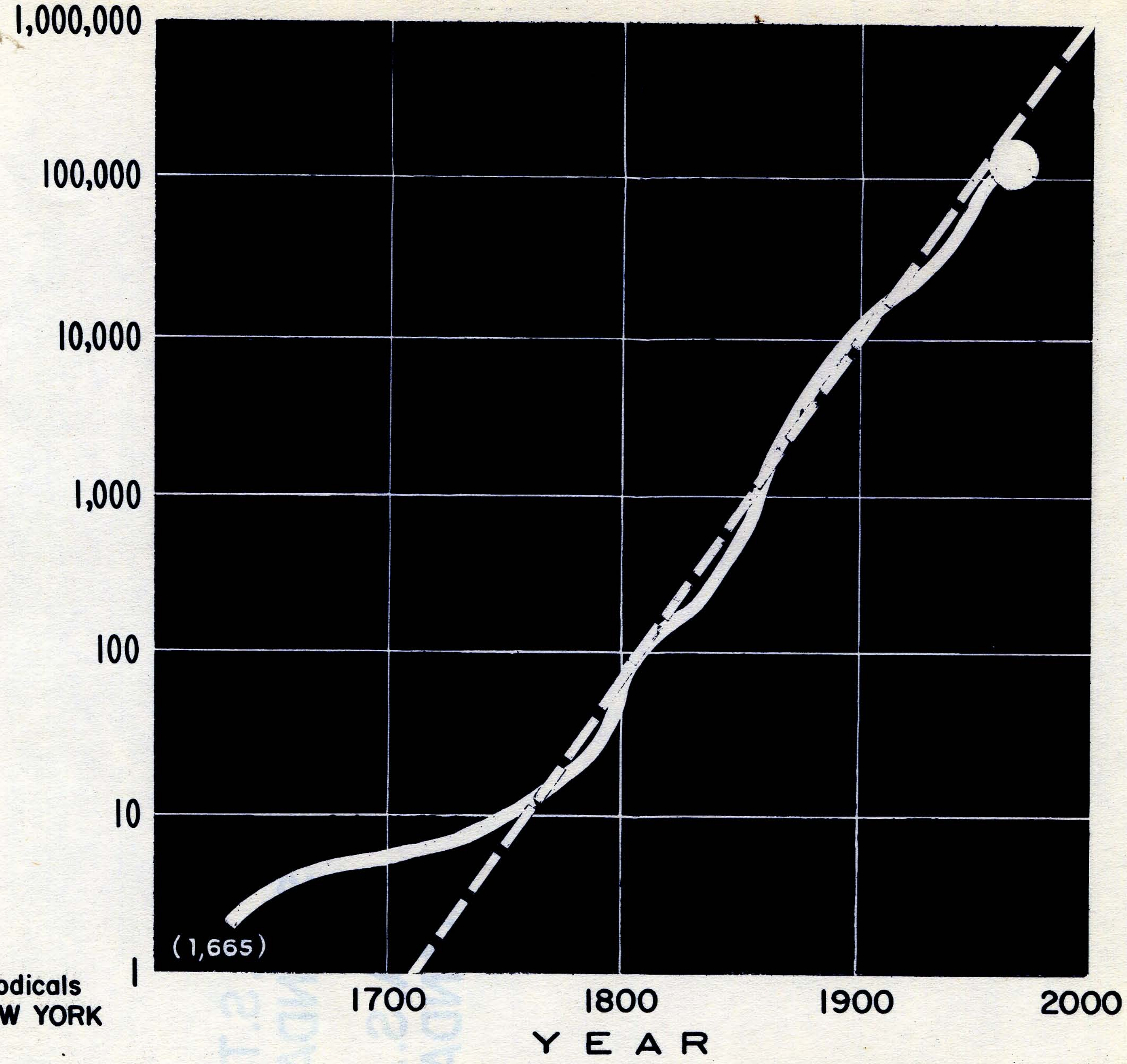


FIGURE 3

NUMBER OF SCIENTIFIC JOURNALS



Source:
World List of Scientific Periodicals
ACADEMIC PRESS INC., NEW YORK

FIGURE 4

WORK (i.e. interest) IDENTIFICATION

I have academic { experience / training } in

the discipline of:

