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Volume 56 APRIL, 1969 Number 2

COMPUTER GRAPHICS

CHARLES W. BEILFUSS*

(Lecture presented on February 13, 1968 as one of the Boston Society of Civil Engineers series on the use of computers in Civil Engineering.)

The subject of this paper is CONSTRUCTS — computer-generated graphics system, designed for the structural steel fabrication industry. The Constructs System performs both structural design and graphic construction functions. The primary theme of this paper is the graphics phase, i.e. the generation of steel shop drawings by the computer, and computer-related equipment.

CONSTRUCTS is a computer-guided system which synthesizes the complete shop drawing drafting operation, known in the vernacular of the industry as "detailing." It maximizes the use of computer-programmed logic in those detailing operations that can be considered standard. The system is able to develop drawings for all members for which the logic of dimensioning, fitting and drawing has been pre-programmed.

CONSTRUCTS was developed with funds provided by Control Data Corporation to its Meiscon Division. The purpose of the project was to direct applied research to the problem of automated drafting, and to determine the effectiveness of passive display devices in a standardized drafting application. The system was not only to be developed by Meiscon, but was to be used in the performance of actual contract work to assess its value and to determine its strengths and weaknesses.

Control Data organized its Meiscon Division in February 1963, and authorized the Constructs Project in July of that year. Upon completion of an approximate 25 man-year effort spread over two years, the system entered field test status. It developed completed drawings for actual use on a detailing job in May of 1965.

Since CONSTRUCTS does not utilize any of the pioneering forms of hardware, this paper will dwell on the requirements of the application itself, and

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the approaches to make this and other similar automated graphic operations feasible. It is our judgement that not only are hardware and software techniques important in the development of automated or computer aided graphic systems, but that the analysis of the application itself and the methods of coordinating manual and automated operations are critical to the success of the project.

Background

At this point, it seems worthwhile to review the operation of the structural steel fabrication industry, as it has existed for the past four years. It is an industry that is strictly cost and production oriented. Stiff competition exists among a handful of very large companies and a large number of medium to small firms. All but the very largest are independent firms and must purchase their supplies of raw rolled steel from the large mills. In the main, the fabricated pieces are sold to still other companies that construct, or erect, the finished structure.

Fabrication work is obtained through competitive bidding. Due to the cyclical nature of heavy construction, the competition may range anywhere from fierce to slight. Fabrication prices fluctuate drastically and, when pressure exists, the resulting low prices must be compensated for by limiting operating costs.

Orders for raw rolled steel must be carefully worked out so that basic costs may be minimized. The orders must be created swiftly to meet the earliest rolling schedules of the steel mills and to assure delivery in time to avoid fabrication shop delays due to lack of material. Shop drawings must be produced in the shortest possible time. This operation is continually under pressure since the engineering drawings, from which the draftsman receives his information, are generally still being produced after the fabricator begins work, and the shop is continually demanding a supply of drawings to insure that their work will not be delayed.

The fabricator purchases his raw material from a steel mill in the form of lengths of steel in standard rolled shapes and sizes. From this raw rolled steel, the exact lengths are cut to allow the members to fit into place. If need be, the pieces are trimmed so that interferences will not occur. Holes are punched in the members to allow bolts to connect a supporting member to a supported member, or to connect secondary material such as handrails and stairways. The locations of all holes are carefully figured to minimize layout and punching problems in the shop. Pieces are fitted together in the shop so that the field erection job may be as easy as possible. All of this work must

be performed with great care since mistakes mean waste of expensive material, or may bring large back-charges against the fabricator for causing erection delays or field repair.

In order to communicate the proper instructions to sub-technical personnel in the shop, the practice has developed of preparing a shop drawing which shows in large pictorial form real-looking views of each member with the positions and dimensions of all holes and attachments. A typical shop drawing is shown in Figure 1. The picture of each member is drawn realistically and clearly so that a minimum of visualization is required of shop personnel. Straight and clear line work and clear characters are important since they affect visualization of the member and interpretation of the measurements.

To prepare these shop drawings, fabricators require a large number of well trained draftsmen, either from their own organization or from independent job shops. These draftsmen have special abilities, training and temperament. They are careful, have good mechanical ability and three dimensional visualization, are able to turn out large volumes of the same type of work day after day without losing interest, and have an understanding of the way in which structural steel should be fabricated and erected.

The draftsman studies the engineer's design drawing, which is a line drawing containing the location and size of all members of the building. In his mind, the draftsman visualizes how the pieces fit together, and arrives at a decision as to how they should be connected. He calculates the proper number of bolts, or amount of weld; designs a connection to fit these needs; determines how to minimize punching by placing bolts from several members through as many common holes as possible; and continually reviews his decisions to be sure that there is adequate clearance for erection and for access of a wrench in order to tighten the bolts. In order to build up a complete picture, the draftsman must relate all connecting members so that bolts on one member have fitting holes accurately placed on attaching members. He then makes an appropriate record on the drawing in a form understandable and suitable to the shop.

The member drawings are placed on sheets in a logical and compact manner. The sheet sizes vary, but generally measure about 24 in. x 36 in. Each contains from four to ten individual pictures. Pictorial realism and clarity are retained although the pictures are generally drawn to scale in only one direction. Vertical scaling is accurate, but the horizontal scale is allowed to vary to compact the individual picture and so conserve sheet space. Each drawing generally represents only one member, and is used just

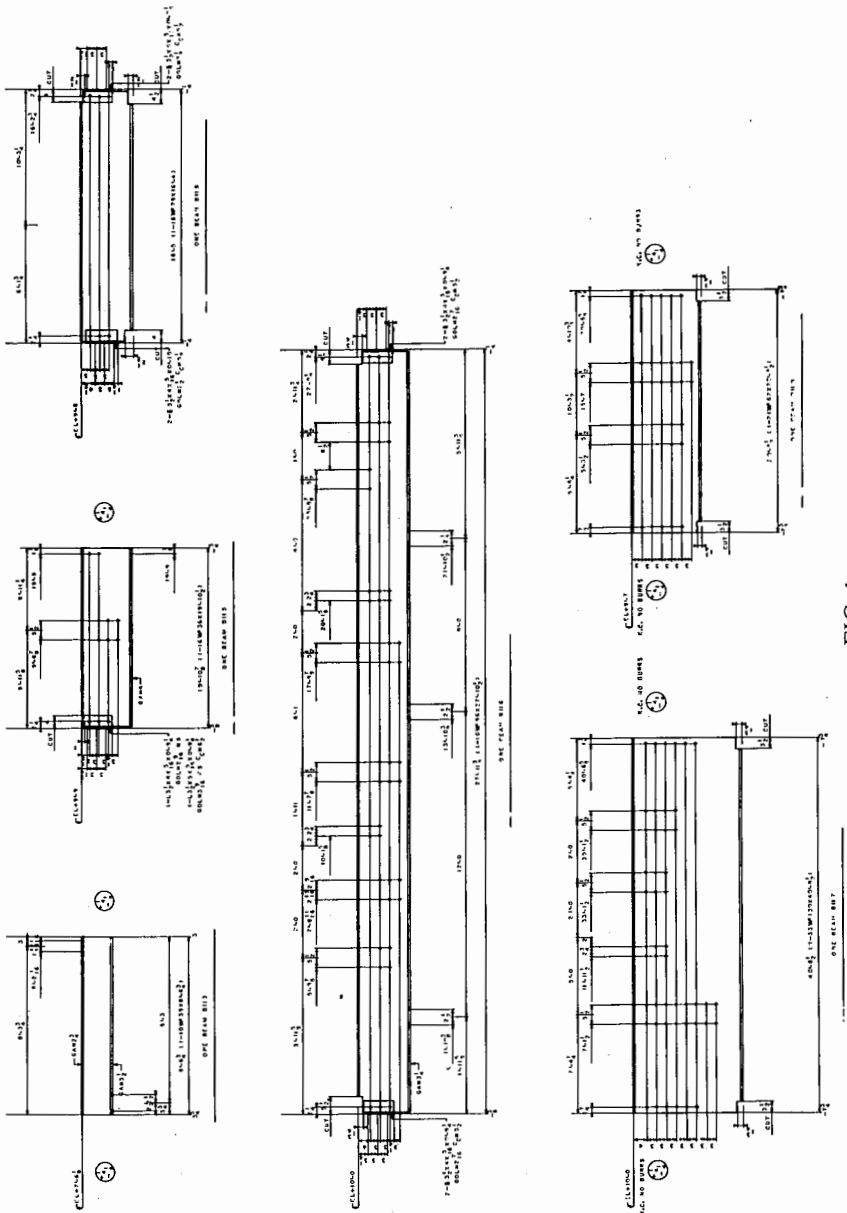


FIG. 1

twice: once in the shop when the member is fabricated, and once in the field when the member is erected. Drawings of this type are essential, but because of the low utilization factor, they are prepared with the least possible cost. They are prepared in high volume with large jobs having as many as 2,000 to 5,000 sheets of up to ten-member drawings.

In summary, the application to which we have applied computers and graphic devices is one which requires that a large number of simple, clear, visually real drawings be produced with very accurate dimensions, at low cost, and in a minimum of time. Although a human draftsman can perform these services, there is need for improvement in efficiency and costs, and a need to supplement the pool of available persons which is being depleted by the attractions of more glamourous occupations.

Research Project

It was decided that there were a significant number of features within this particular application to warrant its selection as the subject of our research project. As our study progressed, it became apparent that the simple development of the picture by the computer would not be the proper way to attack the problem. The cost of the "art work" by manual techniques is low because of the simplicity of line work and the relatively standardized and semi-schematic presentation of the drawing components. This indicated the need for the computer to perform operations other than just graphic output, in order to gain economy. One logical step was to have the system calculate the dimensions that were to appear on the drawing, in addition to producing the drawing itself. Since the shop drawings are made up largely of standardized components selected by rather well-defined logic, the system could perform the selection function also. Having the system perform this standardized selection function was not just desirable for economy, it was essential unless man-machine interaction was on a high level, since the calculation of dimensions and the selection of connection type are mutually dependent.

In 1964, we were faced with an unavailability of hardware and software needed to develop an efficient means of man-machine graphic communication. At that time, Control Data's Burlington Laboratory was just beginning work on the Digigraphic System, utilizing cathode ray tube (CRT) and light pen techniques. Although it was obvious that the lack of an efficient interactive medium would not prohibit development of our system (because the needs were for production of large volumes of standardized drawings resulting from fixed logic), it did inhibit system capability in terms of decision flexibility and ease of development of input data. Our input technique remained the punched card prepared from a dataform. Without ready interac-

tion, it would be impossible , except under a few special conditions, to allow the draftsman to impose his will on the system by reacting to system calculations. Without convenient man-machine communication, we also decided to make the system as independent as possible, thus causing the system to be one of automated drafting rather than of computer-aided drafting. Although this approach was recognized as being expensive, and less flexible, it would, in addition to producing pictures, attack the detailer's greatest problem, namely, that of reducing human errors in data correlation and transfer.

Each member would require many logical decisions and many computations based on logic iteration. Large amounts of data would have to be stored to define the structure, and to define all of the many small details of each member, not only in its real physical state, but also in its graphically represented state. The speed and storage requirements of the computer to be used were significant.

We selected a Control Data 3600, which had just been installed in Control Data's data center in Minneapolis. The configuration has 131,000 words of core storage, each of 48 bits. Cycle and add times were 1.2 and 2 micro-seconds respectively. At the time the design of the Constructs System took place, the computer had 12 tape drives but no random access storage. To provide our office in Chicago with access to the Minneapolis data center, we installed a Control Data 160A computer, with card reader, tape drives and printer, to transmit and receive data by telephone lines. All program development as well as production runs have been performed through this process. Data received in Minneapolis from our office are stored on tape, and then inserted into our batch process.

A graphic device for producing the drawings also had to be selected. Our previous experience had been with a high speed CRT-to-film device. The results, which we obtained from the 1000 x 1000 grid on a four-inch CRT, indicated to us that, when the film was blown-up to the required size of 24 in. x 36 in., the resolution would be unsatisfactory. The through-put rate, however, would be fairly well balanced with that of the computer.

We reached the conclusion that it was more important to produce a drawing of the type and quality needed to allow the shop personnel to perform their work with the least retraining, than to balance the system through-put, since the computers involved would not be dedicated solely to this application.

After considerable study, we selected a 45 in. x 60 in. flat bed, analog, mechanical plotter for our output device. It has a plotting tolerance of $\pm$ .015 in., which is approximately that of a draftsman. Line work is created

by ink on hard copy from one of three different size reservoir pens mounted in a program-addressable turret. Characters may be printed by a print head mounted on a translating arm along with the pen turret, or they may be drawn by pen. The plotter is off-line and accepts simple line and point commands from magnetic tape. The plotting speed is about 144 in. per second for lines, or about three characters per second by print head.

Detailing System

The CONSTRUCTS detailing system can be thought of as being divided into three basic phases. Each of these phases simulates the thought processes and physical actions of an experienced draftsman.

In the first phase, CONSTRUCTS simulates the draftsman's study of engineering design drawings by reading minimal data from punched cards. Figure 2 is a sample of just such a design drawing, or framing plan, as produced by the design engineer. The framing plan shown depicts a structural floor arrangement, showing the floor beams as straight lines, and the supporting columns as as H or I shaped symbol. In practice, framing plans display structural systems much larger and more complex than this sample. The system input data are the information portrayed on the engineer's design drawings, regarding each member's relative location within the framing plan (i. e. 10 ft. - 0 in. from vertical plane A, 2 ft. - 3 in. from floor plane 1, etc.), as well as declarations of the absolute location of the structure's vertical and floor planes. Since these dimensions are available on the design drawings, the draftsman creating input need only record what he sees displayed on his source document. He need not make tedious and error-prone mental summations to compute coordinates, nor be concerned about connection design or dimensional determination since the system handles these functions. The location of each member, its shape, size and orientation are also input. In addition, a declaration is supplied of the members which *support*, but not those supported by, the piece in question. A small amount of subsidiary information regarding the type of shop and field fastenings is also input. These data are written on well laid-out, but rather typical, preprinted input forms. Figure 3 is one of the three data forms available to record input information to the system. A major part of the dataform is reserved for special overrides to normal conditions, and thus is used only for these special conditions.