Proficiency engineering

and use this knowledge to do

Activity

in the field of

Application

FIGURE 5

LIKERT'S FORMULA

$$\text{SUCCESS} = (f)\ \frac{\text{REALIZATION}}{\text{EXPECTATION}}$$

$$\text{SATISFACTION} = (f)\ \frac{\text{WHAT GET}}{\text{WHAT EXPECTED}}$$

FIGURE 6

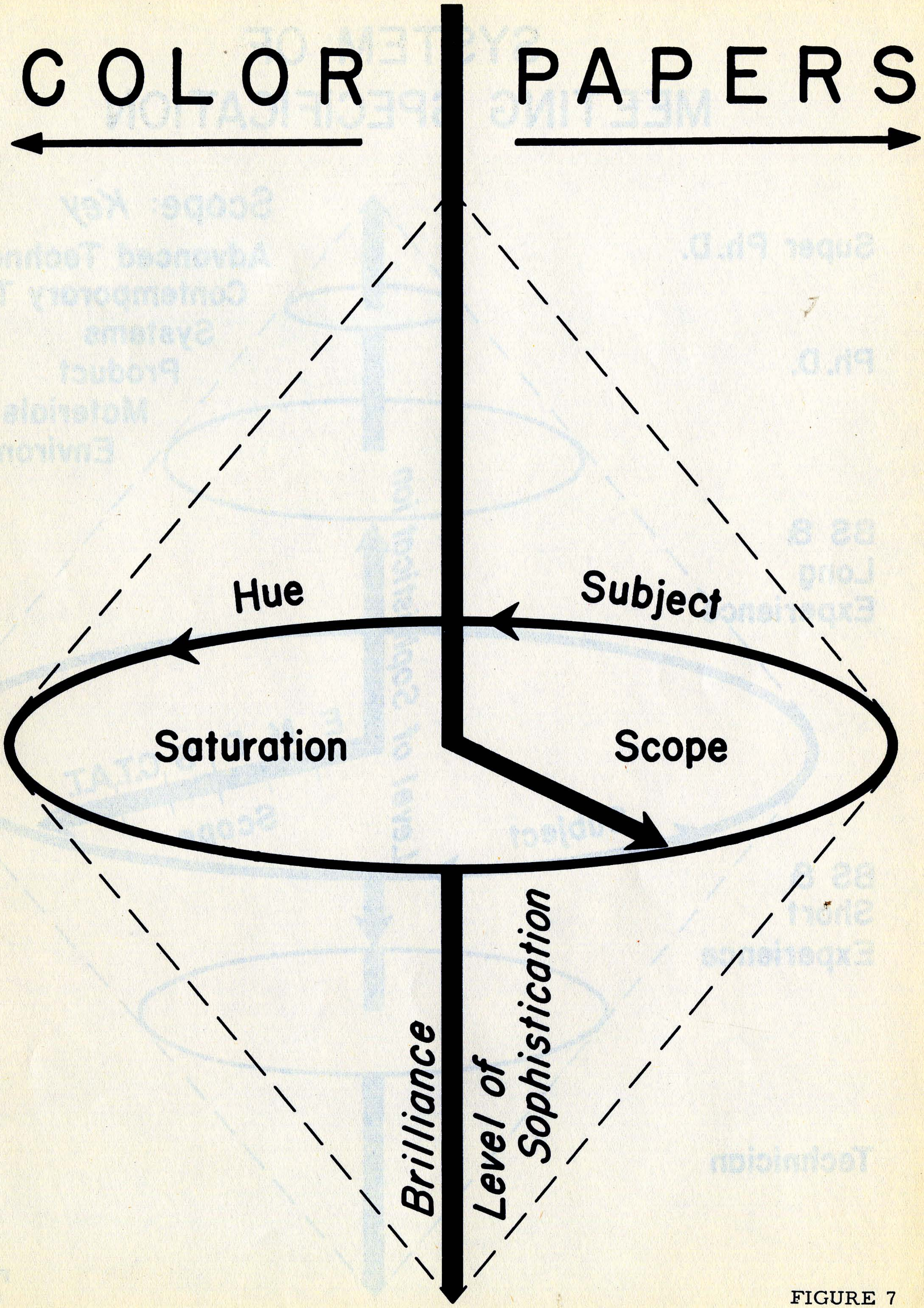

COLOR
PAPERS
Hue
Subject
Saturation
Scope
Brilliance
Level of Sophistication

FIGURE 7

SYSTEM OF MEETING SPECIFICATION

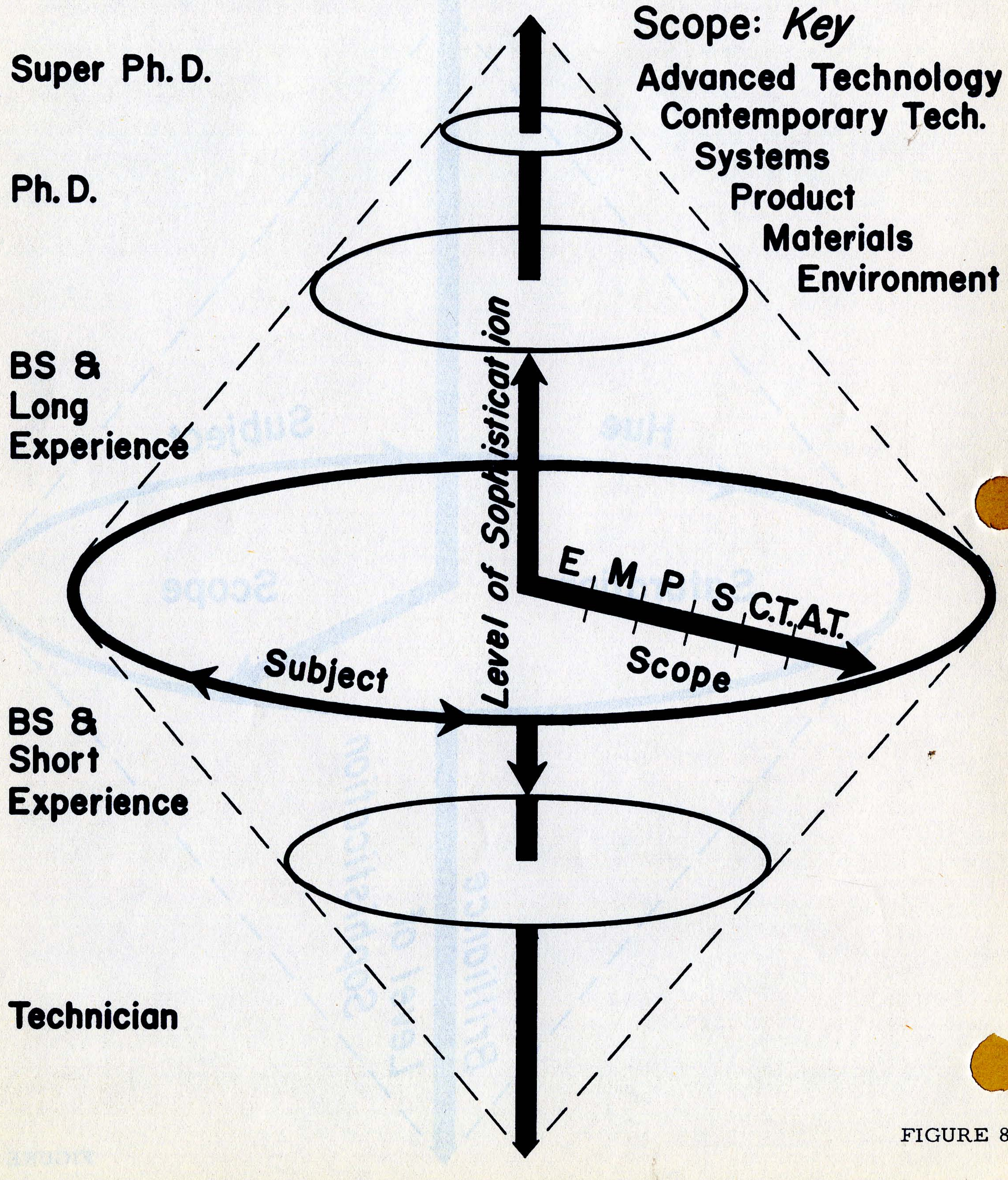


FIGURE 8

SUMMARY

1. CHARTER OF COMMITTEE REORIENTED.

2. MEETINGS ARE INTEGRAL PART OF INFORMATION FLOW SYSTEM.

3. BASIC METHODOLOGY OF INFORMATION RETRIEVAL SUGGESTS USEFUL TECHNIQUES.

4. SYSTEM OF MEETING SPECIFICATIONS DEVELOPED.

5. CENTRALIZED MEETING PROGRAMMING POSSIBLE WITH COMPUTERS.

6. ECONOMICS AND MOTIVATIONAL POTENTIALS NEED EVALUATION.

FIGURE 9

APPENDICES

APPENDIX A

1. Summary of Cooperation with Other Groups.

2. Principal Findings from Report, "Technical Meetings in the Flight Sciences."

APPENDIX B

First Objectives of the Founder Societies.

APPENDIX C

Data on Number of Meetings. See FIGURE 2 - STC's Held Jointly with AIEE.

APPENDIX D

"Information Dissemination," The American Engineer, November, 1961, pp. 30-33.

APPENDIX E

Chemical Engineering Thesaurus. Can be obtained from AIChE.

APPENDIX F

Shortcomings of Present Programming and Structure of Meetings.

APPENDIX G

"Computer Firms Push New Systems to Dig Data Out of Libraries," Wall Street Journal, 11/3/61.

APPENDIX H

Growth Trends Data

APPENDIX J

Typical Examples of Subjects: Proficiencies, Functions, Areas of Application.

APPENDIX K

Letter and Tentative Pattern for 1962 ASME Summer Meeting from W. B. Wilkins, Chairman of ASME Meetings Committee.

APPENDIX L

Wisely, W. H., "A New Concept for Technical Programs in ASCE," Civil Engineering, September, 1961, pp. 44-45.

APPENDIX M

Example of Information Categorization from College Catalogue.

COOPERATION WITH OTHER GROUPS *

1. The Guggenheim Foundation through Pendray & Co., Bronxville, N. Y., studied meetings in ASME, AIEE, SAE, AIChE, IRE, ARS, IAS, and ISA. In 1959 the results were published in "Technical Meetings in the Flight Sciences." (See APPENDIX A - 2)

2. The Ad Hoc Planning Committee of ARS, IAS, SAE, ASME, with EJC as an invited guest. The results of the activities of this Committee were indefinite. Principally, the conclusion was a shift in emphasis from the original thought of "too many meetings" to the thought that the need is to "make meetings better." This was to be accomplished through better scheduling and programming, although the need even for this was not clear to those representing the aero-space technology.

3. The Long-Range Planning Committee of the IAS. This was a confidential study made by the Institute of Aero-Space Sciences' Secretary, but eventually formed the basis for the following report:

4. Aircraft Industry Association sponsored a study on co-operation among scientific and technical societies in the aero-space field. It covered the meetings of AAS, ARS, IAS, SAE, ASME, IRE. The study concluded that due to the many causes listed elsewhere there is an inevitable overlapping of programs with duplication of effort and that possibly there are not enough of the right kind of meetings at the right place at the right time. The suggested methodology for improving this was a complete re-orientation of the society structure, with the proposal of a "National Academy of Aero-Space Sciences." It was thought that this would submerge all prior interests, loyalties, commitments, etc., for the benefit of the common welfare. Thus, the proper relationships and channels of communication between the scientific community, government and the membership in the industry and the public-at-large could be improved through re-orientation.

* Copies of these reports are available through the Committee file.

Principal Findings

Summarized from the more complete discussion in subsequent sections of this report, the principal findings were as follows:

1. While none doubt the importance and virtually all emphasize the values of technical meetings, companies engaged in fields related to the flight sciences are of the opinion (two to one) that too many meetings are being held by the technical societies, that there is unnecessary overlapping and duplication, and that this tendency has been increasing.

2. Though a great many scientific and technical societies are currently interested in some aspect of the flight sciences, eight engineering organizations appear at present to be most important to the field. In the order of their founding, these are:

   American Society of Mechanical Engineers (1880)
   American Society of Electrical Engineers (1884)
   Society of Automotive Engineers (1905)
   American Institute of Chemical Engineers (1908)
   Institute of Radio Engineers (1912)
   American Rocket Society (1930)
   Institute of the Aeronautical Sciences (1932)
   Instrument Society of America (1946)

   Of these, four are most predominant in the flight sciences: ASME, SAE, ARS and IAS.

3. These eight societies held some 43 meetings concerned with various aspects of the flight sciences in 1959, held 37 in 1958, and 35 in 1957. While the total number of national meetings dealing with the flight sciences thus appears to be on the increase, the rise in number has been produced principally by four of the eight societies: AIEE, ARS, IAS and ISA. One society, ASME, has decreased its flight sciences meetings since 1957.

4. Since meetings by these societies usually draw from 500 to 5,000 or more engineers and scientists, it can be calculated that some 258,000 or more man-days of technical time are being used annually by the meetings of these eight societies alone, and the cash sums spent yearly by those attending is of the order of $8,600,000 or more, not counting the value of their time. If time is included at an average of $50 per day, the economic cost of these meetings may be estimated at $21,500,000 or more annually. This still does not include the time and money required to prepare papers, arrange the meetings, publish programs, create and install exhibits, finance "hospitality suites", etc., which may add another $1,000,000 to $3,000,000 to the total annual cost.