It was recognized that by asking the draftsman to transfer data from graphic form to a dataform rather than between graphic forms as he was used to doing, we were increasing the potential for error. To help overcome this, an extensive series of validation tests are applied to the input data by

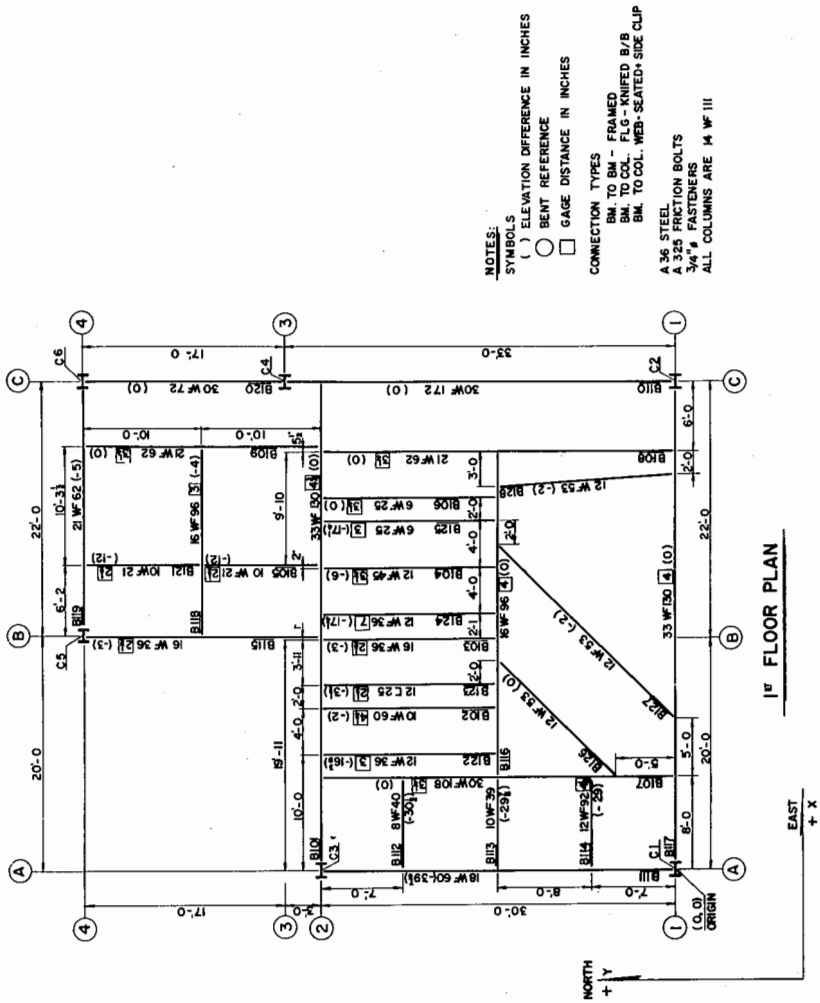

NOTES:
SYMBOLS
( ) ELEVATION DIFFERENCE IN INCHES
BENT REFERENCE
GAGE DISTANCE IN INCHES
CONNECTION TYPES
BM. TO BM - FRAMED
BM. TO COL. FLG - KNIFED B/B
BM. TO COL. WEB - SEATED + SIDE CLIP
A 36 STEEL
A 325 FRICTION BOLTS
3/4" ø FASTENERS
ALL COLUMNS ARE 14 WF 111
1st FLOOR PLAN
NORTH +Y
EAST +X
(0,0) ORIGIN

FIG. 2

CONSTRUCTS DETAILING INPUT FORM

0 = ZERO 1 = ONE 2 = TWO
O, Θ = LETTER O I = LETTER I Z = LETTER Z

MEMBER DATA

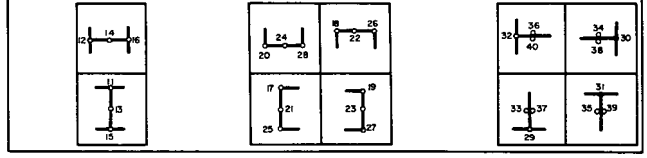
MEMBER NUMBER	CARD I.D. TYPE	CARD I.D. CORRECTION CODE	ADD I.D.	ERECTION DIVISION	MEMBER LOCATION CODE	MEMBER FUNCTION IDENTIFICATION	ROLLED SECTION PROPERTIES: SHAPE CODE	NOMINAL DEPTH	FLANGE WIDTH / COVER PLATE WIDTH "t" IN. 1/16 IN 1/16	WEIGHT/FT.	STEEL GRADE	GAGE DISTANCE	ORIENTATION: WORKLINE LOC.	ORIENTATION: ROTATION	ORIENTATION: ANGLE OF CANT -45° ≤ ANGLE ≤ 45° (DEGREES) + DEG MIN SEC. XX XX XX (BEVEL) IN 16Th XX	"LEFT" SUPPORT: MEMBER NUMBER	"LEFT" SUPPORT: REACTION CODE	"LEFT" SUPPORT: REACTION	"LEFT" SUPPORT: CONNECTION TYPE CODE	"RIGHT" SUPPORT: MEMBER NUMBER	"RIGHT" SUPPORT: REACTION CODE	"RIGHT" SUPPORT: REACTION	"RIGHT" SUPPORT: CONNECTION TYPE CODE
1 2 3 4 5	6	7 8 9	10 11 12 13	14	15 16 17 18	19 20	21	22 23 24 25 26 27 28 29	30 31 32 33 34 35 36 37	38 39 40 41 42	43	44 45	46 47	48 49	50 51	52 53 54 55 56	57 58 59 60 61	62	63 64 65 66	67	68 69 70 71 72 73	74	75 76 77	78 79 80

① ⑧ ②-④ ⑤ ⑥ ③-⑦

FOR SHAPE CODE 06,07 & 11 ONLY

⑨

CROSS SECTION VIEW LOOKING FROM RIGHT TO "LEFT END" OF A MEMBER



⑤

A7	1
A373	2
A36	3
A242	4
A440	5
A441	6

USER _____
JOB _____
_____
_____
CONTRACT NO. _____
DATE _____

① ②

M	AN	ANGLE
M	HA	HANGER
M	PO	POST
B	BE	BEAM
B	CH	CHANNEL
B	SB	SPANDREL BM
B	TB	TROLLEY BM
P	PU	PURLIN
D	BS	SWAY BRACE
D	SF	SWAY FRAME
D	BR	BRACE
D	KB	KNEE BRACE
D	DI	DIAGONAL
D	HB	HORIZ. BRACE
C	CO	COLUMN
G	GI	GIRDER
F	GT	GIRT
R	RA	RAFTER
S	SS	STAIR STRINGER
S	ST	STRUT

③

SYSTEM WILL COMPUTE	(BLANK)
REACTION GIVEN (KIPS)	R
SPAN LENGTH (FT)	L
NO. OF FASTENERS	N

④

WF COLUMN CORE	01
WF SECTION	02
I BEAM	03
LIGHT BEAM	04
MISC. SHAPE	05
LIGHT WF COLUMN	06
MISC. COLUMN	07
JR. BEAM	08
CHANNEL	09
JR. CHANNEL	10
CAR & SHIP CHANNEL	11
T FROM WF	12
T FROM I BEAM	13
T FROM MISC. SHAPE	15
T FROM LIGHT BM	16
T FROM JR BM	17

⑦ SEE USER'S MANUAL FOR CONNECTION TYPE CODE

⑧

(BLANK)	ORIGINAL CARD
A	ADD CARD
C	CHANGE CARD
D	DELETE CARD

MEISCON CORPORATION
A SUBSIDIARY OF
CONTROL DATA CORPORATION

FIG. 3

the first phase of the system to keep detectable errors from passing through the system. Member sizes are checked for validity against the steel section table. Abnormally long, short or skewed members are brought to the user's attention as possible error conditions. The support declaration made by the user is verified for consistency. From this information a model of the structure is created in memory, through a simple list processing technique, to determine the design sequence of the members. Once the tree-structured model has been produced, a string of pointer indexes is generated for each member, identifying the list address of all connected members. The declaration of shop and field fastening modes for the various classes of members are also cross-validated to avoid inconsistencies in fabrication procedures. If any error conditions are uncovered, printed messages indicating the source and cause of the error are given. Corrections of errors may be made by edit and update programs.

After the input has been approved by the user, it is rearranged by the system into the proper detailing sequence for submission to the connection design phase. The individual connections of two or more members are designed by the detailing procedures recommended by the American Institute of Steel Construction, and by the additional detailing criteria input supplied by the user. All of the basic facts regarding each member, such as deciding on the member's end and interior connections, cuts, copes, fasteners, wrench clearance, etc., are determined by the system through program logic and stored for image generation.

During processing in the connection design phase, a record of 3000 characters minimum is constructed for each member, completely describing all details of the member in final fabricated form. This record is the most compact description of the complete structural piece and its attachments. From this information, the third or graphic phase of the system formulates the plotter output in a three-step process. The first step is problem oriented in that the programs interpret the data from the structural steel member record and builds-up a series of graphic entities into the specific kind of shop drawing for portraying the member.

The second step converts the shop drawing graphic entities into a general graphic representation not at all related to shop drawings. The third step converts this general representation into the specific command structure of the plotter through a post processer type of operation.

The object of step one is to select, for each particular member type, a series of graphic entities, or sub-pictures, that are manipulated and joined together to form an entire picture. Figure 4 shows six graphic entities which

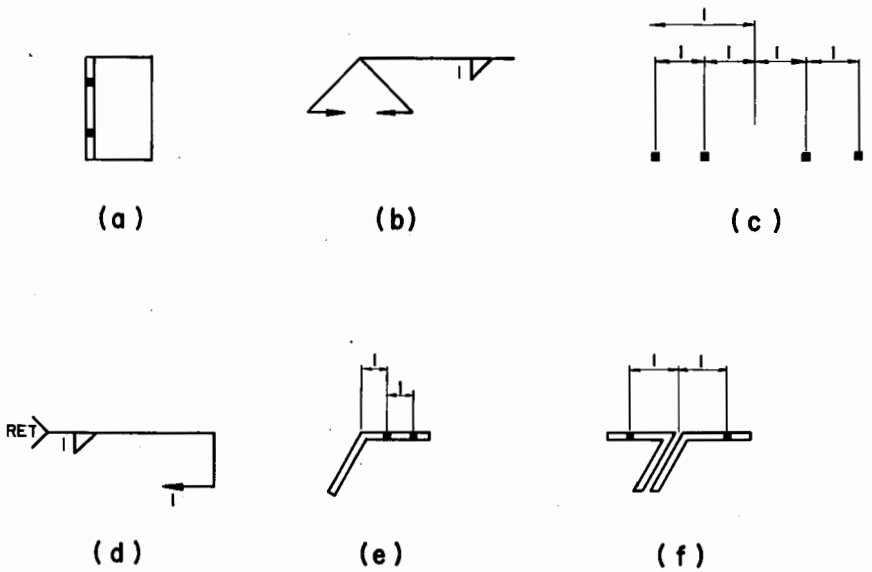


FIG. 4

are contained in a file of master drawings. The graphic entities are preprogrammed from a scaled layout of a "unit picture". Each unit picture is a generalized component of a particular member image, and is stored with all of its dimensions and variable patterns shown as unity. If a series of circles, which represents a hole pattern, is to be drawn as part of the entity, the unit picture is shown with one circle set and a spacing factor. Each of the points of the entity may be identified as being scalable or not. Linkage points with other entities are pre-defined. Lines which are viewed as solid lines in the basic position, and which become hidden when viewed from the other side, are also pre-indicated.

Coding of the basic entity is accomplished by a separate file-builder program which can interpret a small vocabulary of convenient English language code words. The master entity file is prepared in advance of a production run, or may be held constant from a previous run, and is made available to the system during run time.

Each structural member drawing has its own local origin and referred axis. From the particular type of member, the program logic determines the proper graphic entities to be used and their order of build-up. As the system

builds each picture, it extracts codes and parameters from the member record to allow the programs to select the names of the proper graphic entities stored in file, and to create the proper factors which will later translate, rotate, stretch, reflect, fill annotation positions, and develop repetitious subportions of this entity.

In Figure 5, two separate graphic entities are displayed in various conditions.

Figure 5.1 is a connection angle shown in:

a. With minimum bolt holes
b. With call for four holes
c. As opposite hand
d. As rotated
e. As viewed from the opposite side, with one line and the bolt holes becoming hidden

Figure 5.2 shows a weld symbol:

a. Normal
b. Opposite hand
c. Rotated

Figure 5.3 shows the weld symbol related to the connection angle, by linkage points.

Manipulation of entities is not actually performed at this stage of the system. The entity name and manipulation factors are carried along with the record and are applied to each entity by the general graphic programs in step two. The graphic entity may be rescaled in total or with programmed constraints. Linkage points set in the basic entities cause all related entities lower in the hierarchy to be manipulated relative to the parental entity.

As an example of the steps of picture build-up, a structural beam has its ends formed first with from one to five individual entities. As each intermediate entity is developed by the system, the ends are spread apart sufficiently to assure adequate room so that no overwrite of characters or lines occurs. When the number and type of each series of dimensions is determined, the system develops an adequate number of line levels to hold each series of dimensions, and stretches the lines to connect related entities. The dimension values are extracted from the member record and placed in relation to a preprogrammed annotation point that has been properly translated due to the stretching of the dimension line.

During the build-up of the member picture, a small two-dimensional space availability table is checked off by the program as each unit of space

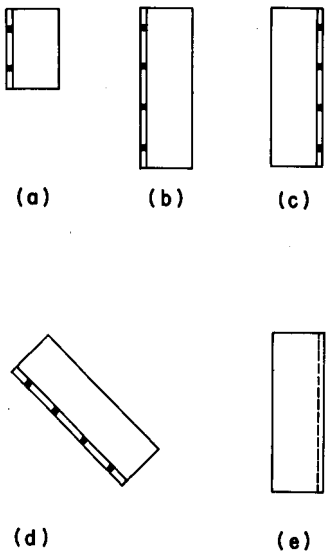


FIG. 5.1

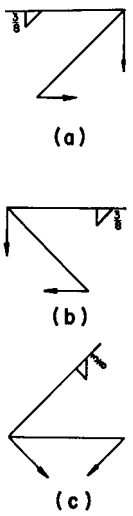


FIG. 5.2

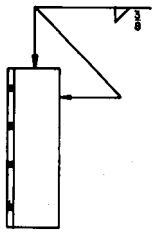


FIG. 5.3

is filled by the expanding member picture. Upon completion of the member picture, the space-availability table is compared against a similar table for the entire drawing sheet being developed. Program logic places the member in the position on the drawing sheet which allows maximum compaction. Translation factors are then applied to the member picture to properly place it in the selected available position. When each sheet is filled, it is numbered. All members on the sheet are then named relative to the sheet number and the drawing is then stored for processing by the general graphic programs.

The second step of the graphic processing extracts the description of the entity named in step one, this being in terms of lines, points and characters, and applies the associated manipulation factors to the series of general line, point and character generation descriptions which make up the entity. The graphic description is based on a general two-dimensional cartesian coordinate system, without regard to the command structure, or special idiosyncrasies of the particular plotter. All entity manipulations, i.e. scaling, rotation, reflection, etc., are performed with the present graphic constraints being observed in this step of the graphic phase.

The third step, or post process stage, formats the plotter commands and performs line interpolation as required by the plotter, selects character or plotting mode, pen, or whatever other facilities are available on the device. A bill of materials is produced in conjunction with the drawings. The information source is the basic member tape produced in phase two.

Project Results

Figure 1 is a view of a completed detail sheet as prepared and arranged by CONSTRUCTS. The five members shown are right angle beams for a building floor system.

Figure 6 shows a close-up of one right angle floor beam with one intermediate connection. An unusual difference of end elevations of this member's supports has caused the unusual dropped connection on the right end.