5. All major technical societies are aware of the problems raised by the multiplicity of meetings, and are also aware of the attitude of industry toward so many meetings; but for the most part feel that the meetings now being held are the minimum necessary to serve their members and meet the needs of the technical fields they represent. Some also point out that if there are too many meetings and too many papers, industry itself is at least partly at fault.

6. A large part of the problem of too-numerous meetings in the flight sciences arises out of the sudden emergence in the last three or four years of rockets, missiles and space flight as a major national and technical concern. This has put pressure upon almost all societies to inform their members on these subjects.

7. Another part of the problem arises from the intense current competition among technical societies for growth, memberships, prestige and income, as societies in the flight sciences vie for a larger place in the new patterns of technology, industrial economics and national defense.

8. Though industrial managers, and some society executives, believe there is considerable overlap and duplication in the programs of these societies, it has proved difficult to reduce such overlap or duplication to measurable values. On close examination and comparison of actual programs, the duplication appears to be very much less than expected, and may in reality be negligible.

9. Efforts in the past to reduce by mutual action the number of meetings and the intensity of inter-society competition have not been very successful. This has been tried especially in the field of atomic energy. Those who engaged in these efforts found that societies will not readily give up vested interests in their membership and the particular "fields" claimed by them. Efforts at "cooperation" have sometimes

FIRST OBJECTIVES OF THE FOUNDER SOCIETIES
(Listed According to Similar Objectives)

Year 1881 ASME	Year 1867 ASCE	Year 1884 AIEE	Year 1871 AIME	Year 1908 AIChE
promote arts and sciences connected with Engineering & Mechanical Construction	the advancement of Engineering in its several branches	promote arts and sciences connected with production and utilization of electricity	promote the arts & sciences connected with the economical production of the useful minerals and metals	to advance the cause of applied chemical science
by means of meetings for social intercourse, and	encouragement of social intercourse	meetings for social intercourse	meetings for members to exchange views	to promote pleasant acquaintance and social and professional intercourse among its members
reading and discussion of professional papers		reading & discussion of professional papers	reading & discussion of professional papers	
circulate by publication among members information thus obtained		circulation, by means of publication among its members & associates of the information thus obtained	circulate by means of publications among its members & associates the information thus obtained	to publish and distribute papers as shall add to classified knowledge in chemical engineering and shall increase industrial activity
	professional improvement of its members			to raise the professional standard among Chemical Engineers, discouraging & prohibiting unprofessional conduct
		welfare of those employed in these industries	safety & welfare of those employed in these industries	
	advancement of Architecture.			
	establishment of a central point of reference & union for its members			
				to give the profession of Chemical Engineers such standing before the community as will justify its recognition by Municipal, State & National authorities in public works
				to cooperate with educational institutions for improvement of education of men who enter this profession
				to encourage original work in chemical technology

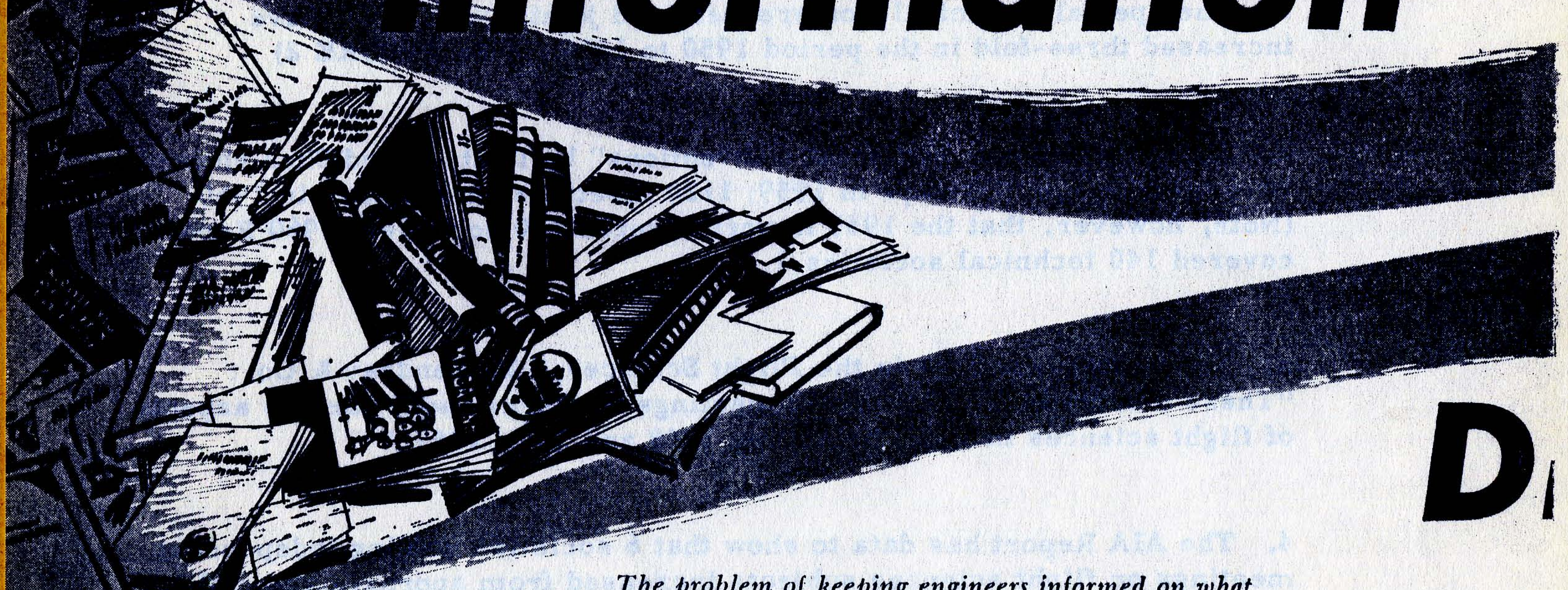
resulted in *more* meetings, rather than fewer. Each of the eight principal societies in the flight sciences now co-sponsors meetings jointly with others. They feel this does not necessarily result, however, in fewer or better meetings.

10. It is our belief that the problem of too many meetings will ultimately solve itself, as companies exercise closer supervision over permissions to attend meetings, and the field itself settles down to more normal development. Those societies that provide real service to their members and the industry will survive and grow; the others will cease to count.

11. Nevertheless, a large and useful field now appears to be open to some interested group or institution: that of finding ways to improve the communication of technical information; the principal activity in which these societies are engaged and one of the principal social purposes they serve. Technical communications are still being carried on by "traditional" methods: meetings, formal papers, discussions, technical publications. In view of the rapid growth of technology and the large amount of information to be communicated, there is a question whether in fact scientists and engineers in the flight sciences are getting technical information fast enough. Improvements in method appear to be much needed.

In the Sections that follow, these points and others will be discussed in further detail.

Information D



The problem of keeping engineers informed on what is going on in the field calls for a system of keeping track of research to avoid the duplication of effort that is so abundant in engineering research today.

LIKE Liza Doolittle in *My Fair Lady*, there are a growing number of engineers throughout the world who are being driven, at least figuratively, to shouting in exasperation, "Words, words, words, we are sick of words."

Unfortunately, the problem these members of the scientific community face is not the sort that can be solved in three acts on a Broadway stage. It is, in fact, a problem that looks altogether as though it will get worse before it gets better, and it is a problem that sits at the very foundation of scientific progress.

The "word" problem that today's engineer faces is, simply, that some sixty million pages of scientific information are published each year. Much of this information is uncodified, uncontrolled, and in many cases irretrievable. For the individual engineer working on a specific problem, it is not a matter of finding a needle in a haystack. It's more like picking a pebble out of an avalanche.

As surely as the first dislodged rock in an avalanche can pull down the side of an entire mountain, so has the volume of scientific publication grown at a geometric rate, with the engineering profession at the bottom of the hill, becoming buried ever deeper in the mounting volume of information.

Not so very long ago, one engineering executive was quoted as saying, "If a research job costs less than $100,000, it is cheaper for us to do it than to find out if it has been done before and reported in literature." In another instance, an engineer on the West Coast heard of a piece of Russian literature bearing on the work that he was doing at the time. He held off on his own work until he was able to get a translation—which, weeks later, turned out to be a re-translation of a monograph he had originally written himself. There is apparently a growing club of engineers who find that the work they have just completed has already been done by somebody else.

Money, time and effort are certainly being wasted because of the current situation of technical literature, and all of them in increasing amounts. But because of its magnitude, there is actually little that the individual engineer can do to protect himself from the ill effects of the problem, or to improve the situation as it generally exists today.

On the other hand, the old adage about "understanding the problem is half the solution," would seem to apply here. This is true because nearly everyone is aware that something is needed, and needed soon. They have made this need known, and at this writing growing attention is being paid to finding a solution. More public and private organizations are devoting time and serious effort to cope with the flood of information that has recently burst all existing levees of control. The engineering

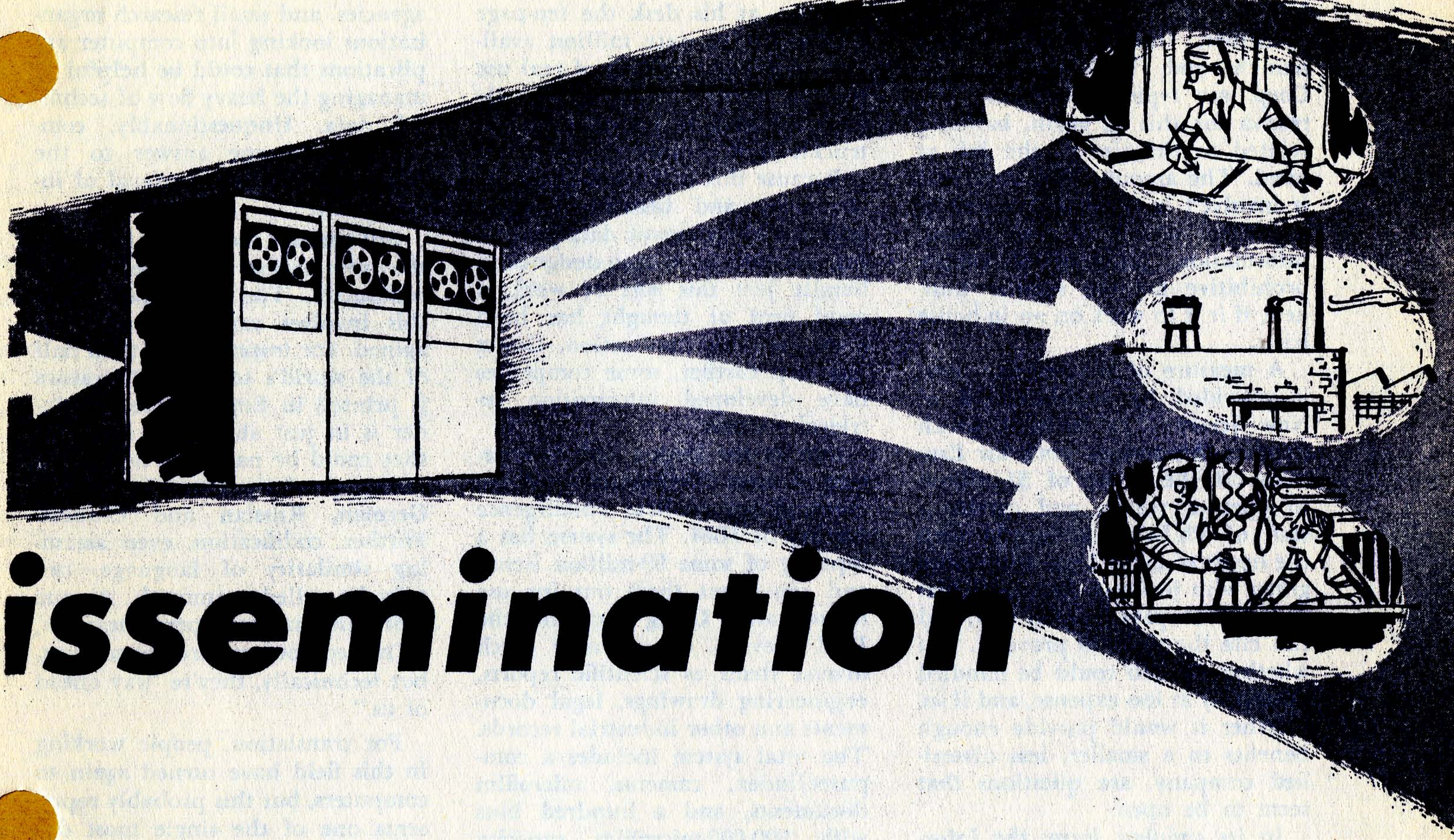
DATA ON NUMBER OF MEETINGS

1. The Special Technical Conferences held jointly with AIEE have increased three-fold in the period 1950 to 1959. (See FIGURE 2)

2. "Engineering and Technical Conventions" by Deutsch and Shea showed 1010 meetings on 262 days in 1959; 1120 meetings on 304 days in 1960. (Note, however, that the 1959 Report covered 130 societies; 1960 Report covered 140 technical societies.)

3. "Technical Meetings in the Flight Sciences," by Pendray & Co.: "These 8 societies held some 43 meetings concerned with various aspects of flight sciences in 1959; held 37 in 1958 and 35 in 1957."

4. The AIA Report has data to show that 6 societies holding independent meetings on flight sciences subjects increased from approximately 20 in 1952 to 30 in 1960.



issemination

profession, incidentally, has done some real pioneering in this area.

Although it is still in the embryo stage, there is nonetheless an information industry growing up in the Nation. Also, many of the larger existing companies are taking definite and positive steps to sort out the heretofore unmanageable mass of scientific information that exists. And, thirdly, the government—acting as the largest research and engineering organization in the world—is moving in this area.

Indicative of what needs to be done is a recent report entitled "Information on Current Scientific Research" published by a Congressional Committee under the chairmanship of Minnesota's Senator Hubert Humphrey. Put out by a subcommittee of the Senate Committee on Government Operations, this report attempts to outline the government's stake and responsibilities in the information field. As such, it also offers an indirect statement for the entire scientific audience, for it is with this area of government operations that the report is concerned.

Six areas are listed in the report as being "especially challenging" and the degree of challenge involved holds true for the nongovernment scientist and engineer as well. They are:

"(1) Formulating a thesaurus of index titles for classifying research and development on a Government-wide and National basis; (2) developing standardization and compatibility of data processing systems, at least for all Government agencies; (3) correlating a central project registry with the indices maintained by different agencies, with information and data centers, with research documentation and with the National Science Foundation Register of Scientific and Technical personnel.

"Also, (4) establishing authority requiring contributions of research and development statistics and operations policies that would elicit wholehearted cooperation from all participants; (5) determining procedures for safeguarding and handling security data; and (6) defining scope of material to be indexed—whether research, or research and development. Related to this question is the possibility of establishing a correlated and unified but not necessarily centralized index."

In simpler terms, this means that there are some very basic criteria that need to be established before any really wide gauge attack can be made with a chance for success. Even at this, it is worth remembering that the Government here is only talking about itself. To this degree, it is blessed with some small amount of standardization to begin with. To go out into industry, where there is in all likelihood an even greater divergence of language, is to add to the difficulties that will be encountered along the way.

It is worth noting that to date, it has tended to be the larger industrial firms that have accomplished the most. Standard Oil of New Jersey, International Business Machines, DuPont, General Dynamics and Lockheed Aircraft Corp. are typical examples. The reason for this is, again, basically related to the size of the job at hand. The amount of money that is involved in making any sort of a fruitful attack on the over-all information problem is simply prohibitive for the smaller business, if it is to work on an in-house basis.

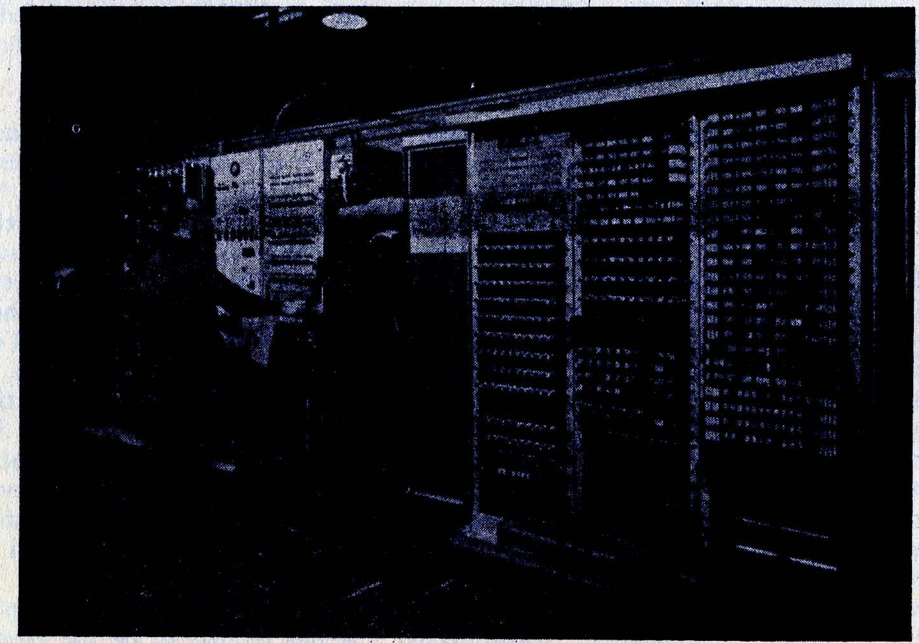
A measure of the cost involved is provided by Standard Oil of New Jersey. The division which handles this sort of work for Esso costs on the order of $1-million to operate yearly, and carries a staff of Ph.D.'s that would turn the heads of many U. S. companies green with jealousy. Esso feels that the division pays its own way, and can cite the cases to prove it. But whether the job could be handled effectively at less expense, and if so, whether it would provide enough benefits to a smaller, less diversified company, are questions that seem to be open.