Programs for the Constructs System are written entirely in Fortran for the Control Data 3600. There are three major phases operating in an overlay mode under the monitor system. The three phases are composed of in excess of 200 sub-programs made up of more than 50,000 source state-

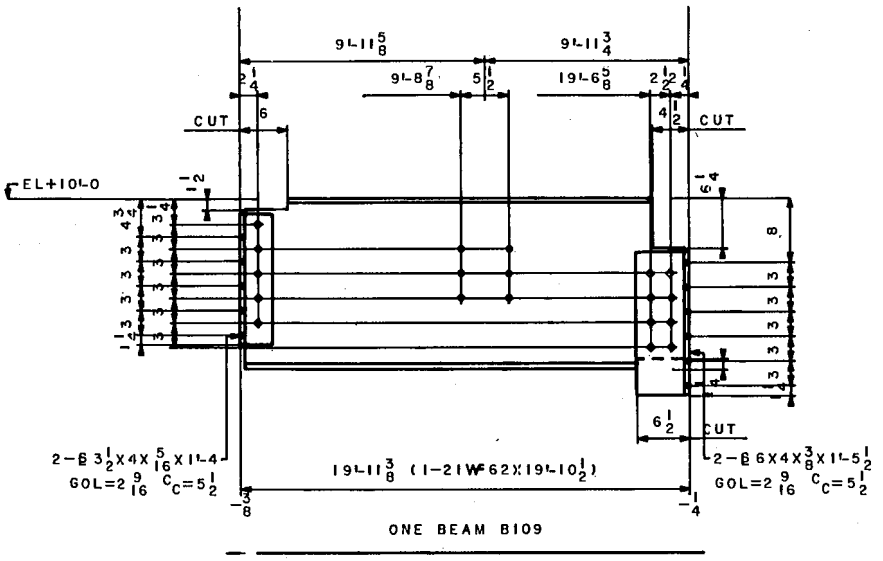


FIG. 6

ments. We currently are converting CONSTRUCTS to a Control Data 3150 for installation in a steel fabrication firm. The 3150 will have a memory of 32k, 24 bit words, and two high-speed disk units.

The CONSTRUCTS steel fabrication detailing system has been in use in our office as a service operation for two and one-half years. A few of our observations on the effectiveness of the system are as follows:

A. Cost
When analyzing the entire cost of shop drawings performed by the system, including manual completion and correction, and calculating computer costs at service bureau costs, we have found cost reductions reaching a maximum of 25 percent.

B. Timeliness
Small jobs have brought little or no time reductions, while jobs with large numbers of members have realized time reductions of 30 percent.

C. Manpower Leverage
Considerably fewer men of lesser experience have been required on jobs having substantial amounts of CONSTRUCTS oriented work.

D. Additional Outputs
The next planned stage of system extension will be the development of production information directly from the member record. This information will include tapes for member punching, templates for plate cutting, as well as expanded data for inventory management. We look forward to the use of an interactive light pen and scope to add increased flexibility. We consider this to be a decision-making tool to achieve a wider range of connection decisions, and to facilitate the development of graphic entities tailored to a particular job. We do not consider using these devices for the basic drafting operation due to the low drawing cost value and high production requirements for this type of drawing.

E. Flexibility
By developing a system which minimizes man-machine communications, flexibility of operation has suffered. Lack of flexibility would have been more noticeable had the effort to program decision logic not been as extensive as it was. We have had little trouble in applying CONSTRUCTS on a job basis; however, on some jobs CONSTRUCTS leaves members incomplete, a condition which we feel can best be satisfied by interactive devices.

In summary, we feel that CONSTRUCTS illustrates the feasibility of producing low-value, high-volume drawings in an economical manner by automated drafting techniques. Although the project has been successful, it should be noted that the effort required to equal the adaptive and highly productive human in a graphic operation is significant, must be well planned to suit the particular application, and should not be treated lightly.

PROCEEDINGS OF THE SOCIETY

Minutes of Meetings

Boston Society of Civil Engineers

February 20, 1969: — A Joint Meeting of the Massachusetts Section of the American Society of Civil Engineers and the Boston Society of Civil Engineers was held in the Mezzanine Lounge of the Student Center at M.I.T., at 7:00 P.M.

Mr. James Archibald, President of ASCE called the meeting to order at 7:35 P.M. At the conclusion of his business, Mr. Archibald called upon President Harl P. Aldrich, Jr., to conduct the business of the Boston Society of Civil Engineers.

President Aldrich called upon the Secretary to present a motion. It was moved and voted that the Board of Government be authorized to transfer an amount not to exceed $4,000 from the Principal of the Permanent Fund to the Current Fund for Current Expenditures.

The Secretary announced the names of applicants for membership in the BSCE.

After making the announcements, President Aldrich turned the meeting over to Prof. Russell C. Jones who introduced the panelists for the evening as follows:

Mr. William Kimball — Moderator
Miss Kathleen Chew — Tufts University
Mr. Joseph April — Northeastern University
Mr. Roger Samuel — Massachusetts Institute of Technology.

The panelists presented an interesting discussion on their ideas of civil engineering education of the future. Following the formal presentation of the subject, there was a lively discussion period which carried over past the formal adjournment which took place at 9:15 P.M.

Forty members and guests were present during the program.

Respectfully submitted,

Paul A. Dunkerley
Secretary

March 24, 1969: — The 121st Annual Meeting of the Boston Society of Civil Engineers was held at the M.I.T. Faculty Club, 50 Memorial Drive, Cambridge, Mass., and was called to order at 4:00 P.M., by President Harl P. Aldrich, Jr.

President Aldrich stated that the reading of the Minutes of Society meetings had been omitted during the year. The Minutes of the January and February 1969 meetings will be published in a forthcoming issue of the Journal, the Minutes of the May, October and November 1968 meetings were declared approved as published.

It was VOTED "to accept and approve the Minutes as published in the Journal".

The Annual Reports of the Board of Government, Treasurer, Secretary and Auditors were presented. Reports were also made by the following committees: — Publication, Hospitality, Program, Library, Membership, Advertising, Public Relations, Quarters, Joint Legislative Affairs, Subsoils of Boston, BSCE - ASCE Relations, Professional Conduct, By-Laws, John R. Freeman Fund, Ralph W. Horne Fund, Organizational Contact.

It was VOTED "that these reports be placed on file".

The Annual Reports of the various Sections were read and it was VOTED "that the Annual Reports of the various Sections be placed on file".

President Aldrich stated that the reports of the Sections would be published in the April 1969 issue of the Journal.

The Tellers of Election, Dr. Ronald E. Bucknam and Mr. Clifford W. Bowers, made their report on the results of the ballots, and in accordance therewith the President declared the following had been elected Officers for the ensuing year: —

President	Robert H. Culver
Vice-President	Ernest A. Herzog

Secretary	Paul A. Dunkerley
Treasurer	Robert T. Colburn
Directors	Max D. Sorota
	Keistutis P. Devenis
Nominating Committee	Athanasios A. Vulgaropulos
	William C. Traquair
	Francis T. Bergin

After a ten-minute recess, the retiring President, Harl P. Aldrich, Jr., then gave his address entitled "Back Bay Boston".

Fifty-three members and guests attended the business meeting.

The meeting adjourned at 5:45 P.M., to re-convene after the Social Hour and the Annual Dinner.

President Aldrich re-convened the meeting at 8:30 P.M.

Following general remarks and the introduction of the head table guests and the newly elected President, Robert H. Culver, the affairs of the meeting were turned to the announcement of newly elected Honorary Members and the awarding of the various prizes.

President Aldrich announced that two distinguished members of the Society had been elected to Honorary Membership in the Society. The Secretary announced the names of Charles O. Baird, Jr., and John B. Babcock, III, and requested them to step to the head table. President Aldrich presented the newly-elected Honorary Member, Professor John B. Babcock, III with a certificate of Honorary Membership which reads as follows:

Boston Society of Civil Engineers

For his outstanding career as a Professor of Transportation, for his untiring dedication as friend and adviser to generations of students, and for his services as Secretary and President of this Society

JOHN BRAZER BABCOCK, III
has been duly elected an
HONORARY MEMBER
By direction of the
Board of Government
January 2, 1969
Harl P. Aldrich, Jr., President
Paul A. Dunkerley, Secretary

President Aldrich then presented to Professor Charles O. Baird, Jr., a certificate of Honorary Membership in the Society, which reads as follows:

Boston Society of Civil Engineers

As a distinguished and dynamic member of the Board of Government of this Society, Dedicated Educator; Generous Philanthropist; Devoted unpaid Public Servant

CHARLES O. BAIRD, JR.
has been duly elected an
HONORARY MEMBER
By direction of the
Board of Government
January 2, 1969
Harl P. Aldrich, Jr., President
Paul A. Dunkerley, Secretary

The Secretary stated that the Ralph W. Horne Award, established in 1964 is presented to a member as having been outstanding in unpaid public services in municipal, state or federal elective or appointive posts; or in philanthropic activity in public interest.

The Secretary asked the recipient to come forward.

EDWARD J. WRIGHT

President Aldrich presented Mr. Wright with the Ralph W. Horne Award, a certificate which reads as follows:

Visionary civil engineer who has given a lifetime of effort to the betterment of the ecology of man, whose professional efforts have been overshadowed by many years of unpaid public service to the health of man, and who has been unanimously chosen by the Board of Government of the

Boston Society of Civil Engineers
to be the
Fifth Recipient
of the
RALPH W. HORNE FUND AWARD
and this Certificate is
proudly presented to him
March 24, 1969
Harl P. Aldrich, President

President Aldrich stated that a number of prizes were awarded annually for worthy papers presented at the Society and Section meetings and also scholarship awards. The Secretary read the names of recipients and asked them to come forward, and President Aldrich presented the following awards: —

Award	*Recipient*	*Paper*
Desmond FitzGerald Medal	David R. Horsefield	"The Deep Tunnel Plan for the Boston Area"
Clemens Herschel Award	Zolton A. Stacho	"The South Cove Tunnel Project"
Sanitary Section Award	David R. Horsefield	"Sewerage Progress in Bogota, Columbia"
Desmond Fitzgerald Scholarship	Robert W. Taylor	
William P. Morse Scholarship	Kathleen E. Chew	

President Aldrich then introduced the guest speaker of the evening, Professor Patrick M. Hurley of the Department of Geology and Geophysics at M.I.T. Professor Hurley gave a very interesting and informative talk on the subject "Why is Planet Earth a 'Blue Oasis'?"

At the conclusion of the talk President Aldrich turned the meeting over to President Elect, Robert H. Culver.

President Culver then presented the retiring President Aldrich with a certificate of appreciation for services rendered.

Two hundred and nineteen members and guests attended the dinner and meeting.

The meeting adjourned at 10:00 P.M.

Respectfully submitted,

Paul A. Dunkerley
Secretary

April 16, 1969: — A Joint Meeting of the Boston Society of Civil Engineers with the Transportation Section was held in the Harvard Room of Purcell's Restaurant, 25 School Street, Boston, Massachusetts, and was called to order by Vice President Ernest L. Spencer, at 7:35 P.M.

Vice President Spencer stated that the reading of the Minutes of the previous meeting held March 24, 1969 would be published in a forthcoming issue of the Journal and that the reading of those Minutes would be waived unless there was objection.

He also announced the meetings which were coming in May.

The Secretary announced the names of applicants for membership and that the following had been elected to membership on February 26, 1969: —

Grade of Member - Helge M. Anderson, Joseph Antebi, Francois Ayer, John E. Ayers, Clarence D. Beatty, Walter H. Bell, Nils-Frederik Braathen*, Donald J. Breda, Arthur L. Brown, Jr., James T. Cassidy, Richard E. Chambers, Philip J. Clang, John D. Cronin, Jr., George W. Dahlberg, Jr., Alton P. Davis, Jr., Logan L. Donnel, Lewis Edgers*, Robert P. Erwin, Richard H. Estes, Francis W. Fewore, John R. Fruland, Douglas D. Gladstone, Charles L. Guild, Carroll J. Hebbel, David I. Hellstrom, Francis X. Hughes, E. Willard Judge, Clifford A. Kaye, Ali S. Kosgatal, Leonard A. McMahon, Narandra M. Mistry, Thomas E. Morello, Jr.*, John W. Nevins, David A. Nuss, Samuel E. Rice, 3rd., Alan E. Rimer, Manuel R. Salgado, Jr., Indravadan K. Shah, John P. Sullivan, Joseph R. Toppi, Herberts Ule, Torkild E. Vennesland, Edward C.R. Walker, Anwar E.Z. Wissa, Anthony Wolfskill, Othar Zaldastani.

Grade of Junior - Joseph B. Kerrissey, Jr., Arthur C. Koski, Michael J. Meagher.

Grade of Student - Stephen P. Stein.

*Transfer from Junior.

Vice President Spencer then turned the meeting over to Mr. Paul LaRosa, Vice Chairman of the Transportation Section to conduct any business of his Section.

Mr. Paul LaRosa introduced the head table guests, and then introduced Senator James R. McIntyre, Massachusetts Senator and Mayor of Quincy.

Senator McIntyre gave an interesting and informal talk on legislation which he has introduced for the establishment of a Department of Transportation to coordinate the many diverse agencies in the Commonwealth of Massachusetts. Following Senator McIntyre's talk was a round table discussion and question and answer period.

Forty six members and guests were present.

The meeting adjourned at 8:45 P.M.

Respectfully submitted,

Paul A. Dunkerley
Secretary

ANNUAL REPORTS

REPORT OF THE BOARD OF GOVERNMENT FOR YEAR 1968 - 1969

Boston, Mass., March 24, 1969

To the Boston Society of Civil Engineers:

Pursuant to the requirements of the By-Laws the Board of Government presents its report for the year ending March 24, 1969.