In its simplest form, the information problem as it exists today is one of selecting very small and specific bits of information out of a huge, uncoordinated mass of data. It is a matter of giving the engineer at his desk the ten-page article out of sixty million available pages that will be of real use to him, without having to literally bury the man in his office with a truckload of printed matter.

Because this is the nature of the challenge, and because a great selection of automatic data processing machines have been designed to handle just this sort of work, a good deal of thought has been given to their application. Going one step further, some companies have developed information retrieval systems.

One of the largest and most recent of these developments was engineered for Central Intelligence Agency by IBM. The system has a capacity of some 99-million items, and can select them out for use momentarily. Using microfilm, the IBM device can handle such diverse items as scientific reports, engineering drawings, legal documents and other industrial records. The total system includes a computer/index, cameras, microfilm documents, and a hundred bins with 990,000-microfilm capacity each. Perhaps significantly, IBM has not disclosed the price of the system.

Computers, such as the one shown here, may eventually ease the problem currently facing the scientific community. But before their high capacities for detailed work can be used, much groundwork will be necessary, in the form of indexing, coding, and translation to machine language.



Besides IBM, there are a number of other companies, government agencies, and small research organizations looking into computer applications that could be helpful in managing the heavy flow of technical data. Unquestionably, computers offer one answer to the rapid and accurate *retrieval* of information.

But perhaps more basic is getting the information in shape for the computers. The complexity that this involves can hardly be imagined. For instance, less than half of the world's technical literature is printed in English—the remainder is in just about any language that could be named. The bulk is made up of literature in French, German, Russian and Chinese. Further, codification, even assuming similarity of language, can only be called mammoth. As one NSF information expert phrases it, "The computers are glamorous, but technically, they're 'way ahead of us."

For translation, people working in this field have turned again to computers, but this probably represents one of the single most difficult jobs that has ever been handed over to the mechanical brains. In the first place, most people who were exposed to second year French will recall that translation is a time-consuming and imperfect art—all languages have nuances of meaning, word similarities and, local complexities that can throw off any but the best and most alert translator. Couple this with the fact that a computer is only as good as the information that has been programmed into it, and an idea of the scope of the job becomes clear.

Even letting translation go by, to concentrate on English language technical material, there still remains the task of codification. It is significant that the Humphrey Committee cited the need for a thesaurus of index titles as number one on its "most challenging" list. There could be no more basic item in sorting out the inundation of technical material that is currently generated.

Perhaps logically, a number of Government agencies are doing much of the pioneering work in this area. Logically, because by virtue of its huge stake in U. S. research and engineering, the Government is in a better position, simply by the variety of the work it does, to search for the necessary common denominators. For any individual private organization to go much beyond its own particular sphere of interest would be largely impractical, and, given the size of the job it would be prohibitively expensive for even the most altruistic industrial corporation.

THERE are several efforts within the Government; Armed Services Technical Information Agency, Commerce Department's Office of Technical Services, and the Bio-Sciences Information Exchange are three of the best known and most experienced. National Science Foundation has been charged with over-all coordination of Government efforts in this field, and because of this responsibility forms a logical focal point for Government activities. For NSF, the job entails such things as insuring that index or computer systems maintain a basic compatability, insuring that interested parties in the information field are kept as informed as possible, and generally keeping different efforts directed against the information problem in contact with each other.

For two reasons, the engineering profession has not been hit quite as hard as, for instance, has the theoretical physicist. The first and most basic of these reasons lies in the type of information that the individual engineer is likely to need in his job. Generally, it tends to be more specific than that desired by the pure scientist. As one example, where the engineer may be interested in the known tensile strength of a given metal, the scientist may have more esoteric questions about various means of improving this strength through new alloy processes. This example, of course, is over-simplified, but this sort of thing has given the engineer a slight edge over many of his professional colleagues.

The second reason, which partly rises out of the first, is that the engineering technical societies have been able to move ahead in the area of indexing information. A group of these societies have gotten together to publish an *Engineering Index*, a compilation of abstracts of published engineering reports. The *Index* is published by a group called Engineering Index, Inc., in connection with various technical societies.

Also, the individual societies are active in this area. One good example of this is offered by the American Institute of Chemical Engineers. Their stated aim is to set up an information clearing house to avoid undesirable duplication of research efforts, as well as to inform investigators of other activities in their fields. Besides operating a clearing house, the AIChE Subcommittee on Research Needs solicits suggestions for research needs, catalogs research suggestions in a booklet for distribution to universities and other organizations, and publishes articles in the technical press of importance to chemical engineers, such as compilations of urgent research needs and state-of-the-art papers.

In a sense, the situation is something like the old story of the blind men and the elephant. Generally speaking, the several interested parties are describing and attempting to find an answer according to their own particular positions and needs. And certainly, the problem is elephantine in size.

To date, considerable progress has been made, and at a rate that is acceptable given the size of the job. Also, the specialized approach to tailored solutions will probably offer the fastest progress in the long run. This is true simply because the mobilization of effort, money and manpower that would be needed for an over-all attack would recreate the original complexities.

Clearly, there are not now, nor are there likely to be any pat solutions for the burgeoning mass of technical data that is flooding technology. But a continuing and thoughtful effort on a number of fronts should do much—as it already has—to harness the deluge. —End.

CATE—Current Air Force Technical Effort

A good indication of the complexity of cross-indexing that is involved in any attack on the information problem is offered by this extract from an Air Force sponsored glossary and index system.

Acuity	definition, resolution, resolve, resolver
Acute	critical, severe, severity
Adaptation	adaptive, conformal, conformity, self-organizing
Adaptive	adaptation, conformal, conformity, self-organizing
Adaptor	connection, connector, contact, coupler, coupling, interconnect, jack, joint, junction, lanyard, link, linkages, plug, socket, terminal
Adder	comparator, summer, totalizer
Additive	
Adhesion	adhesive, bond, bonded, bonding, cohesion, joining, joint
Adhesive	adhesion, bond, bonded, bonding, cohesion, joining, joint
Adiabatic	
Adjust	adjustable, alignment, autotune, change, changeable, compensating, compensation, erection, erector, exchange, orient, trim, tunability, tuning
Adjustable	adjust, alignment, autotune, change, changeable, compensating, compensation, erection, erector, exchange, orient, trim, tunability, tuning
Adjustment	
Administration	control, controlled, controller, controls, director, directs, drive, guidance, guide, management, metering, regulate, regulation, regulator, regulatory, steer, steerable, supervision

Shortcomings of Present Programming and Structure of Meetings

Programming

1. Chronological overlap.

2. Geographical overlap. (ASME and IAS held simultaneous meetings on the same subject in the same area without knowledge of the other's activity.)

3. Too many parallel sessions at any one meeting.

4. Scheduling of sessions at meetings is haphazard. No pattern.

Structure

1. No gradation as to degree of sophistication.

2. Paper quality.

   a. Papers not always previewed before presentation.

   b. Personality needs and obligations.

   c. Desire for publication.

3. Administrative committee meetings get mixed up with technical.

4. Need more accurate prior identification of meeting subject matter. Titles are not descriptive enough to allow discriminating attendance.

WALL STREET JOURNAL — 11/3/61

Computer Firms Push New Systems to Dig Data Out of Libraries

* * *

IBM Unit to Handle 99 Million CIA Papers; Kodak Sells Some $2 Million Systems

By NORMAN C. MILLER, JR.
Staff Reporter of THE WALL STREET JOURNAL

Need some information quickly? Afraid it will take weeks to find it among the stacks of books, brochures and reports in your company's library?

Ask the office computer, and it might be able to tell you just which report contains the facts you want. Pretty soon, the computer may even order a machine to go fetch it for you.

That, at least, is the hope of some of the nation's top business-machine makers. Having successfully automated many office routines such as record-keeping and billing, they now are tackling what is often a monumental paperwork bottleneck in the library. Their tool is a system called IR—information retrieval.

An IR system is an arrangement of microfilm cameras, computers and mechanical selection devices. It's designed to reduce the information in business, government and academic libraries to manageable bulk, index it thoroughly, search through it on command for wanted information, and produce needed data in a matter of minutes. All the machinery necessary to produce such a system already exists, and some IR systems already are in use.

A System for the CIA

To date, more widespread use of IR systems has been held back because the early ones have run to extremes—either rudimentary or highly elaborate. At one extreme is the computer designed primarily for other data-processing work, which a company puts to part-time use indexing a library. At the other extreme are custom-built systems which Eastman Kodak Corp. has installed in a few government agencies for over $2 million each. International Business Machines Corp. is building a still more massive system for the Washington headquarters of the Central Intelligence Agency.

Now another type of IR system is coming on the market; A full-fledged but compact system priced in a range which businesses outside the titan class can afford. One, the File-Search system of FMA, Inc., an El Segundo, Calif., concern, rang up its first $114,500 sale to the Navy's Bureau of Ships in July. Magnavox, Inc., began soliciting orders for two medium-priced systems in September, and Eastman Kodak hopes to have a "mass market" version of its $2 million Minicard system ready for sale in about three months. IBM, Avco Corp. and Itek Corp. also have medium-priced systems in varying stages of development.

The potential market for such systems is large. IBM estimates companies, government agencies, professional groups and universities already are spending $20 million a year for information retrieval equipment; this includes part of the cost of computers bought and used mainly for other purposes. By 1966, Magnavox predicts, such sales will increase fivefold, to $100 million a year. And IBM believes IR system sales could mushroom to $500 million a year by 1971.

Waste in Duplicate Research

The savings to industry and government from speedier access to information could be greater still. The solutions to many research problems, for instance, lie buried somewhere in the more than 200,000 journals, books and reports the world's scientists publish each year. But digging any data out of this mountain of paper has become such a formidable task that scientists often find it quicker to solve the problems all over again in the laboratory. Sen. Hubert Humphrey, in a recent Government Operations subcommittee report, estimated such duplicate effort is wasting some $200 million a year in the single field of Federally-supported electronics research.

How do the IR system makers propose to break this bottleneck? The systems vary somewhat, and with much development work still going on it's impossible to predict now what form the most successful medium-priced system eventually will take. But a look at some of the systems now in operation or under construction illustrates the principles involved and some of the potentialities of IR equipment.

The first step in nearly all IR systems is to have a computer index the contents of a library, usually by feeding titles into it and having it pick out key words under which to list them. Human librarians can do this too, of course, but they often have trouble keeping up with the flood of material pouring into technical libraries.

By contrast, a computer at the Bell Telephone Laboratories' library in Murray Hill, N.J., has indexed as many as 1,700 documents in 12 minutes. This particular computer serves as a sort of IR system in itself; it continuously keeps track of new material coming into the library, and the index it compiles is distributed

Please Turn to Page 19, Column 1

Computer Firms Push Development Of Systems to Automate Libraries

Continued From First Page

to Bell scientists each month. Scanning the latest index at his desk, a Bell scientist can determine quickly if any of the new reports bear on his work; if any do, he will know the exact report he wants among the 20,000 documents now in the library. Since the computer began its work in February, use of library materials by the scientists has jumped 20%, Bell says.

The potentialities of more sophisticated IR systems are much greater. The system IBM has promised to deliver next year to the CIA, for instance, is designed to cram microfilmed versions of the intelligence agency's 99 million-odd reports, books, newspapers, maps and other documents into 100 washtub-sized cabinets, and to fish any needed document out of this hoard in about a minute flat.

To do this, each document first will be microfilmed, then fed into another photographic device which in effect microfilms the microfilm, to turn out a stamp-sized copy. This copy is mounted on a film strip with 98 other similar images, and a control card is punched out to note its location. Fifty film strips are inserted into each of 200 narrow holders; each holder fits into a slot in a storage bin. While all this is going on, a computer indexes all the material by key words.

When a CIA man wants information, he will write out a request and hand it to a specially-trained human librarian who will edit the request into key words and feed the words into the computer. The computer will match these words against the key words it has indexed and report which documents are indexed under these words, which cabinets they are in, and on which control cards they are listed.

Control cards for the wanted documents then will be fed into a retrieval mechanism on the storage bin. The mechanism signals a mechanical arm to dip into the storage bin and pull out the film strip with the needed documents. A camera then blows up the strip to standard microfilm size, and the microfilm is projected on a viewer so the agent can read the type. The master document copy on the film strip is returned to the storage cabinet while the agent is reading.

Since few potential IR system buyers have libraries as extensive as the CIA's—and since few can tap the Federal budget to buy IR systems—IBM concedes only a handful of systems this elaborate will ever be built. But "mass-market" systems will operate on the same principles, with less elaborate machinery and some variations in the type of machine used. The problem, which some firms apparently think they are well on the way to solving, is to produce machinery sophisticated enough to do the particular job required at a lower cost, and to find the most efficient way of hooking the machines up to work with each other.

There are other problems too, of course. One particularly difficult one is to set up the search instructions to the computer so that the data it digs out of a microfilm library is really the information that's needed.

The computer can miss in two ways. If the instructions are too general, a computer can swamp an information seeker with every document that conceivably might contain something he wants. Or, if the instructions are too narrow, the computer might pull out only those documents devoted entirely to the subject on which information is needed, and miss important references to the topic in reports that cover other subjects as well. At present, all depends on the skill of the person who feeds the instructions to the machine, and IR experts see no easy solution.

Some scientists doubt IR systems will be an unmixed blessing even if this problem can be solved. "There are certain advantages to browsing, you know," says one researcher. "Usually the process of searching gives birth to ideas, and you can't brush that off."

IR system makers nevertheless think their machines, even if imperfect, will mark a huge advance over present methods of finding data. "The big problem now is getting any information, and a guy would rather get 10 pages too much and flip through them than be unable to find anything," says Richard E. Kaufman, an IR specialist for IBM.

U. S. POPULATION, Historical Statistics of the United States, Washington, D. C., Government Printing Office.

1940:	132,122,000
1945:	139,928,000
1950:	151,683,000
1955:	165,270,000
1960:	179,323,000

ENGINEERS & SCIENTISTS IN WORKING FORCE, "Engineering Manpower and the National Interest," Engineering Manpower Commission, Jan., 1960.

1940:	375,000
1950:	750,000
1960:	1,300,000

TECHNICAL SOCIETY MEMBERSHIP, based on records from IRE, AIEE, ASME, AIChE, AIME, ASCE.

1945:	95,355
1950:	146,575
1955:	206,855
1959:	270,776

TECHNICAL AND SCIENTIFIC SOCIETIES, Scientific and Technical Societies of the United States, NAS-NRC.

1940:	1104
1950:	1413
1955:	1506
1960:	1750

LABORATORIES, Industrial Research Laboratories of the United States, NAC-NRC, Separate Editions.

1940:	2264
1946:	2443
1950:	3333
1956:	4834
1960:	5420

RESEARCH & DEVELOPMENT EXPENDITURES, Statistical Abstracts of the United States, 1957.

1950:	3 Billion Dollars
1960:	10 Billion Dollars (est.)

BACHELOR SCIENTIST & ENGINEERING GRADUATES, Office of Health, Welfare and Education, H. H. Armsby.

	Engineers	Physical Sc.	Total
1939, 40:	14,000	9,000	23,000
1949, 50:	52,700	17,250	69,950
1954, 55:	22,600	8.700	31,300
1959, 60:	37,800	13,400 (est.)	51,200 (est.)

TYPICAL EXAMPLES OF SUBJECTS

Based on study of Engineering Specialties Advisory Committee for use with National Engineers Register.

Proficiencies:

Consists of engineering curricula accredited by ECPD.

Aeronautical
Chemical
Mechanical
Sanitary
Textile
etc. — Apprx. 28 now on ECPD list.

Functions:

A list of activities which identify the method by which Proficiencies are applied.

Consulting
Management
Design
Teaching
Sales
etc. — Not over 20 on list now.

Areas of Application:

Broad areas of activities within which Engineering Proficiencies are applied.

Should be restricted to activities in which sizeable groups of engineers are interested. Suggested criteria:
- (a) In the name of technical society
- (b) Name of large group in a technical society
- (c) A committee in a technical society (as the smallest!)

Acoustics
Commercial Farming
Explosives
Instrumentation

Areas of Application cont.

Optics
Solid State Devices
Waterways and Harbors
etc.

Apprx. 110 areas derived from EJC member societies plus IRE.

Additional descriptive words may be used to further limit subjects if necessary: See "Links and Roles" in AIChE system.

APPENDIX K

The American Society of Mechanical Engineers

United Engineering Center
345 EAST 47th STREET, NEW YORK 17, N.Y. · PLAZA 2-6800

November 20, 1961

To: Chairmen and Secretaries
of Professional Divisions,
Groups and Committees

Subject: 1962 Summer Meeting

Dear Sir:

Commencing with the 1962 Summer Meeting, program agencies will no longer be requested to schedule technical sessions at this meeting. The purpose of this letter is to discuss the future status of this meeting. The by-laws require that a meeting be held to elect the Regular Nominating Committee at the Summer Business Meeting. The Regional Delegates Conference must also meet at this time. In addition, the Vice Presidents and the Council meet.