The following is a statement of the status of membership of the Society: —

Honorary	14
Members	1046
Associates	3
Juniors	48
Students	3
Total	1114
Applications pending on March 24, 1969	102
Student Chapters	2

Summary of Additions

New Members	94
New Juniors	14
New Students	2

Reinstatements

Members	3

Summary of Transfers

Juniors to Member	5

Summary of Loss of Members

Deaths	10
Resignations	12
Dropped for non-payment of dues	22
Dropped for failure to transfer	5

Life Membership

Life Members	134
Members becoming eligible today for Life Membership	4

Honorary Membership is as follows:

John B. Babcock, 3rd, elected, January 2, 1969
Charles O. Baird, Jr., elected, January 2, 1969
Harry P. Burden, elected, February 1, 1965
Thomas R. Camp, elected, February 3, 1964
Arthur Casagrande, elected February 1, 1965

E. Sherman Chase, elected, February 3, 1964
Gordon M. Fair, elected, February 3, 1964
Frank M. Gunby, elected, February 15, 1950
Ralph W. Horne, elected, February 1, 1965
Karl R. Kennison, elected, February 7, 1951
Frank A. Marston, elected, February 15, 1960
Howard M. Turner, elected, February 18, 1952
Frederic N. Weaver, elected, February 1, 1965

The following members have been lost through death:
Thomas A. Appleton, April 1968
Timothy F. Creeden, 1967
James M. Driscoll, Nov. 11, 1968
Harold S. Gillis, March 2, 1968
James P. Kelley, Nov. 11, 1968
Elson T. Killam, May 27, 1968
John Lucas, Dec. 10, 1967
George A. MacDonald, May 15, 1967
Lawrence G. Ropes, June 25, 1968
Adam Sulesky, Nov. 9, 1968

MEETINGS OF THE SOCIETY

March 19, 1968	120th Annual Meeting - Business meeting. Address of retiring President, Harry L. Kinsel, "The Challenge of Our Heritage." Dinner Meeting, Dr. Arthur T. Ippen, Ford Professor of Engineering, M.I.T., "A Civil Engineer's Look at the World."
April 24, 1968	Joint meeting with the Transportation Section. Mr. John T. Driscoll, Massachusetts Turnpike Authority, "Recent Activities of the Massachusetts Turnpike Authority."
May 22, 1968	Regular meeting of the Society. Elliot F. Childs, Hydraulics, Hydrology Branch, and John M. Lind, Project Engineer, New England Corp of Engineers. "Comprehensive Charles River Watershed Studies."
October 16, 1968	Joint Meeting with the Massachusetts Section, American Society of Civil Engineers (Student Night). Joseph C. Lawler, Partner, Camp, Dresser & McKee. "Civil Engineering Experience Abroad."
November 13, 1968	Joint Meeting with Structural and Construction Sections. Charles A. Richardson and Morse E. Klubock of Perini Corporation, and Zoltan A. Stacho, of Parsons, Brinckerhoff, Quade & Douglas. "M.B.T.A. Tunnel - Haymarket Square to Charlestown - Design and Construction."
December 4, 1968	Joint Meeting with Sanitary Section. Mr. Ariel A. Thomas, Metcalf & Eddy. "Design of 150 MGD Secondary Treatment Facilities for the Alleghany County Sewage Treatment Plant."

January 22, 1969 — Joint meeting with the Hydraulics Section. John R. Freeman Memorial Lecture. Mr. Thomas R. Camp, Camp, Dresser & McKee. "Hydraulics of Mixing Tanks."

February 20, 1969 — Joint meeting with the Massachusetts Section, ASCE. Mr. William P. Kimball, ASCE and Panel: Miss Kathleen Chew, Tufts University; Mr. Joseph April, Northeastern University; Mr. Roger Samuel, M.I.T. "Education for Civil Engineers in the 1970's."

ATTENDANCE AT MEETINGS

Date	*Place*	*Meeting*	*Dinner*
March 19, 1968	M.I.T. Faculty Club, 50 Memorial Drive Cambridge, Mass.	40	190
April 24, 1968	United Community Services Building, 14 Somerset St. Boston, Mass.	35	28
May 22, 1968	Society Rooms, 47 Winter Street Boston, Mass.	71	
October 16, 1968	Northeastern University, Warren Center Ashland, Mass.	188	188
November 13, 1968	Nick's Restaurant 100 Warrenton St. Boston, Mass.	95	95
December 4, 1968	Society Rooms 47 Winter Street Boston, Mass.	35	
January 22, 1969	United Community Services Building 14 Somerset Street Boston, Mass.	88	70
February 20, 1969	M.I.T. Student Center Cambridge, Mass.	30	

In addition to the Main Society meetings, meetings were sponsored by the five technical sections of the Society. Papers presented at these professional meetings and discussions which follow, continue to offer members and their guests an opportunity to keep abreast of developments in civil engineering and related fields.

The Annual Reports of the Sections which summerize these meetings will be presented at the Annual Meeting and will be published in the Journal of the Society.

*FUNDS OF THE SOCIETY**

Permanent Fund. The Permanent Fund of the Society has a present value of

*Details regarding the value and income of these funds are given in the Treasurer's Report.

$78,555.27. The Board of Government authorized the use of as much as necessary of the current income of this fund in payment of current expenses. By vote of the Society (as prescribed by the By-Laws) at the January 22, 1969 and February 20, 1969 meetings, the Board of Government was authorized to transfer an amount not to exceed $4,000 from the Principal of the Permanent Fund for current expenditures. The amount necessary to transfer from the Principal of the Permanent Fund for current expenditures was $1,399.21.

John R. Freeman Fund. In 1925, the late John R. Freeman, a Past President and Honorary Member of the Society, made a gift to the Society of securities which was established as the "John R. Freeman Fund." The income from this fund is to be particularly devoted to the encouragement of young engineers. Mr. Freeman suggested several uses, such as, the payment of expenses for experiments and compilations to be reported before the Society; for under-writing meritorious books or publications pertaining to hydraulic science or art; or a portion be devoted to a yearly prize for the most useful paper relating to hydraulics contributed to the Society; or establishing a traveling scholarship every third year open to members of the Society for visiting engineering works, a report of which would be presented to the Society. This year a Scholarship of $7,000 plus $200 for expenses was awarded to Michael A. Collins.

Edmund K. Turner Fund. In 1916 the Society received a bequest of $1,000 from Edmund K. Turner, a former member of the Society, the income of which "is to be used for library purposes." The Board voted to use $100 of the income of this fund for the purchase of books for the library.

Alexis H. French Fund. The Alexis H. French Fund, a bequest of $1,000 was received in 1931, from the late Alexis H. French, a Past President of the Society. The income of this fund is "to be devoted to the Library of the Society." The Board voted to use $100 of the income of this fund for the purchase of books for the library.

Tinkham Memorial Fund. The Samuel E. Tinkham Fund, established in 1921 at Massachusetts Institute of Technology, by the Society, "to assist some worthy student of high standing to continue his studies in Civil Engineering" had a value of $3,507.24 on June 30, 1968. Jai-Jai Phinyawetans, a student in Civil Engineering, class of 1971 was awarded this Scholarship of $550 for year 1968-69.

Clemens Herschel Fund. This fund was established in 1931, by a bequest of $1,000 from the late Clemens Herschel, a Past President and Honorary Member of the Society. The income from this fund is "to be used for presentation of prizes for papers which have been particularly useful and commendable and worthy of grateful acknowledgment". The expenditure from this fund during the year was $33.25.

Desmond FitzGerald Fund. The Desmond FitzGerald Fund, established in 1910 by a bequest of $2,000 from the late Desmond FitzGerald, a Past President and Honorary Member of the Society, provided that the income from this fund shall "be used for charitable and educational purposes." The Board voted on April 13, 1964, to appropriate from the income of this fund the sum of $100 to be known as the "Boston Society of Civil Engineer's Scholarship in Memory of Desmond FitzGerald," and be given to a student in Civil Engineering at Northeastern University. It was voted on February 26, 1969 "to accept the recommendation of the Committee at Northeastern University, namely, that the $150 Scholarship be given to Robert W. Taylor. Presentation was made at the Annual Meeting of the Society on March 24, 1969. During the year a donation of $100 was received from a former recepient of this scholarship and has been added to the fund.

Edward W. Howe Fund. This Fund, a bequest of $1,000 was received in 1933 from the late Edward W. Howe, a Past President of the Society. No restrictions were placed on the use of this bequest, but the recommendation of the Board of Government was "that the fund be kept intact, and that the income be used for the benefit of the Society or its members." There was no expenditure from this fund during the year.

William P. Morse Fund. This Fund, a bequest of $2,000 was received in 1949 from the late William P. Morse, a former member of the Society. No restrictions were placed on the use of this bequest, but the recommendation of the Board of Government was "that this fund be kept intact and that the income be used for the benefit of the Society or its members." Upon recommendation of the Committee appointed by the President, the Board voted on April 5, 1954, "to appropriate from the income of this fund the sum of $100, to be known as the "Boston Society of Civil Engineer's Scholarship in Memory of William P. Morse," and be given to a civil engineer student at Tufts University." It was voted on February 26, 1969 "to adopt the recommendation of the Committee at Tufts University, namely, that the $150 Scholarship be given to Kathleen E. Chew. Presentation was made at the Annual Meeting of the Society on March 24, 1969.

Frank B. Walker Fund. This Fund, a bequest of $1,000 was received in 1961, from Mary H. Walker, wife of Frank B. Walker, a Past President of the Society. No restrictions were placed on the use of this bequest, but the recommendation of the Board of Government was "that this fund be kept intact and that the income be used for the benefit of the Society or its members." There was no expenditure from this fund during the year.

Ralph W. Horne Fund. This Fund, a bequest of $3,000 was received June 29, 1964, from the Directors of Fay, Spofford & Thorndike, Inc., the income from which shall be devoted to a prize or certificate to be awarded annually to a member designated by the Board of Government as having been outstanding in unpaid public service in municipal, state, or federal elective or appointive posts; or in philanthropic activity in the public interest. Members of BSCE only eligible for the Award. The Board of Government voted unanimously January 22, 1969 "to approve recommendation of the Ralph W. Horne Fund Award Committee, namely, 'that Edward J. Wright be the recipient to receive the Ralph W. Horne Fund Award for the year 1968-69'." Presentation was made at the Annual Meeting of the Society on March 24, 1969.

PRIZE AWARDS

AWARD	*RECIPIENT*	*PAPER*
Desmond FitzGerald Medal	David R. Horsefield	"The Deep Tunnel Plan for the Boston Area."
Clemens Herschel Award	Zoltan A. Stacho	"The South Cove Tunnel Project."
Sanitary Section Award	David R. Horsefield	"Sewerage Progress in Bogota, Columbia."
Desmond FitzGerald Scholarship	Robert W. Taylor	Northeastern University
William P. Morse Scholarship	Kathleen E. Chew	Tufts University

COMMITTEES

At the beginning of the year, the President appointed the usual committees and several special committees to conduct the Society activities, other than technical meetings. The membership of these committees is published in the Journal and committee reports will be presented at the Annual Meeting and subsequently published.

While progress can be shown toward meeting "The Challenge of our Heritage", as outlined at the 1968 Annual Meeting by Past President Harry L. Kinsel, much remains to be accomplished, in particular toward improving the Society Headquarters, in obtaining technical papers for publication in the Journal, and in our relations with ASCE.

However, significant accomplishments for the year can be reported. To cite the more important, the Society:

1. Formed two new technical sections, a Geotechnical Section and a Computer Section to serve the Society in sponsoring meetings in these important and growing areas of civil emgineering.
2. Through the outstanding efforts of the Membership Committee, Max D. Sorota Chairman, added 208 new members and applications for Society membership, a 20 percent increase.
3. Sponsored a series of twelve lectures on "Man and His Environment" during October through December 1968, organized and conducted by the Sanitary Section.
4. Voted to relocate Society Headquarters to improved new quarters, when a tenant for the present space is found. New quarters will not include a room for technical meetings, but will provide a library and reading room, a business office, and conference room for meetings of the Board of Government, Section officers and committees.
5. Through the Subsoils of Boston Committee, Ronald C. Hirschfeld Chairman, collected boring bata for the Boston Peninsula for publication in the Journal by July 1, 1969. Mr. Clarence N. Seagrave was hired by the Society to work full-time for the Committee. Consulting firms and contractors donated $6,355 toward this effort. Our thanks to those who contributed.
6. Sponsored the formation of a "Joint Registration Law Revision Committee" to represent all local engineering societies in drafting needed revisions to the Massachusetts Registration Act. It is hoped that changes can be made to bring us closer to the proposed 1960 Model Law for Professional Engineers and the proposed 1968 Model Law for Land Surveyors.
7. Re-established the office "contact man" organization, to assist the Society in publicizing meetings and soliciting new members.
8. Through the Sanitary Section, printed and mailed a Brochure entitled "A Guide to Careers in Environmental Engineering" which was mailed to high schools in Massachusetts and all colleges and universities in New England. The response has been overwhelmingly favorable and many requests for copies have been received from all parts of the country.

We especially acknowledge the untiring dedication of Charles O. Baird, Jr., who retired this year after 18 years service to the Society as Treasurer, then Secretary.

In conclusion, your Board wishes to express its appreciation of the excellent work done by the officers of the Society, by the technical sections and by the committees.

Harl P. Aldrich, Jr.
President

REPORT OF THE SECRETARY

Boston, Mass., March 24, 1969

To the Boston Society of Civil Engineers:

The following is a statement of cash received by the Secretary and of the expenditures approved by the President in accordance with the budget adapted by the Board of Government.

FOR THE YEAR ENDING MARCH 24, 1969

OFFICE	*EXPENDITURES*	*RECEIPTS*
Secretary's Salary & Expense	$ 1,514.00	
Treasurer's Honorarium	899.10	
Stationary, Printing & Postage	1,065.46	
Incidentals & Petty Cash	153.84	
Insurance & Treasurer's Bond	23.00	
Quarters, Rent. Tel. & Light	5,895.90	
Office Secretary	6,443.07	
Soil Mechanics		$ 966.55
Social Security	421.99	
New Office Equipment	340.88	
MEETINGS		
Rent of Halls	80.00	
Hospitality Committee	1,174.25	906.50
Reporting & Projection	12.00	
Annual Meeting March 1968	929.63	735.00
SECTIONS		
Sanitary Section	15.03	
Structural Section	56.18	
Transportation Section	36.25	
Hydraulics Section	78.70	
Construction Section	76.66	
JOURNAL		
Editor's Salary & Expense	899.10	
Editor's Secretary	1.78	
Printing & Postage	7,275.61	
Advertisements	—	1,649.69
Sale of Journals	—	2,244.01
Reprints	499.05	375.00
Copyright	18.00	
Newsletter	358.60	
LIBRARY		
Periodicals	73.00	
Binding	60.64	

MISCELLANEOUS

Binding Journals for Members	4.25	
Badges		19.00
Bank Charges	8.43	
Miscellaneous	480.58	263.75
Engineering Societies Dues	880.50	
Public Relations Committee	60.00	
Membership Committee	51.25	
Sales Tax	3.35	2.98
Dues from B.S.C.E. Members		16,945.00
Trans. Income Perm Fund		4,383.39
Trans. Prin.		1,399.21
	$29,890.08	$29,890.08

94 New Members; 14 New Junior Members; 5 Junior Members transferred to Members.

The above receipts have been paid to the Treasurer who's receipt the Secretary holds. The Secretary holds cash amounting to $30 included as payment under item 36 (Petty Cash) to be used as a fixed fund or cash on hand. $308.25 withholding tax and social security, which is payable to Collector of Internal Revenue and State of Massachusetts in April, is not included in the above tabulations, also 55¢ sales tax to be paid to Commonwealth of Massachusetts.

Respectfully submitted,
Paul A. Dunkerley
Secretary

REPORT OF THE TREASURER

March 24, 1969

To the Boston Society of Civil Engineers:

This report is for the fiscal year beginning March 1, 1968 and ending at the close of the business day on February 28, 1969.

The Boston Safe Deposit and Trust Co., 100 Franklin St., Boston, Mass. continues to serve as financial advisor and custodian of the securities owned by the Society. In accordance with the terms of the contract, the officers of the custodian bank have furnished the Treasurer of the Boston Society of Civil Engineers with a certified audit of the Income and Principal accounts. This audited accounting, the bills paid by the Treasurer, the receipts from the Secretary, the savings bank passbook, and the checkbook have been reviewed by the Auditing Committee of the Society and the information contained in this report has been verified.