With the increase in the number of division conferences, professional divisions found that their backlog of technical papers could be readily absorbed by conferences and the Winter Annual Meeting. Therefore, there was extreme reluctance to solicit papers for this additional meeting. Enthusiasm was further dampened by the prospect of poor session attendance. The number of sessions devoted to any one subject was not sufficient for a company to justify sending people. Continuing to hold these sessions was proving detrimental to the Society since the author's company in many cases could not justify the expense of the author's participation. The session attendance at the 1960 meeting in Dallas ranged from a minimum of two to a maximum of fifty-six, with the average less than thirty. Such attendances raise doubts in the minds of participants as to whether ASME is the proper platform for their presentation. Attendance at the 1961 meeting in Los Angeles was no better. It was a simple matter several years ago to cancel the Spring and Fall meetings.

Since the situation is different for the June meeting, because of the reasons stated above, the Meetings Committee has been considering ways to strengthen the June meeting. Efforts to balance the two general Society meetings have proved unsuccessful. The idea of shifting a division conference so that it would be held concurrently with the Summer Annual Meeting was not feasible. Having the Meetings Committee program general interest sessions on new areas of the technology did not appear to be the answer. Any such sessions should be scheduled at a Winter Annual Meeting where a relatively good attendance could be expected.

The immediate solution appears to be to hold a week of committee meetings for "working members" during the Summer Meeting. The foundation of the newly conceived meeting would be the Regional Delegates Conference, the Nominating Committee hearings and Organization meeting, Vice Presidents, the Council, and the Business Meeting.

With the change in the administative year. it is logical to hold the Technology Executives' Conference at this time. The Technology Executives' Conference would probably be a concentrated all day (three session) meeting devoted to the orientation of incoming division chairmen and the new member of the executive committee. Since attendance at the T. E. C. would not be limited because of location, all members of the executive committee would be invited to attend.

With such a large representation of the various professional division, it is planned to hold a meeting of each of the four Professional Division Department Executive Committees. A joint meeting of the four departments would serve as the platform for an annual critical review of the technological progress of the Society.

It is hoped that all divisions will be able to meet at the Summer Meeting. If this proves impossible it should be understood that each division must be represented at the T. E. C. and Department meetings.

The Publications, Research Executive and Planning Committees and Board on Codes and Standards will not be asked to join in the 1962 meeting. There is a need for closer cooperation between the technological and codes and standards branches of the Society but it does not appear feasible to move all groups to this June meeting for the first year the meeting is held.

Please answer the enclosed questionnaire which will assist us in planning the 1962 Summer Meeting. Your comments are welcome regarding the tentative pattern of the meeting which is attached. You will note that meetings related to divisions are restricted to Sunday, Monday and Tuesday. This is only one day more than the old Arden House T. E. C. and much more business will be accomplished.

Sincerely yours,

W. Burdette Wilkins

W. Burdette Wilkins, Chairman
Meetings Committee

cc: J. K. Louden
M. Bradner
F. D. Snyder
P. Carroll
J. F. Young
H. N. Blackmon

P.S. Please return completed questionnaire to me by December 15, 1961.

1962 ASME SUMMER MEETING

TENTATIVE PATTERN

	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
9:00 a.m.	RDC Reg. Affairs	Council Div. Exec.	Council Nom. Comm. Div. Exec.	TEC Nom. Comm.	Jt. Meeting of PD Depts. Nom. Org.	Bd. on Tech.
2:00 p.m.	RDC Reg. Affairs	Council Div. Exec.	Council Nom. Comm. Div. Exec.	TEC Nom. Comm	Power Dept., Gen. Engrg. Dept., Industry Dept., Basic Engrg. Dept. Exec. Comms.	X
4:45 p.m.			Business Mtg.		Meetings Comm.	
6:30 p.m.		EIC-ASME Dutch Treat Social & Informal Dinner	Council Org. Dinner Mtg.	TEC Dinner Mtg.		
8:00 p.m.		Div. Exec.	Div. Exec.	TEC	Publications Comm.	

A new concept for technical programs in ASCE

WILLIAM H. WISELY, Executive Secretary ASCE

When an engineering society of 48,000 members attracts only 5 to 10 percent of them to its national technical meetings each year there is obviously cause for concern. This condition has prevailed in ASCE for some years. At the same time cognate civil engineering organizations—mostly "splinters" from ASCE—are holding larger and better technical meetings and producing superior publications. Some examples are the American Concrete Institute, the American Water Works Association, the Water Pollution Control Federation, the Highway Research Board, and the American Railway Engineering Association.

Critical appraisal of this problem reveals quickly that there are serious deficiencies in the present pattern of the Society's technical meeting programs.

PRESENT TECHNICAL MEETINGS

The principal technical meeting programs of the Society traditionally have been presented in its Conventions, of which there are usually three annually. In recent years there has been an increasing trend to additional specialty conferences, sponsored and presented by a single Technical Division. There have also been occasional joint conferences with other national engineering societies, such as the Nuclear Congress and the American Power Conference.

Conventions

All of the fourteen Technical Divisions of the Society are free now to arrange sessions in any Convention program. This results in a haphazard assembly of 35 to 55 sessions offered by 10 to 14 of the Divisions in concurrent batches of as many as seven sessions in any morning or afternoon period. There is seldom any consistent aim or direction to the program as a whole; it is too often a conglomerate of sessions and papers that is arranged merely because a convention is scheduled for a particular time and place.

Some observations on present Conventions:

1. Sessions arranged by any Division are rarely strong enough to draw a truly national audience. Except for officers, staff, and committee personnel, whose expense is borne entirely or in part by ASCE, the attendance is mainly regional and local.

2. The program in any Technical Division specialty is rarely strong enough to justify granting of time and expenses by employers of members. The bulk of attendance from outside the Convention locality is limited to self-employed and supervisory personnel. Registration by younger employee members is practically all local.

3. Session attendance is small, usually ranging from 20 to 100. This discourages top-flight authors and papers. Society publications subsequently suffer.

4. Program coverage of professional topics is only nominally effective because the audience is small and includes many of the same people at all Conventions. The impact of professional activities is realized effectively only when there is a national audience representing a cross section of all segments of membership.

5. The demand for meeting rooms to accommodate numerous concurrent technical sessions greatly complicates Convention management and limits the selection of Convention headquarters.

Technical Conferences

Because the Conventions have not given adequate opportunity for exchange of knowledge and experience, the more aggressive Technical Divisions have staged periodic or occasional conferences of their own. Such conferences are considered to be the most productive technical meetings of the Society at this time.

These conferences are sponsored and presented by a single Technical Division, with the cooperation of a Local Section. They may offer a general program under the interest of the Division, such as the Annual Hydraulics Division Conference, or a specialty program, such as the Electronic Computation Conferences that have been held by the Structural Division.

As managed to date, however, these conferences have also been more regional than national in attendance. Also, a topic such as "Electronic Computation" is of interest to practically all members and should be offered through all the Divisions concerned.

In each of the years 1959 and 1960, there were six Technical Division conferences, drawing an aggregate registration of 1,300 members.

Joint Conferences with Other Societies

ASCE has always been a willing participant in joint programs with other engineering societies. Joint programs in Society Conventions have also been arranged, as with the American Concrete Institute in February 1958, and with the International Association of Bridges and Structural Engineering in October 1958.

The joint conferences (the American Power Conference, the EJC Nuclear Congress, the Engineering Management Conference) do not, however, attract a significant segment of the ASCE membership.

PROPOSED PLAN OF MEETINGS

No doubt there is more than one possible solution to the problem as outlined. The plan suggested here is believed to be flexible and adaptable to the development of programs with a definite and specific purpose.

The components of the plan are:

1. At least four annual basic technical conferences centered upon major areas of civil engineering practice.

2. Annual or periodic Division or specialty conferences on timely subjects.

3. One Annual Meeting of broad civil engineering interest, to be held in connection with one of the basic technical conferences.