Twice each year the Investment Division of the Boston Safe Deposit and Trust Co. reviews the portfolio of securities. After each review this year, the Custodian made recommendations to the Society. The Investment Committee of the Society considered the recommended changes and presented its findings to the Board of Government of the Society. In each instance, the Board voted to authorize the changes and directed the Custodian to proceed with the transactions. The Board of Government invited Mr. John

Norton, Investment Counsel of the Boston Safe Deposit and Trust Co., to sit with it and to explain the position of the Custodian in the handling of the portfolio. Mr Norton explained the possible positions which could be adopted by societies of this kind. He presented a breakdown of our holdings with the reasons for each issue held. In summary, the Custodian has been trying to maintain a reasonable income consistent with a reasonable growth rate as a hedge against inflationary trends.

CUSTODIAN ACCOUNT

The following changes were made in the securities held by the Society during the fiscal year:

Aluminum Company of America, Deb.
Sold $5,000.00 par value

General Motors Acceptance Corp., Deb.
Sold $5,000.00 par value

Public Service Electric and Gas Co., 1st
Sold $4,000.00 par value

Superior Oil Co., Deb.
Sold $4,000.00 par value

Commercial Credit Co.
Sold 240 shares

General Motors Corp.
Bought 44 shares

New England Electric System
Bought 100 shares

Newmont Mining Corp.
Bought 130 shares

International Business Machine Corp.
Received in stock split 16 shares

Warner Lambert Pharmaceutical Co.
Bought 100 shares

Clark Equipment Co.
Bought 400 shares

W. R. Grace and Co.
Donation of 4 shares from A. Casagrande

On March 1, 1968 the Principal Account was overdrawn in the amount of $606.22. Receipts to the account were as follows:

Bonds sold	$13,788.34
Stocks sold	18,653.93
Total Receipts	$32,442.27

The sum of $31,998.74 was expended for the purchase of stock leaving a negative balance of $162.69 in the Principal Account.

On March 1, 1969 the cash available in the Income Account was $8,577.52. Receipts to and expenditures from this account during the fiscal year are summarized as follows:

Receipts	
Interest	$ 3,557.38
Dividends	5,702.12
Total Receipts	$ 9, 259.50

Expenditures	
Service charges	$ 830.42
Transferred to savings	8,000.00
Transferred to checking	4,000.00
Total Expenditures	$12,830.42

The sum of $5,006.60 was remaining in the Income Account on February 28, 1969.

SAVINGS ACCOUNT

Early in the fiscal year the Board of Government voted to transfer $8,000.00 from the Income Account of the Boston Safe Deposit and Trust Co. to the savings account held by the First Federal Savings and Loan Association of Boston. This was to be held in an interest earning capacity until needed in the checking account to meet large cash expenditures for the Freeman Scholarship. Nearly eight months after deposit, the $8.000.00 was transferred to the checking account to bolster its balance. The total interest earned by the savings account during the fiscal year was $369.87.

FINANCIAL STANDING

The financial standing of the Society is summarized in the seven tables which accompany this report. These tables represent conditions as they existed at the close of the business day on February 28, 1969. The tables are as follows:

TABLE I	DISTRIBUTION OF FUNDS
TABLE II	DISTRIBUTION OF FUNDS - RECEIPTS AND EXPENDITURES
TABLE III	RECORD OF INVESTMENTS - BONDS
TABLE IV	RECORD OF INVESTMENTS - STOCKS
TABLE V	RECORD OF INVESTMENTS - SAVINGS BANK
TABLE VI	COMPARISON OF BOOK AND MARKET VALUES OF INVESTMENTS
TABLE VII	COMPARISON OF BOOK AND MARKET VALUES OF FUNDS

CURRENT FUND

Receipts to the Current Fund during the fiscal year from dues, sales of publications, advertisements in the Journal and from other sources totaled $24,107.48. Total expenditures from this fund were $29,890.08. On March 1, 1968 and on March 1, 1969 the Current Fund was valued at $1,500.00 Expenditures from the Current Fund exceeded the income by $5,782.60. By vote of the Board of Government and by two votes taken at regular monthly meetings of the Society the deficiency was made up by a transfer from the Permanent Fund.

The membership and other interested persons are referred to the Report of the Secretary published elsewhere in this volume of the Journal for a detailed breakdown of the income to and the expenditures from the Current Fund.

PERMANENT FUND

Income to the Permanent Fund from entrance fees was $1,000.00. That portion of the interest and dividends which could be credited to the Permanent Fund was $4,797.35. The book value of the gift of stock from Dr. Arthur Casagrande was also credited to the Principal of the Permanent Fund. That portion of the service charges which could be charged against this fund was $413.96. The balance of the income remaining after the service charges was $4,383.93 which was transferred to the Current Fund to meet cur-

rent expenses. The Current Fund was still deficient in the amount of $1,399.21. This sum was transferred from the Principal of the Permanent Fund to the Current Fund. The total transferred was $5,782.60.

JOHN R. FREEMAN FUND

At the September meeting of the Board of Government, a recommendation of the John R. Freeman Fund Committee was taken under advisement. The Board voted to award to Mr. Michael Collins, a graduate student at M.I.T., a scholarship of $7,500.00 with an additional $200.00 for equipment expenses and for computer time.

$382.25 was expended from this fund for the annual Freeman Lecture. The lecturer, Mr. Thomas Camp, received an honorarium of $300.00. He promptly endorsed the check and returned it to the Treasurer who redeposited it into that account.

This fund was also used to print and distribute a brochure on Environmental Engineering as a career. The Secretary has been swamped by requests for this brochure, and it will take months to honor all of the requests so far received.

LECTURES

Again this fiscal year during the fall and winter of 1968, the Society offered a series of professional lectures. This series concerned Environmental Engineering. Last fiscal year the Board of Government established a working fund for lecture series. This fund was used again for this series of lectures. The total income to this fund from registration fees was $1,660.00. From this account the sum of $1,453.52 was expended. Part of the expenditure was used to complete the payments on expenses incurred during the Computer Lecture Series, and the remainder was used to defray the expenses of the Environmental Engineering Lecture Series.

At the December 1968 meeting of the Board of Government it was voted to combine the Transportation Lectures Fund and the Structural Lectures Fund with the newly created Lectures Fund.

BORING DATA

The Committee on the Subsoils of Boston has been actively engaged in the task of revising the Boring Data Book. Considerable new data are now available because of the flurry of construction in the Boston Area. The improved boring techniques developed by some of the older and more experienced members of this Society have made modern boring logs more intelligible and useful. The Board of Government voted to engage Mr. Clarence Seagrave (retired) at a nominal fee to sift and collate this information into a publishable form.

In order to finance this project, the Committee requested the Board for permission to solicit funds from potential users of the information. This permission was granted. The Treasurer applied for and received from the Office of the Attorney General of Massachusetts, permission to solicit funds in accordance with Chapter 68, Acts of 1964. The total receipts solicited from subscribers was $6,365.00. Sale of existing Boring Data brought an income of $25.00. Total expenditures from this fund during the fiscal year for the preparation of the new publication amounted to $3,408.22.

KARL R. KENNISON FUND

On March 17, 1969, Mr. Charles Flaherty of the Massachusetts Company reported to the Treasurer of the Boston Society of Civil Engineers on the status of the irrevocable trusts established in behalf of the Society by Mr. Karl R. Kennison. As of February 28, 1969, the two trusts involving shares in the Massachusetts Fund were as follows:

Trust#4315	356.650 shares	$4,356.59
Trust#4444	431.259 shares	5,485.61
TOTAL	787.909 shares	$9,842.20

OTHER FUNDS

The membership and other interested persons are referred to the Report of the Board of Government published elsewhere in this issue of the Journal for information concerning the remaining funds, the reasons for their existence, and the disbursements made from each.

TAXES AND SOCIAL SECURITY

Of the cash on hand in the Current Fund, $308.25 is committed to the Federal and State Governments for withholding taxes and Social Security. An additional $0.55 is committed to the Bureau of Corporations and Taxation of the Commonwealth of Massachusetts for sales taxes collected.

FELICITATIONS

Your present Treasurer has been privileged to serve in this office since the Annual Meeting in March of 1960. It has been an enlightening and rewarding experience. The Treasurer would like to thank and congratulate all of those who have assisted him in his duties throughout the years. The words of advice, of caution, of encouragement, and actual physical assistance in the performance of these duties is deeply appreciated. The list of persons involved is too great to enumerate. The Treasurer will select as his symbol of all those who have rendered assistance his good friend and colleague, Prof. C. O. Baird.

The Treasurer congratulates the Treasurer-elect and wishes for him and for many years to come the same kind of pleasant experiences enjoyed during the last nine years.

Respectfully submitted

Paul A. Dunkerley
Treasurer

TABLE I
DISTRIBUTION OF FUNDS

	Book Value	Interest and Dividends		Net Profit or Loss at sale or maturity		Transfer of Funds		Book Value
	Mar. 1, 1968	Cash	Credit			Purchased	Sold	Mar. 1, 1969
	1	2	3	4(+)	5(−)	6(+)	7(−)	8
Bonds	$ 78,056,94	$3,557.38			$ 4,448.46		$ 18,236.80	$ 59,820.14
Stocks	70,366.01	5,702.12		$3,713.91		$32,154.74	14,940.02	87,580.73
Savings Bank	2,645.69		$369.87			8,000.00	8,000.00	3,015.56
Available for Investment	9,906.84					690.57		10,597.41
TOTAL	$160,975.48	$9,259.50	$369.87	$3,713.91	$ 4,448.46	$40,845.31	$41,176.82	$161,013.84

Columns 1 + 3 + 6 − 7 = 8

TABLE II
DISTRIBUTION OF FUNDS — RECEIPTS AND EXPENDITURES

	Book Value Mar. 1, 1968	Allocation of Income Profit and Loss: Income Col. 2 + 3	Allocation of Income Profit and Loss: Net Profit Col. 4 + 5	Received	Expended	Book Value Mar. 1, 1969
Permanent Fund	$ 79,167.43	$ 4,797.35	−$368.95	$ 1,156.00	$ 6,196.56	$ 78,555.27
John R. Freeman	53,301.59	3,162.70	239.43	300.00	6,902.46	49,622.40
Edmund K. Turner	2,118.57	128.02	9.83		11.05	2,225.71
Desmond FitzGerald	4,476.64	264.26	20.09	100.00	174.56	4,646.25
Alexis H. French	2,097.41	126.75	9.74		10.94	2,203.48
Clemens Herschel	1,522.44	90.64	6.92		63.05	1,543.11
Edward W. Howe	2,359.12	142.56	10.95		12.30	2,478.43
William P. Morse	4,346.63	255.76	19.49		171.90	4,411.00
Frank B. Walker	1,930.71	116.67	8.96		10.07	2,028.35
Ralph W. Horne	3,508.83	212.00	16.29		18.31	3,686.23
Transportation Lectures	494.60	29.90	2.30		522.20	0.00
Structural Lectures	1,949.85	117.83	9.05		2,058.63	0.00
Lectures	3,260.16	184.93	12.55	4,228.08	1,470.29	6,190.33
Boring Data	441.50			6,390.00	3,408.22	3,423.28
SUBTOTAL	$160,975.48	$ 9,629.37	−$734.55	$12,174.08	$21,030.54	$161,013.84
Current	1,500.00	5,782.60		24,107.48	29,890.08	1,500.00
TOTAL	$162,475.48	$15,411.97	−$734.55	$36,281.56	$50,920.62	$162,513.84

Secretary's Change Fund of $30.00 should be added to show total cash

Cash Balance		
	Investment Fund	$10,597.41
	Current Fund	1,500.00
	Total Cash	$12,097.41

Transferred from the Income of the Permanent Fund to the Current Fund	$4,383.39
Transferred from the Principal of the Permanent Fund to the Current Fund	1,399.21
TOTAL transferred to the Current Fund	$5,782.60

TABLE III
RECORD OF INVESTMENTS — BONDS
March 1, 1968 to March 1, 1969

Bonds	Date of Maturity	Interest Rate	Interest Received	Par Value	Book Value Mar. 1, 1969	Market Value Mar. 1, 1969
Aluminum Company of America, Deb.	Apr. 1, 1983	3⅞	$ 206.67	$ 5,000.00	$ 0.00	$ 0.00
Associates Investment Co., Deb.	Aug. 1, 1979	5⅛	307.50	6,000.00	6,000.00	4,800.00
Flintkote Co., Deb.	Apr. 1, 1981	4⅝	462.50	10,000.00	10,450.00	8,000.00
Florida Power Co., ist Mort.	Jul. 1, 1984	3⅛	31.25	1,000.00	1,017.50	653.75
Florida Power Co., 1st Mort.	Jul. 1, 1986	3⅞	193.75	5,000.00	5,037.59	3,525.00
General Motors Acceptance Corp., Deb.	Sep. 1, 1975	3⅝	208.44	5,000.00	0.00	0.00
Georgia Power Co., 1st Mort.	Dec. 1, 1977	3⅜	168.75	5,000.00	5,162.50	3,825.00
Marine Midland Corp., Deb.	Jul. 15, 1989	4½	225.00	5,000.00	5,000.00	3,650.00
Montreal Quebec Improvement, Deb.	Jan. 15, 1987	6	600.00	10,000.00	10,075.00	8,850.00
Province of Ontario Deb.	Sep. 1, 1972	3¾	97.50	3,000.00	2,936.25	2,602.50
Public Service Electric and Gas Co., 1st	Jun. 1, 1979	2⅞	103.52	4,000.00	0.00	0.00
So. Pacific, 1st Series A Oregon Lines	Mar. 1, 1977	4½	180.00	4,000.00	4,191.30	3,275.00
Superior Oil Co., Deb.	Jul. 1, 1981	3¾	122.50	4,000.00	0.00	0.00
Orange and Rockland Utilities Inc., 1st	Oct. 1, 1997	6½	650.00	10,000.00	9,950.00	9,350.00
TOTALS			$3,557.38		$59,820.14	$48,531.25

TABLE IV
RECORD OF INVESTMENTS — STOCKS
March 1, 1968 to March 1, 1969

Stocks	Classification	Number of Shares	Dividend Received	Book Value Mar. 1, 1969	Market Value Mar. 1, 1969
American Telephone & Telegraph Co.	Common	250	$ 600.00	$ 4,505.87	$ 12,968.75
Clark Equipment Co.	Common	400	120.00	12,286.76	12,800.00
Commercial Credit Co.	Common	240	216.00	0.00	0.00
General Electric Co.	Common	150	390.00	2,341.47	12,975.00
General Motors Corp.	Common	170	645.20	9,130.92	13,196.25
W.R. Grace and Co.	Common	4	0.00	156.00	160.00
Hartford Fire Insurance Co.	Common	214	235.40	1,534.39	11,609.50
Illinois Power Co.	Common	200	356.00	9,686.00	7,375.00
International Business Machine Corp.	Common	32	83.20	5,331.68	9,388.00
Jewel Companies, Inc.	Common	187	60.78	0.00	0.00
Monsanto Co.	Common	110	181.50	7,289.51	5,403.75
National Dairy Products Corp.	Common	200	315.00	1,154.74	8,150.00
New England Electric System	Common	308	344.84	6,216.14	8,585.50
Newmont Mining Corp.	Common	200	337.00	12,548.53	14,950.00
Southern California Edison Co.	Common	177	247.80	1,932.99	6,571.12
Standard Oil Co., New Jersey	Common	200	730.00	2,012.76	15,575.00
Texaco Inc.	Common	236	684.40	1,515.72	19,352.00
Warner Lambert Pharmaceutical Co.	Common	200	155.00	9,937.25	11,075.00
TOTALS			$5,702.12	$87,580.73	$170,134.87