4. Joint technical conferences with other societies.

Basic Annual Technical Conferences

As presently visualized these would be: (*a*) the Annual ASCE Environmental Engineering Conference, (*b*) the Annual ASCE Structural Engineering Conference, (*c*) the Annual ASCE Transportation Engineering Conference, and (*d*) the Annual ASCE Water Resources Engineering Conference. Sponsorship and participation in them would include only those Technical Divisions having a direct interest in the scope of the conference, somewhat as follows:

TRANSPORTATION ENGINEERING CONFERENCE
Highway
Air Transport
Waterways and Harbors
City Planning
Pipeline

ENVIRONMENTAL ENGINEERING CONFERENCE
City Planning
Sanitary

STRUCTURAL ENGINEERING CONFERENCE
Structural
Engineering Mechanics
Soil Mechanics and Foundations

WATER RESOURCES ENGINEERING CONFERENCE
Power
Sanitary
Hydraulic
Waterways and Harbors
Irrigation and Drainage

In this schedule of assignments

twelve of the fourteen Technical Divisions are included. The Surveying and Mapping Division and the Construction Division, being independently functional, could provide papers in any of these programs under the conference theme.

Whenever appropriate, luncheon addresses, papers, or forums dealing with professional subjects and activities would be included in any technical conference.

Locale of the basic conferences would be rotated throughout the nation. Meetings of the Board of Direction could also be rotated among them as desired.

Specialty Conferences

There will always be a need for technical conferences pointed to specific timely problems and subjects. These should be sponsored by one or more Technical Divisions, on the basis of direct interest, and they should be presented as major national meetings, supplementing the basic annual conferences.

Some Divisions, such as Surveying and Mapping, Construction, and Engineering Mechanics, might occasionally find it expedient to stage their own specialty conferences. In fact, any Division would be free to hold a technical conference for its members whenever there is such a need.

Annual Meeting

The Annual Meeting would be planned for all members of the Society, regardless of technical specialty. It would always be held with one of the major technical conferences, preferably alternating among them. Duration would be one to two days, in addition to the time for the concurrent technical conference.

Features of the Annual Meeting would be:

1. Annual Business Meeting.
2. Annual Honors and Awards Convocation.
3. Addresses by national figures from government, industry, and other professions, on topics of timely public concern (such as the Interstate Highway Program, national defense, nuclear energy applications, space age developments, international relations and projects, etc.)
4. Conditions of Practice programs, on professional subjects in all areas.
5. Special addresses by Society officers (President, President-elect).
6. Special lectures by national and international authorities.
7. Workshop sessions for Committee on Conditions of Practice and Committee on Technical Procedure.

It will be noted that this type of program possesses extraordinary public relations possibilities.

• There is much concern with various indications that civil engineering is declining in stature among other engineering disciplines, particularly as measured by college enrollments. At the same time, population growth, a burgeoning economy, increasing defense needs, and the onset of the Space and Nuclear Ages impose new and greater demands and challenges upon the civil engineer.

It is vitally important, therefore, that every resource be fully utilized to develop civil engineering as a science and art. There is currently much discussion of current needs in education and research, but little thought has been given to the greatest resource of all—the 100,000 civil engineers who are in practice today.

The memorandum presented on these pages outlines a plan that will employ to best advantage the manpower, facilities, and mechanism of ASCE in meeting its responsibilities in modern technology.

This proposal has already been endorsed in principle by the Executive Committee of the Board of Direction, the Committee on Technical Procedures, the Committee on Division Activities, the Committee on Conditions of Practice, and the Committee on Convention Policy and Practice. The Executive Committee has authorized publication of the proposal in "Civil Engineering" in advance of the Board of Direction meeting in October when the plan will be considered for formal adoption. W.H.W.

Joint Conferences with Other Societies

Opportunity for joint programs with other societies should be greatly enhanced in the proposed basic annual conferences. The American Railway Engineering Association, the American Association of State Highway Officials, the American Road Builders Association, and the Highway Research Board would be logical participants, for example, in the Annual ASCE Transportation Engineering Conference.

Increased emphasis on the Division and specialty conferences as national meetings would make these more attractive to cognate and related societies for joint participation.

CONCLUSIONS

It is believed that the proposed new combination of technical programs will markedly enhance the over-all quality and productiveness of the meetings, and publications, of the Society. Among the foremost benefits and advantages are the following:

1. All meetings would have specific direction and purpose, offering vigorous programs with national and international appeal and providing maximum advantage in personal contacts.
2. Better audiences would attract the best available authors and papers, with ultimate secondary benefit to all Society publications.
3. Strong, four-day, concentrated programs would encourage subsidization of time and expenses of employee members, broadening the service to membership.
4. Opportunity would be afforded for cross-fertilization of ideas and practice among those Technical Divisions having overlapping and related interests.
5. There would be at least one meeting a year that any member of the Society "could not afford to miss." Just one of the basic annual conferences would give a member of any of the participating technical divisions as much or more useful material as all three of the present conventions.
6. By attracting more members from all segments of interest and age, the proposed technical conferences and Annual Meeting would afford a much broader audience for Conditions of Practice programs.
7. The proposed Annual Meeting would give greater emphasis to professional activities, public affairs, and to honors and awards, with maximum opportunity for public relations development.

Example of Information Categorization from College Catalogue

LEVEL OF SOPHISTICATION

SUBJECT

SCOPE (i. e., Contemporary Technology)

74 • ENGINEERING

GRADUATE LEVEL

690. GEOLOGY OF RADIOACTIVE MATERIALS. Class 3, cr. 3.

691. ADVANCED GEOPHYSICS. Class 2, Lab. 3, cr. 3.

692. GROUND WATER GEOLOGY. Class 2, cr. 2.

693. ADVANCED ENGINEERING GEOLOGY I. Class 2, Lab. 3, cr. 3.

694. ADVANCED ENGINEERING GEOLOGY II. Class 2, Lab. 3, cr. 3.

695. SEDIMENTATION. Class 2, Lab. 3, cr. 3.

696. PETROGRAPHY. Class 1, Lab. 6, cr. 3.

ELECTRICAL ENGINEERING

Professor Jones in charge

Professors: Beck, Bowman, Canfield, Cooper, Eaton, Freeman, George, Happell, Hayt, Hesselberth, Jones, Sabbagh, F. V. Schultz, R. P. Siskind.

Associate Professors: Gibson, Heim, Izawa, Kramer, LaMothe, Machol, McFadden, Nichols, C. S. Siskind, Sprague, Tou.

Assistant Professors: Chang, Chapman, El-Abiad, Friedlaender, Hancock, Kinnen, Miraldi, Shelley.

Instructors: Adams, Aein, Amoroso, Austin, Birkemeier, Bolle, Butterworth, Chung, Cohen, Czarapata, Donovan, Evans, Grant, Halsey, Holmes, Holub, Joseph, Kozin, Landgrebe, Leedham, Leliakov, Lin, Lindenlaub, Lytal, McVey, Meditch, Murphy, Ogborn, Rekasius, Rogers, Sage, Schemmer, Schoendorf, D. G. Schultz, Seo, Sheppard, Sims, Smith, Tchamran, Waltman, Wyman.

Graduate Teaching Assistants: Anders, Dalton, Davisson, Detraz, Dietrich, Dunkin, Eveleigh, Goerke, Griffin, Hemdal, Hiranandani, Holsberg, Lucky, Miller, Myers, Nahi, Newton, Simpson, Spilo, Tyrrell, White.

Extension Centers—Associate Professor: Wisner.
Assistant Professors: Anderson, Cox.
Affiliate Associate Professor: John R. Clark, Fort Wayne, Indiana.
Affiliate Assistant Professors: Perry Kendall, Fort Wayne, Indiana; W. J. Williams, Fort Wayne, Indiana.

UNDERGRADUATE LEVEL
Lower-Division Courses

203. CIRCUITS I. Sem. 1 and 2. SS. Class 4, Lab. 3, cr. 5. (3 EE). Must be preceded or accompanied by MA 261 and PHYS 261.

Fundamental properties of electric and magnetic circuits. Basic concepts, circuit elements, and source functions. Response of simple circuits. Transformations. Sinusoidal steady-state analysis. Professors Freeman and Shelley.

204. CIRCUITS II. Sem. 1 and 2. SS. Class 4, Lab. 3, cr. 5. (4 EE). Must be preceded by EE 203 and preceded or accompanied by MA 262.

Continuation of EE 203. The complex-frequency plane, impedance and admittance functions, network analysis and theorems, nonsinusoidal periodic functions. Professors Freeman and Shelley.

UNDERGRADUATE LEVEL
Upper-Division Courses

291. INDUSTRIAL PRACTICE I. Sem. 1 and 2. SS. cr. 0. For Cooperative program students only.

292. INDUSTRIAL PRACTICE II. Sem. 1 and 2. SS. cr. 0. For Cooperative program students only. Must be preceded by EE 291.

393. INDUSTRIAL PRACTICE III. Sem. 1 and 2. SS. cr. 0. For Cooperative program students only. Must be preceded by EE 292.

394. INDUSTRIAL PRACTICE IV. Sem. 1 and 2. SS. cr. 0. For Cooperative program students only. Must be preceded by EE 293.

395. INDUSTRIAL PRACTICE V. Sem. 1 and 2. SS. cr. 0. For Cooperative program students only. Must be preceded by EE 294.

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