TABLE V
RECORD OF INVESTMENTS — SAVINGS BANK
March 1, 1968 to March 1, 1969

Bank	Savings Account Number	Interest Received	Book Value Mar. 1, 1968	Book Value Mar. 1, 1969
First Federal Savings and Loan Association of Boston	IS-631	$369.87	$2,645.69	$3,015.56

TABLE VI
COMPARISON OF BOOK AND MARKET VALUES OF INVESTMENTS

	Book Value Mar. 1, 1969	Market Value Mar. 1, 1969
Bonds	$ 59,820.14	$ 48,531.25
Stocks	87,580.73	170,134.87
Savings Bank	3,015.56	3,015.56
Available for Investment	10,597.41	10,597.41
Total March 1, 1969	$161,013.84	$232,279.09
Total March 1, 1968	160,975.48	212,430.28
Increase or decrease	+$ 38.36	+$ 19,848.81

TABLE VII
COMPARISON OF BOOK AND MARKET VALUE OF FUNDS

Funds	Book Value Mar. 1, 1969	Market Value March 1, 1969
Permanent	$ 78,555.27	$114,079.36
John R. Freeman	49,622.40	72,062.53
Edmund K. Turner	2,225.71	3,232.22
Desmond FitzGerald	4,646.25	6,747.37
Alexis H. French	2,203.48	3,199.93
Clemens Herschel	1,543.11	2,240.93
Edward W. Howe	2,478.43	3,599.22
William P. Morse	4,411.00	6,405.73
Frank B. Walker	2,028.35	2,945.60
Ralph W. Horne	3,686.23	5,353.21
Lectures	6,190.33	8,989.71
Boring Data	3,423.28	3,423.28
Subtotal	$161,013.84	$232,279.09
Current	1,500.00	1,500.00
TOTALS	$162,513.84	$233,779.09

REPORT OF THE AUDITING COMMITTEE

Boston, Mass., March 24, 1969

To the Boston Society of Civil Engineers:

We have reviewed the records and accounts of the Secretary and Treasurer of the Boston Society of Civil Engineers, and we have compared the bank statement of securities held by the Boston Safe Deposit and Trust Company with the enumeration submitted by the Treasurer.

We have found them to be in order and to account accurately for the Society's Funds.

Respectfully submitted,
Llewelyn T. Schofield
James P. Archibald

REPORT OF THE EDITOR

Boston, Mass., March 24, 1969

The Journal was issued quarterly for the months of April, July and October 1968. The January 1969 issue is in press as of this date.

Volume 55 for the year 1968 contained ten technical papers, plus society reports, in 287 pages of text. This compares with eight papers and 237 pages in Volume 54. In addition, the October issue contained a cumulative index by subject, author and place covering the years 1949-1968. The earlier cumulative index covers the years 1914-1948.

As will be noted from the Secretary's report, the net expense of the Journal was $4,425. This was roughly $2,000 more than fiscal 1968, and $2,000 less than 1967. The difference from 1968 was due mostly to higher printing costs, and a decrease in sales and advertising income.

The Board of Government has expressed the purpose that the traditional high standard of the Journal be maintained, as suitable for a publication with international circulation, and as a medium for the top quality technical papers and high grade professional advertising.

In keeping with this policy, the page size was increased and the format modified, both to conform to the standards followed over the years. If these standards are maintained, and the papers published are of high quality, it is believed that the circulation income and advertising receipts can be increased to properly balance the publication expenses.

Respectfully submitted,
H. H. Holly, Editor

REPORT OF PUBLICATION COMMITTEE

Boston, Mass., March 24, 1969

To the Boston Society of Civil Engineers:

As the usual practice of the Chairman of this Committee, I wrote to all section chairmen urging them to get written papers for as many section meetings as possible. To date, from about twenty section meetings this Society year, we have reveived four papers. Two have been published, two are at the printers to be published in the January issue. We need at least twelve papers per year for our four issues.

The Sections must make a greater effort to obtain suitable papers. Furthermore, the dearth of papers from this prime source opens the Journal to papers not presented before the Society. Members are urged to prepare technical papers for presentation and for publication in the Journal.

Respectfully submitted,
Charles Y. Hitchcock, Jr., Chairman
Publication Committee

REPORT OF THE ADVERTISING COMMITTEE

Boston, Mass., March 6, 1969

Gentlemen:

A meeting of the "Advertising Committee" was held on November 6, 1968. Only two members plus the chairman were at this meeting. A list of twelve Boston firms not advertising in our journal was prepared and each of the three members undertook to contact four of these. Only three new professional cards have been subscribed to.

Letters were sent by the chairman to twenty-seven contracting firms in hopes of obtaining fractional page ads; but none of these has responded.

The lack of interest in advertising, ties in closely with the problem of producing a journal. If interesting papers in adequate quantity can be published, then we can better convince firms to advertise. It would appear that many ads are taken as a courtesy rather than for their commercial value, and this trend can only be improved by a better journal published on time and well read because of the interesting content.

Sincerely yours,
Paul S. Crandall
Advertising Chairman

REPORT OF THE LIBRARY COMMITTEE

Boston, Mass., March 24, 1969

The principal efforts of the Library Committee during the past year were directed to the special task with which it was charged of making a report in September with specific recommendations to the Board of Government concerning the future of the library. Two meetings were held and other discussions relative to the content and use of the library took place.

These resulted in a report to the Board of Government on September 6, 1968, which considered the following three alternatives:

1. Continue the library on the present basis,
2. Continue to operate the library but only for the historical value of its present holdings and without making new acquisitions to keep it current, or
3. To discontinue the library and donate its books to some other library where they might continue to be available for reference.

The principal points of the September 6 report are as follows:

"At its initial meeting on May 21, the committee's attention was first directed to the recommendations of last year's Library Committee that (1) a program be undertaken to advertise the library and promote its use and (2) a study be made during 1968 to determine the use made of the library and the interest in it and need for it.

"It was recognized at the outset that the recommended study could not be carried out in time to permit an early fall report to the Board of Government.

"A record of books borrowed from the library during the first five months of 1968 shows an average of less than four per month. No record is kept of the number of persons who use the library without borrowing books. In general, however, such use appears to be erratic and fairly limited. Back copies of journals and periodicals are perhaps referred to most often.

"The library now contains some 500 books, exclusive of bound periodicals and journals of various societies."

* * *

"...the committee agreed unanimously that BSCE should keep its library. It recognizes, however, in view of the present cost of books and the large number being published, that it is out of the question for BSCE, with its small library budget, to attempt to maintain an up-to-date library of engineering publications that would be comprehensive in coverage.

"Therefore, the committee makes the following recommendations:

1. Retain library and, in particular, works of historical value, proceedings and journals.
2. Make no attempt to maintain up-to-date comprehensive coverage of the various fields of engineering.
3. Limit new purchases to handbooks and general reference works and try to do a thorough job in this area.
4. Publicize in the NEWSLETTER new material acquired by the BSCE library, its availability for use by the engineering community at large and the fact that books may be borrowed by BSCE members.
5. Maintain a record of borrowings from the library and, in addition, the name and affiliation of each person who otherwise uses the library."

Use of the library is sporadic and has decreased slightly in recent months. During the period from June 1968 through February 1969, the number of books or journals borrowed has averaged about three per month. A substantial part of the recent use is attributable to students who are working on theses.

No books have been added to the library during the current Society year.

Nothing has occured since the presentation of the committee's September report to change the recommendations it contained regarding the future of the library.

Respectfully submitted,
John M. Biggs
Joseph Capone
George W. Hankinson
William H. Parker, III
Nathaniel N. Wentworth, Jr.
Harry L. Kinsel, Chairman

REPORT OF THE HOSPITALITY COMMITTEE

Boston, Massachusetts, March 6, 1969

To: Boston Society of Civil Engineers

The Hospitality Committee submits the following report for the year 1968-1969.

A total of eight meetings of the Society were held during the past year. This was two meetings more than the previous year. Included in this total were the 120th Annual Meeting, two joint meetings with the American Society of Civil Engineers, one of which was a Student's Night Meeting, and five regular meetings of the Society.

Catered dinners were served prior to five meetings.

The average attendance of members and guests for all eight meetings or dinners (using the larger attendance figure) was 92, as compared to last year's average of 108.

Attendance at regular meetings of the Society during the past year was 65 persons per meeting. This represents a 23 percent decrease in attendance over last year.

DATE	*PLACE*	*MEETING*	*DINNER*
March 19, 1968	M.I.T. Faculty Club 50 Memorial Drive Cambridge, Mass.	40	190
April 24, 1968	United Community Ser. Bldg. 14 Somerset St. Boston, Mass.	35	28
May 22, 1968	Society Rooms 47 Winter St. Boston, Mass.	71	—
October 16, 1968	Northeastern University Warren Center Ashland, Mass.	188	188
November 13, 1968	Nick's Restaurant 100 Warrenton St. Boston, Mass.	95	95

December 4, 1968	Society Rooms 47 Winter St. Boston, Mass.	35	—
January 22, 1969	United Community Ser. Bldg. 14 Somerset St. Boston, Mass.	88	70
February 20, 1969	M.I.T. Student Center Cambridge, Mass.	30	—

Respectfully submitted,
Thomas Tsotsi
Chairman

REPORT OF THE MEMBERSHIP COMMITTEE

Boston, Mass., March 19, 1969

During the past year, the Society received a total of 210 membership applications. Of this total 168 were obtained through the direct efforts of the members of the Membership Committee and the remaining 42 were received by other means. The new applications received should result in an approximate 20 percent increase in the overall Society membership.

It is felt that the large number of new members brought into the Society this year are only a small proportion of the prospective members who are available. It is suggested that the Society plan to continue, or possibly even intensify, the membership campaign in the coming year.

Respectfully submitted,
Max D. Sorota, Chairman
Membership Committee

REPORT OF THE PUBLIC RELATIONS COMMITTEE

Boston, Mass., March 10, 1969

To the Boston Society of Civil Engineers:

No formal meetings were held during the year by the Public Relations Committee as no subject matter was evidenced to warrant a meeting of the committee.

Review of the BSCE Journals for the Period April 1959 to April 1968, indicates the following:

1. No committee reports were published in six of the years.
2. Three reports state no formal meetings were held.
3. One report states informal conferences were held but no formal meetings.

It is suggested by the undersigned that the incoming Board of Government consider this matter and determine the need and purpose of such a committee.

Respectfully submitted,
R. F. Battles, Chairman
Public Relations Committee

REPORT OF THE COMMITTEE ON SUBSOILS OF BOSTON

Boston, Mass., March 10, 1969

The Committee on Subsoils of Boston met on August 12, 1968, and December 20, 1968.

The Committee is currently compiling boring data from Greater Boston. The data for individual sub-areas will be published as reports in the Journal, and all of the sub-area reports will ultimately be published in a hard-cover book, which will supplement the book *Boring Data from Greater Boston,* published by this Society in 1961. This publication scheme has been approved by the Board of Government.

The Board of Government has set aside $3,000 for publication of the hard-cover book, and $6,355 has been donated by 46 consulting firms and contractors to help pay the expenses of collecting and compiling the data. Up to Jan. 10, 1969, approximately $2,000 has been spent.

Mr. Clarence Seagrave has been hired by the Society to collect and compile the data. The Committee expects to have the Boston Peninsula map and boring data ready for publication in the Journal by July 1, 1969, and will have started collecting data from other sub-areas by that time.

The Engineering and Geology Branch of the Boston office of the U. S. Geological Survey has made its boring log files for the Boston Peninsula available to the Committee.

We wish to thank the Board of Government, the U. S. Geological Survey, and the many firms that have supported this project so generously.

Ronald C. Hirschfeld, Chairman

JOINT COMMITTEE ON PROFESSIONAL CONDUCT

Boston, Mass., March 5, 1969

Gentlemen:

Your representatives on the Joint Committee on Professional Conduct (ASCE; MSPE; BSCE) have attended the one meeting held in the Society rooms during the year. In addition to attendance at this meeting there has been some correspondence relative to possible ethical problems which, however, did not come within the purview of the Committee.

In 1955 the Attorney General of the Commonwealth of Massachusetts secured indictments for conspiracy against the late Chairman of the Massachusetts Turnpike Authority, his son-in-law, and the chief engineer of an engineering firm, the latter a member of ASCE. In 1967 a Suffolk County jury found the first two named to be guilty but no charges had been pressed against the engineer as his evidence evidently was considered necessary for the conviction of the other two.

Transcript of the evidence by the engineer was finally received late in 1968 and turned over to ASCE. The directors of that society decided that under the circumstances no action should be taken by them against the engineer. Your chairman, who had heard

part of the testimony before the Suffolk County jury and has read the engineer's testimony, concurs with the ASCE opinion, particularly as the engineer is now retired.

Inasmuch as your chairman has represented the BSCE since 1963 he feels it would be incumbent for him to decline retention on the Committee should the new President of the Society request it.

Respectfully submitted,
E. Sherman Chase, Chairman
William L. Hyland, Secretary
George G. Bogren

REPORT OF JOINT LEGISLATIVE COMMITTEE

Boston, Mass., March 24, 1969

The Legislative Committee reviewed the legislation proposed for consideration during the 1968 session of the Great and General Court of the Commonwealth and cited twelve that related to the interests of the Boston Society of Civil Engineers in its annual report of March 19, 1968.

The committee submits the following final report on these twelve pieces of proposed legislation.

Bill No.	Description	Legislative Action
H 1922	Petition of T. McGrath III and T. Hickey relative to the qualifications for registration as professional engineers and surveyors. *Chapter 44 — Resolves of 1968* *Resolve increasing the scope of the special commission established to make a investigation and study relative to the awarding of contracts for construction and for materials by counties, cities, towns and districts in cases of extreme emergency and other related matters.*	Reported as part of H 4055 on May 20, 1968 and Resolve signed by Governor on May 24, 1968. Chapter 44 Resolves of 1968
H1542	Petition of T. McGrath III and T. Hickey relative to the qualifications for registration as professional engineers and surveyors.	Reported as part of H 4055 on May 20, 1968 and Resolve signed by Governor on May 24, 1968. Chapter 44 Resolves of 1968
H 1381	Petition of James Nolen for legislation to restrict membership of certain state boards.	Defeated July 3, 1968

Bill No.	Description	Legislative Action
H 3454	Petition of T. McGrath III and T. Hickey relative to the qualifications for registration as professional engineers and surveyors.	Reported as part of H 4055 on May 20, 1968 and Resolve signed by Governor on May 24, 1968. Chapter 44 Resolves of 1968.
S 679	Petition of the Mass. State Engineer's Assoc. Inc. for legislation relative to age requirements in professional engineer registration.	Rejected
S 577	Petition of the Mass. Municipal Engineer's Assoc. Inc. to provide persons in charge of certain work for cities and towns shall be registered professional engineers or registered land surveyors.	Next Annual Session on February 28, 1968
S 685	Petition of James Kelley and J. Nolen for legislation to create the office of executive secretary of the board of registration of professional engineers and of land surveyors and increasing the fees for registration of professional engineers and land surveyors.	Rejected
S 700	Petition of T. McGrath III and T. Hickey relative to the qualifications for registration as professional engineers and surveyors.	Reported as part of H 4055 on May 20, 1968 and Resolve signed by Governor on May 24, 1968. Chapter 44 Resolves of 1968.
S 698	Petition of DeNormandie to establish board of registration of landscape architects and provide use of the title of landscape architects. *Chapter 473 — Acts of 1968* *An Act Establishing the Board of Registration of Landscape Architects and providing for the use of the Title of Landscape Architect.*	Passed June 19, 1968. Signed by Governor July 1, 1968 as Chapter 473 of 1968.
H 1124	Petition of T. Farrell for requiring prompt decisions by the awarding authority, architects or engineers on public works projects.	Reported as part of H 4055 on May 20, 1968 and Resolve signed by Governor on May 24, 1968. See Chapter 44 Resolves of 1968.
H 2581	Petition of Paul C. Menton to investigate by Special Commission relative to the operation of Trade Regulation Board and other professional regulator boards.	Rejected.

Bill No.	Description	Legislative Action
S 623	Petition of Maurice A. Donahue and Samuel Harmon for legislation to require the architects and engineers of housing projects for the elderly to consult with the Commission on Aging prior to construction. *Chapter 217 — Acts of 1968* *Act requiring housing boards to consult with the commission on aging prior to the construction of housing for elderly persons of low income.*	Passed April 29, 1968. Signed by Governor May 2, 1968 as Chapter 217, Acts of 1968.

The proposed legislation that follows does not include all the bills filed on the particular subject. It is a representative list of legislation that is being considered by the 1969 session of the General Court which should be of interest to members of the Boston Society of Civil Engineers.

H 4032	Petition of George Keverian for legislation to prohibit the disposal of refuse in certain dumps by means of an open fire.
S 1012	Petition of James A. Kelley, Jr. and others for legislation to provide for methods of payment on public consulting services performed by architects and engineers.
H 1118	Petition of Herbert B. Hollis for creating the office of executive secretary of the Board of Registration of Professional Engineers and of Land Surveyors and increasing the fees for registration of professional engineers and land surveyors.
H 1517	Petition of the Massachusetts State Association of Architects for legislation to eliminate the requirement of citizenship by applicants for registration as architects.
H 2396	Petition of the Massachusetts State Engineers Association, Inc., and Edward J. Dever, Jr., relative to the regulation of the practice of land surveying.
H 2398	Petition of the Massachusetts State Engineers Association, Inc., and Michael E. Haynes for legislation to revise the qualifications for registration of professional engineers.
H 3809	Petition of James S. Conway for legislation to establish the state council on architecture.

Bill No.	Description	Legislative Action
H 2115	Petition of Michael Paul Feeney that provision be made for tax deductions for certain business and manufacturing corporations for the construction or improvement of air pollution control facilities.	
S 479	Petition of John L. Daneby for legislation to provide for the creation of county refuse disposal commissions.	
H 2174	Petition of James J. Collins that county commissions be authorized to study the need of incinerator districts within their respective counties and to erect such incinerators when found necessary.	
H 3449	Petition of John F. Dever, Jr., that the county commissioners of Middlesex County be authorized to borrow money for making a study of the feasibility of constructing an incinerator for use of the cities and towns within said county.	
H 167	Bill (accompanying House, No. 154, recommendations of the Department of Public Health) relative to establishing a certification board for personnel of water works facilities	
H 547	Petition of Winston Healy for legislation to provide state aid to cities and towns for the purpose of increasing water supplies.	
H 1949	Petition of Robert H. Quinn for an investigation by a special commission (including members of the General Court) of the feasibility of constructing a water purification facility at Quabbin Reservoir and opening the reservoir area for recreational use.	
H 873	Petition of Alexander A. George and another that the Board of Fire Prevention Regulations be authorized to adopt regulations relative to the installation, repair and maintenance of electric wiring and fixtures used for light, heat and power purposes.	
H 148	Bill (accompanying House, 147, recommendations of the Board of State Examiners of Plumbers) relative to extending the authority of the uniform state plumbing code to all cities and towns in the Commonwealth.	

Bill No.	Description	Legislative Action
H 161	Bill (accompanying House, No. 154, recommendations of the Department of Public Health) relative to approval of architectural plans by said department.	
H 166	Bill (accompanying House, No. 154, recommendations of the Department of Public Health) relative to requiring said department approval of plans or designs of refuse transfer stations, incinerators, or composting plants prior to construction or operation thereof.	
S 381	Petition of Francis X. McCann and Oliver F. Ames for legislation to authorize the establishment of air pollution control districts and duties of the Department of Public Health therein, the control of automobile exhaust systes. and other authority of the Department of Public Health in the control of air pollution.	
H 1510	Petition of George Rogers and Robert A. Belmonte for state reimbursement of costs incurred for the construction of regional incinerator districts.	
H 2093	Petition of John J. Slater, Jr., and another for legislation to establish the metropolitan solid waste disposal district.	
S 1043	Petition of Joseph D. Ward for legislation to establish a certification board for personnel of waste water treatment facilities.	
S 1144	Petition of Samuel Harmon for legislation to provide additional funds for the Metropolitan District Commission for extending and further developing its sources of water supply by diverting waters of the Connecticut River into Quabbin Reservoir.	
H 598	Petition of Walter T. Kostanski for increasing the amount of state reimbursement to the Metropolitan District Commission and to cities and towns which have constructed a water pollution project.	

Respectfully submitted,
Charles A. Parthum
James L. Dallas
Ralph Soule
Cornelius J. O'Leary, Chairman

REPORT OF THE QUARTERS COMMITTEE

March 24, 1969

To: The President and Board of Governors, Boston Society of Civil Engineers

Gentlemen:

During the past year the Quarters Committee held five meetings on the following dates; May 15, 1968, July 8, 1968, July 11, 1968, October 9, 1968, December 9, 1968.

We considered the location and condition of the existing quarters, the wishes and desires of individual members as expressed to the Committee, and the objectives of the Society. We concluded that the existing quarters do not and cannot be made suitable to represent the position of the Society and the desires of the members. We, therefore, recommended to the Board of Governors at its meeting on December 11, 1968, that new quarters be obtained. The Board of Governors approved of our recommendations and authorized the Committee to proceed forthwith to make all arrangements needed to acquire new quarters.

The Committee has contacted three real estate companies, prominent in the office rental field, with a request to assist us in finding a tenant to sub-lease our existing quarters for the remaining term of our lease, June 30, 1972, and at the same time find us suitable office space. The Committee wishes to rent about 600 to 900 sq. ft. for an office, library and meeting room for the Board of Government. Regular meetings of the Society and its sections will be held in hotels or restaurants engaged for each meeting.

In the meantime the Committee will continue to develop plans for quarters worthy of the needs and desires of the Society.

Respectfully submitted,
C. O. Baird, Jr.
P. A. Dunkerley
W. M. Newman
H. G. Protz
R. H. Culver, Chairman

REPORT OF BY-LAWS COMMITTEE

Boston, Mass., March 24, 1969

Gentlemen:

The By-laws Committee met in the Society Rooms on March 1, 1969 and reviewed the Constitution and the Main body of the By-laws as adopted in 1910 and amended in 1932, 1936, 1943 and 1950.

The Committee has a number of suggestions for improvement of this section of the By-laws and will propose amendments in accordance with section 16. The By-laws of the Sections will be reviewed shortly and any proposed amendments will be referred to the Executive Committee in accordance with sections one, two and three of Article VI of the By-laws of the Sections.

Respectfully submitted,
Llewellyn T. Schofield, Chairman
Paul A. Dunkerley
George G. Bogren

REPORT OF THE COMMITTEE ON ORGANIZATION CONTACTS

March 21, 1969

To the Boston Society of Civil Engineers:

The Committee on Organization Contacts was appointed on November 18, 1968, "to establish contact members at the engineering firms and other organizations for the purpose of promoting attendance at Society meetings and to further increase membership."

The Committee prepared a list of individuals at 123 firms and organizations and a letter from the President was sent, requesting that one or more men be designated as BSCE contact men at each office. A special reply form was included.

The Committee received 64 replies and is planning to send a second request to those who have not yet responded. From replies received to the above letter, a list of contact men will be established and instructions mailed to each man.

The Committee's work should be completed within the next few weeks.

The Committee recommends that the President consider assigning a committee to study other means to increase attendance, considering such items as frequency, time, place, subject matter and format of meetings.

Respectfully submitted,
Committee on Organization Contacts
Charles H. Flavin, Chairman
A. Russell Barnes
David A. Duncan
Richard Jasper
Frank J. Killilea
Ronald T. McLaughlin

REPORT OF NEWSLETTER EDITOR

Boston, Mass., March 10, 1969

Gentlemen:

The BSCE NEWSLETTER was published five times during the past year on June 15, 1968, September 15, 1968, and December 15, 1968, January 24, 1969 and March 15, 1969. Offset printing has been accomplished through the cooperation of the Graphic Arts Department of M.I.T. They have always been prompt and cooperative, and their work has been of the highest quality. It is recommended that this agency be used for future issues of the NEWSLETTER.

Due to the expanding membership of the Society during the past year, the number of NEWSLETTER copies has been increased to 1300 per issue, at a printing cost of approximately $54.00 per regular four-page issue.

The editor wishes to thank all of the Society members who have been so cooperative during the year in furnishing information promptly so that it has been possible to meet the various mailing deadlines.

Very truly yours,
Ronald E. Bucknam, Editor

REPORT OF FREEMAN FUND COMMITTEE

Boston, Mass, March 3, 1969

During the year 1968-69 the John R. Freeman Fund granted a scholarship to Mr. Michael Collins of M.I.T. who is studying the dispersion in porous media as a doctoral investigation.

No scholarship has been advertised for the year 1969-70.

On January 22, 1969 Dr. Thomas R. Camp presented the fourth John R. Freeman Memorial Lecture at a joint meeting of the Hydraulic Section with the Main Society. His subject was "Hydraulics of Mixing Tanks."

It is planned to have a similar meeting next year, circumstances permitting. At this moment the speaker has not been selected.

Respectfully submitted,
George R. Rich
C. W. Hubbard
L. W. Wolman
D. Campbell
L. J. Hooper, Chairman

REPORT OF THE RALPH W. HORNE FUND COMMITTEE

Boston, Mass., March 24, 1969

To the Boston Society of Civil Engineers:

This is the third Annual Report of the Ralph W. Horne Fund Committee.

At its 1968 Annual Meeting, the Society, acting upon recommendation of the Committee, named Dr. Carl Stephen Ell as the recipient of the Ralph W. Horne Award and presented him a scroll in recognition of unpaid public service he has rendered throughout his professional career.

Prior recipients of the award were Llewellyn T. Schofield in 1967, Miles N. Clair in 1966, and Charles O. Baird, Jr., in 1965.

Miles N. Clair
George G. Bogren
William L. Hyland, Chairman

REPORT OF THE EXECUTIVE COMMITTEE OF THE SANITARY SECTION

Boston, Mass., March 5, 1969

The Sanitary Section met four times during the preceding year. A brief account of each meeting follows:

1 — *March 6, 1968 — Annual Meeting*
(Meeting held at European Restaurant)

The following officers and members of the executive committee were elected:

Charles A. Parthum	Chairman
David A. Duncan	Vice-Chairman
Leland F. Carter	Clerk
Allison C. Hayes	Executive Committee
Cornelius O'Leary	Executive Committee
Prof. Alvin Goodman	Executive Committee

After election of officers, Dr. Clarence Tarzwell presented his views and criticisms of present approaches to standards in his interesting and thought-provoking talk on Water Quality Control.

2 — *June 5, 1968 — Annual Outing and Joint Meeting with the Parent Society*
(Meeting held at Woonsocket, Rhode Island)

Thirty-eight members and guests attended the dinner meeting, convened at the El Dorado Restaurant in early evening.

Between 2:00 p.m. and 5:30 p.m., previous to the dinner meeting, the members and guests visited the following facilities in the City of Woonsocket:

The eleven million gallon per day water treatment plant placed in operation in 1962;

The eleven million gallon per day primary sewage treatment plant made operable in 1964, and

The 160 ton per day rubbish incinerator which had been in operation since 1960.

3 — *October 2, 1968*
(Meeting held at Society Rooms)

At this meeting, a paper on the subject of "The Proposed Deep Tunnel Plan for the Boston Area", was presented by Mr. David R. Horsefield of Camp, Dresser and McKee. About forty members and guests attended.

4 — *December 4, 1968 — Joint Meeting with Parent Society*
(Meeting held at Society Rooms)

The meeting was opened by President Aldrich of the Boston Society of Civil Engineers and Parent Society business was conducted.

The meeting was turned over to the Sanitary Section Chairman Charles Parthum.

A nominating committee, consisting of Mr. Walter Newman, Chairman, Professor Robert Meserve and Mr. William Traquair, was appointed to submit a slate of officers for the coming year.

Mr. Ariel A. Thomas, Senior Vice-President of Metcalf & Eddy, Inc., presented a paper on the "Design of the 150 MGD Secondary Treatment Facilities for the Allegheny County Sanitary District." The presentation was illustrated with slides.

Attendance was about forty-five persons.

Executive Committee

The executive committee met prior to the March 6, October 2 and December 4 meetings. Programs for the year were planned and plans for future meetings were discussed.

The following major subjects were discussed during these meetings.

1. Possibility of changing the Sanitary Section to "Environmental Engineering Section."
2. Action on more suitable quarters.
3. Proposed lecture series on advanced pollution control technology.
4. Pamphlet — a guide to careers in Sanitary Engineering.

Action on the above subjects was as follows:

1. No action was taken relative to changing the name of the Sanitary Section.
2. The executive committee's opinion that the present quarters were not satisfactory was transmitted to the parent organization and it was reported to the executive committee that the parent organization was investigating the possibility of acquiring other quarters.
3. The main body of the Boston Society of Civil Engineers presented a lecture series entitled "Man and His Environment" in which a series of eleven lectures was scheduled.
4. A pamphlet entitled "A Guide to Careers in Environmental Engineering" was published.

   Copies were forwarded to over one hundred and fifty (150) Massachusetts High Schools and to New England Colleges and Universities.

   5,000 Copies were printed and over 1,000 have been distributed to date.

   Over 110 additional requests for copies of the pamphlet have been received from universities and professional engineers all over the United States and Canada, as a result of publicity in the Water Pollution Control Federation's "Highlights" and the American Society of Civil Engineers Sanitary Engineering Division Newsletter.

Respectfully submitted,
Leland F. Carter, Clerk

REPORT OF THE EXECUTIVE COMMITTEE OF THE STRUCTURAL SECTION

Boston, Mass., March 13, 1969

The following meetings were held during the past year:

April 10, 1968	Mr. Laymon N. Miller, of Bolt, Beranek and Newman, Inc., spoke on "Noise and Vibrations". Attendance was 22.
May 8, 1968	Professor R. C. Hirschfeld, M.I.T., spoke on "Rock Mechanics". Attendance was 66.
October 9, 1968	Mr. Sepp Firnkas, Consulting Engineer, spoke on "Design of World's Longest Folded Plate". Attendance was 37.

November 13, 1968	This was a Joint Meeting of the Structural and Construction Sections. The first speaker, Mr. Zoltan A. Stacho, Project Engineer for Parsons, Brinckerhoff, Quade & Douglas, spoke on the engineering aspects and design of the new M.B.T.A. Tunnels. The second speaker, Mr. Morse H. Klubock, Chief Engineer of the Marine Division of Perini Corporation, spoke on the construction aspects of the new M.B.T.A. Tunnels. Attendance was 96.
December 11, 1968	Professor Robert V. Whitman, M.I.T., spoke on "Nuclear Power Plants, Earthquakes, and Soil Mechanics". Attendance was 72.
January 8, 1969	Meeting cancelled.
February 12, 1969	Mr. Murray Shapiro, of the office of James Ruderman, spoke on the structural design of "The Boston Company Building". Mr. Edmund G. Johnson, of Haley and Aldrich, Inc., spoke on the foundation design, and Mr. Eric O'Neill, of Franki Foundation Co., spoke on the foundation construction. Attendance was 77.
March 12, 1969	Mr. G. Joe Taylor, from Howard, Needles, Tammen & Bergendoff, spoke on the "Rio de Janeiro Niteroi Bridge". Attendance was 21.

The total attandance at the seven meetings was 391, averaging 56 per meeting.

Respectfully submitted,
Howard Simpson, Clerk

REPORT OF THE EXECUTIVE COMMITTEE OF THE TRANSPORTATION SECTION

Boston, Mass., March 24, 1969

The Transportation Section held four meetings during the past year, as follows:

April 24, 1968

Mr. John T. Driscoll, Chairman, Massachusetts Turnpike Authority, spoke on the "Recent Activities of the Massachusetts Turnpike Authority". He gave the history and background of the Authority, stating that this agency presently has jurisdiction over the Turnpike in its entirety and the Sumner and Callahan Tunnels. Mr. Driscoll also described the projects being studied for possible future implementation — i.e., North-South toll road through Worcester County, a third tunnel under Boston Harbor to East Boston and the Stadium.

Attendance — 35
This dinner meeting was held in the Adams Room of the United Community Services Building

October 30, 1968

Mr. Edward J. Ribbs, Commissioner, Massachusetts Department of Public Works, gave an informative and provocative talk on "The Federal Highway Act of 1968", with particular emphasis on the proposed regulations regarding public hearings during the various stages of design.

Mr. A. Paul LaRosa was nominated and elected as Clerk of the Section to fill out the unexpired term of Mr. Louis Forti, who has been transferred out of state.

Attendance — 55

This dinner meeting was held in the Harvard Room of Purcell's Restaurant, School Street, Boston.

November 20, 1969

Mr. A. S. Plotkin, Transportation Editor of the Boston Globe, spoke on his concept of "The Social Impact of Urban Highway Location".

Attendance — 49

This luncheon meeting, an innovation for the Transportation Section, was held in Rosoff's Restaurant, Summer Street, Boston.

March 20, 1969 (rescheduled from February 26, 1969)

This unusual and interesting meeting was in the form of a seminar. The general subject was Highway Safety. A panel of three speakers discussed various aspects of this subject, as follows:

"Roadside Hazards" — Mr. Robert Tierney, Highway Engineer, Massachusetts Department of Public Works.

"Innovations in Highway Lighting" — Mr. Warren H. Edman, Vice-President, Roadway Lighting, Holophane Company, Inc., New York.

"Highway Automation" — Professor Dwight Baumann, Massachusetts Institute of Technology.

The following were nominated and elected to the Executive Committee of the Transportation Section for the year 1969-1970:

Charles D. Shaker	Chairman
A. Paul LaRosa	Vice-Chairman
Russell Barnes	Clerk
Charles H. Flavin	
Maurice Freedman	
Robert Tierney	

Attendance — 38

This dinner meeting was held in the Harvard Room of Purcell's Restaurant, School Street, Boston.

Respectfully submitted,
Charles D. Shaker, Vice-Chairman

EXECUTIVE COMMITTEE REPORT OF THE HYDRAULICS SECTION

Boston, Mass., February 11, 1969

To: The Boston Society of Civil Engineers:

The following meetings of the Hydraulics Section of the Boston Society of Civil Engineers were held during the past year:

April 30, 1968 — Professor Lawrence Neale of Worcester Polytechnic Institute spoke on "Comparative Model Pump Testing for the Tehachepi Project" in California — Attendance 16.

October 5, 1968 — Twenty members and guests journeyed to Providence, Rhode Island and then to New Bedford, Mass., to view the Hurricane Barriers constructed by the Corps of Engineers at these locations. Operational personnel conducted tours, explained the features, and operated each of the barriers.

November 6, 1968 — A Workshop on Urban Drainage was presented with the following panel speakers participating:

Research: Murray B. McPherson, Director, Urban Water Resources Research Program of the American Society of Civil Engineers at Harvard University.

Climatology and Hydrology: Robert E. Lautzenheiser, Meteorologist in Charge, U. S. Weather Bureau Office for State Climatology, Boston, Mass.

Administration and Financing: Willard S. Pratt, Director, Department of Public Works, City of Newton, Mass.

Planning and Design: Charles Fuller, Project Engineer, Camp, Dresser & McKee, Consulting Engineers, Boston, Mass.

Design Criteria and Design: Robert A. Carleo, Project Manager of Water Resources, Howard, Needles, Tammen & Bergendoff, Consulting Engineers, Boston.

Construction: Carl Buccella, R. A. Buccella, Inc., Contractors, Avon, Mass.

Attendance — 40.

January 22, 1969 — The Annual Meeting was held jointly with the Main Society in the Adams Room of the United Community Services Building, 14 Somerset Street, Boston, Massachusetts, President Harl P. Aldrich of the Society presided.

Chairman Athanasios A. Vulgaropulos of the Hydraulics Section presented the report of the Nominating Committee of the Hydraulics Section, consisting of Peter S. Eagleson, Allan Grieve, Jr., and Nicholas Lally with the following slate of officers of the Hydraulics Section for the year 1969-70, who were subsequently elected unanimously by voice vote:

Ronald T. McLaughlin	Chairman
Stephen E. Dore, Jr.	Vice-Chairman
Albert G. Ferron	Clerk
Jerome Degen	Executive Committee
Frank E. Perkins	Executive Committee
Robert S. Restall	Executive Committee

President Aldrich called on Dr. Robert H. Culver, First Vice President of the Society, to introduce the speaker, Mr. Thomas R. Camp, Consulting Engineer,

who gave the fourth John R. Freeman Memorial Lecture on "Hydraulics of Mixing Tanks".

Mr. Camp was presented with a certificate for the lecture and a check on behalf of the John R. Freeman Memorial Fund. Attendance at dinner preceding the meeting was 75, at the meeting 88.

Respectfully submitted,
Stephen E. Dore, Jr., Clerk

REPORT OF THE EXECUTIVE COMMITTEE OF THE CONSTRUCTION SECTION

Boston, Mass., February 25, 1969

The Construction Section of the Boston Society of Civil Engineers held the following meetings during the past year:

May 29, 1968 — The Chairman of the Nominating Committee, Herbert M. Priluck, presented the following slate of officers of the Construction Section for the year 1968-69 who were subsequently elected:

Chairman	Arthur H. Mosher
Vice-Chairman	Charles F. Sullivan
Clerk	Frank J. Killilea, Jr.

Following the election, Mr. Joseph Hanson, Construction Engineer for the Cooley Building Construction, Montpelier, Vermont, gave an illustrated talk on "Mountain Top Construction — Jay Peak Aerial Tramway". Fourteen members and guests were present.

November 13, 1968 — This meeting was a joint meeting with the Main Society and the Structural Section at Nick's Restaurant, 100 Warrenton Street, Boston, Mass. Mr. Zoltan A. Stacho, Project Engineer, Parsons, Brinckerhoff, Quade and Douglas, and Mr. Morse H. Klubock, Project Engineer, Perini Corporation spoke on "M.B.T.A. Tunnel — Massachusetts Turnpike to Charlestown — Design and Construction". Ninety-three members and guests attended.

January 14, 1969 — The Annual Meeting was held jointly with the American Society of Military Engineers, Boston Post, at the Red Coach Grill, 43 Stanhope Street, Boston, Massachusetts. Chairman Arthur H. Mosher of the Construction Section read the report of the Nominating Committee with the slate of officers for the year 1969-70 who were subsequently elected unanimously by voice vote:

Chairman	Frank J. Killilea, Jr.
Vice-Chairman	Herbert M. Priluck
Clerk	James A. Fife

Col. Edward W. Ribbs, Commissioner, Massachusetts Department of Public Works, spoke on the subject "Forecasts for the Year 1969". Over one hundred and fifty members and guests were present.

Respectfully submitted,
Frank J. Killilea, Jr., Clerk

COMMITTEES 1969 - 1970

NOMINATING COMMITTEE

John F. Flaherty
Donald T. Goldberg
Charles C. Ladd
Robert J. Van Epps
(Term expires March 1970)

William A. Henderson

Leslie J. Hooper
Athanasios A. Vulgaropulos
William C. Traquair
Francis T. Bergin
(Term expires March 1971)

PROGRAM

Robert H. Culver, *Chairman*
David A. Duncan
Richard C. Jasper
Charles D. Shaker
Ronald T. McLaughlin

Ernest L. Spencer
Ernest A. Herzog
Paul A. Dunkerley
H. Hobart Holly

Donald T. Goldberg
Frank J. Killilea
Frank E. Perkins

PUBLICATION

Ernest A. Herzog, *Chairman*
Charles D. Shaker
Ronald T. McLaughlin
Frank J. Killilea

H. Hobart Holly
David A. Duncan
Richard C. Jasper

Donald T. Goldberg
Frank E. Perkins

LIBRARY

Harry L. Kinsel, *Chairman*
George W. Hankinson

John M. Biggs
Joseph Capone

William H. Parker, 3rd
Nathaniel N. Wentworth

HOSPITALITY

Conrad Fagone, *Chairman*
Ralph H. Cross, 3rd.
Charles E. Fuller

Philip Bianchi
William P. Breen

William P. Kramer
Thomas H. Turton

MEMBERSHIP

Charles H. Flavin, *Chairman*
Ara Demurjian
Nicholas Lally
Robert T. Tierney

Philip Bianchi
John Lowe
George Fulton

Lee M. G. Wolman
Paul Prendiville

ADVERTISING

Ronald E. Bucknam, *Chairman*
Robert J. Van Epps
Frank W. Stockwell, Jr.

Francis T. Bergin
Walter M. Newman

Herbert M. Priluck
Lawrence T. Kraynick

JOINT LEGISLATIVE

James L. Dallas, *Chairman*
Ralph M. Soule

Joseph C. Knox

Charles A. Parthum, Jr.

PROFESSIONAL CONDUCT

William L. Hyland, *Chairman*
George G. Bogren

Francis S. Harvey

George M. Reece

PUBLIC RELATIONS

Charles A. Parthum, *Chairman*
Harold F. MacWilliams
Lino Patti

David R. Campbell
Nicholas Lally

Arthur Quaglieri
Robert T. Tierney

SUBSOILS OF BOSTON

Horst Borbereky, *Chairman*

Richard F. Battles
Donald T. Goldberg

James F. Haley
Rev. Daniel Linehan

AUDITING

James P. Archibald

Max D. Sorota

INVESTMENT

Robert T. Colburn, *Chairman*

Robert H. Culver

Ernest L. Spencer

QUARTERS

Harl P. Aldrich, Jr., *Chairman*
Walter M. Newman

Paul A. Dunkerley

Frank L. Heaney

B.S.C.E. and A.S.C.E. RELATIONS

Ernest L. Spencer, *Chairman*

James P. Archibald
William A. Henderson

Edward C. Keane
Robert J. Van Epps

BY-LAWS

Llewellyn T. Schofield, *Chairman*
Robert T. Colburn

Paul A. Dunkerley

George G. Bogren

JOHN R. FREEMAN FUND

Leslie J. Hooper, *Chairman*

David R. Campbell
Clyde W. Hubbard

George R. Rich
Lee M. G. Wolman

RALPH W. HORNE FUND

William L. Hyland, *Chairman*

George G. Bogren

Miles N. Clair

FITZGERALD - HERSCHEL AWARD

Edwin B. Cobb, *Chairman*

Edward C. Keane

Saul Namyet

SANITARY SECTION AWARD

Robert L. Meserve, *Chairman*

William C. Traquair

Charles Y. Hitchcock, Jr.

STRUCTURAL SECTION AWARD

John M. Biggs, *Chairman*

James F. Haley
Frank J. Heger

William L. Hyland
Charles C. Ladd

TRANSPORTATION SECTION AWARD

Edward C. Keane, *Chairman*

Alexander J. Bone

George C. Wey

HYDRAULICS SECTION AWARD

Arthur T. Ippen, *Chairman*
Allen Grieve

Allan T. Gifford

Lawrence C. Neale

CONSTRUCTION SECTION AWARD

Paul D. Crandall, *Chairman*

William E. Wiley

Arthur H. Mosher

ORGANIZATIONAL CONTACT

A. A. Vulgaropulos, *Chairman*
Herbert M. Priluck
Charles C. Ladd

Leland F. Carter
Howard Simpson
Stephen E. Dore

A. Paul LaRosa
Gerald L. Woodland

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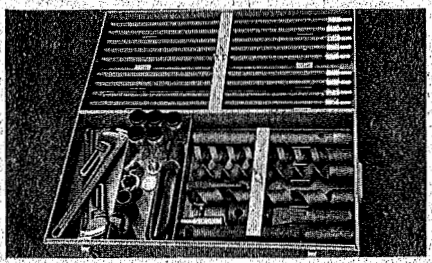

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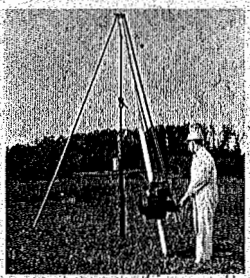

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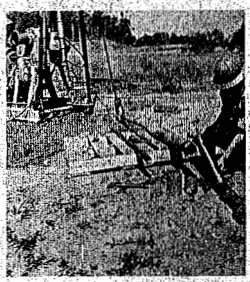

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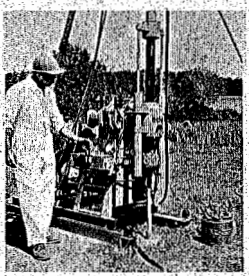

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