R E P O R T R E S U M E S

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A CENTER FOR CONFERENCES AND CONTINUING EDUCATION.
CAUDILL, ROWLETT, SCOTT AND ASSOCIATES, BRYAN, TEX
UNIVERSITY CITY SCIENCE CENTER, PHILADELPHIA, PA.

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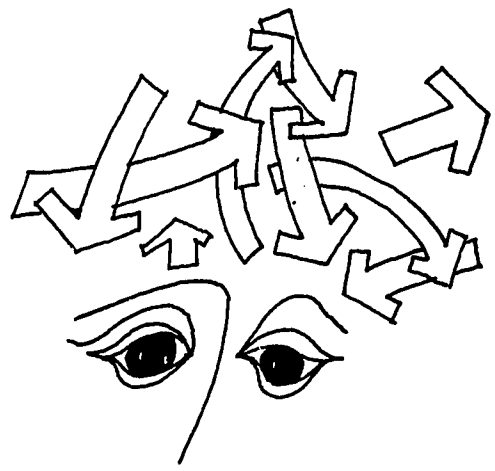
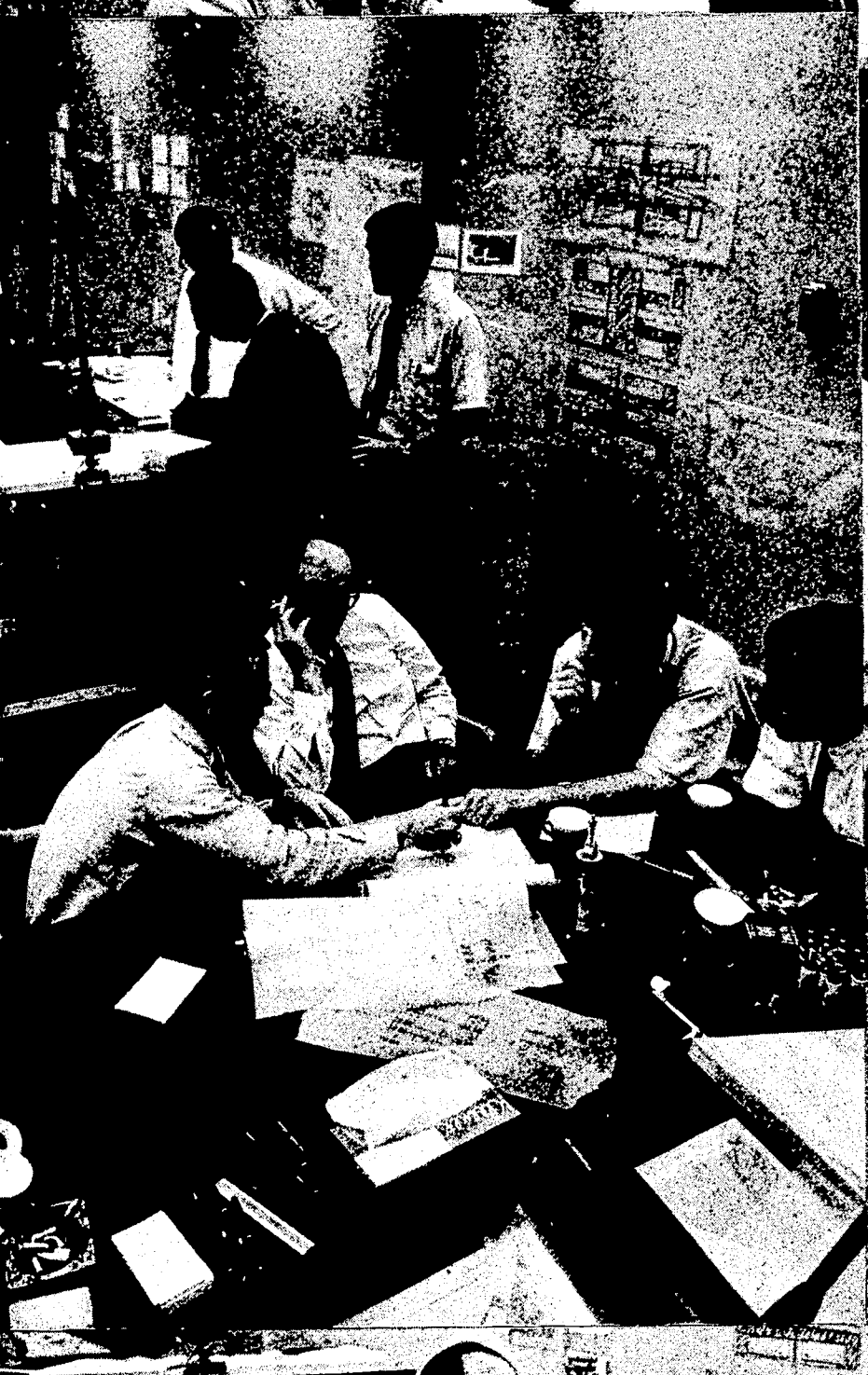
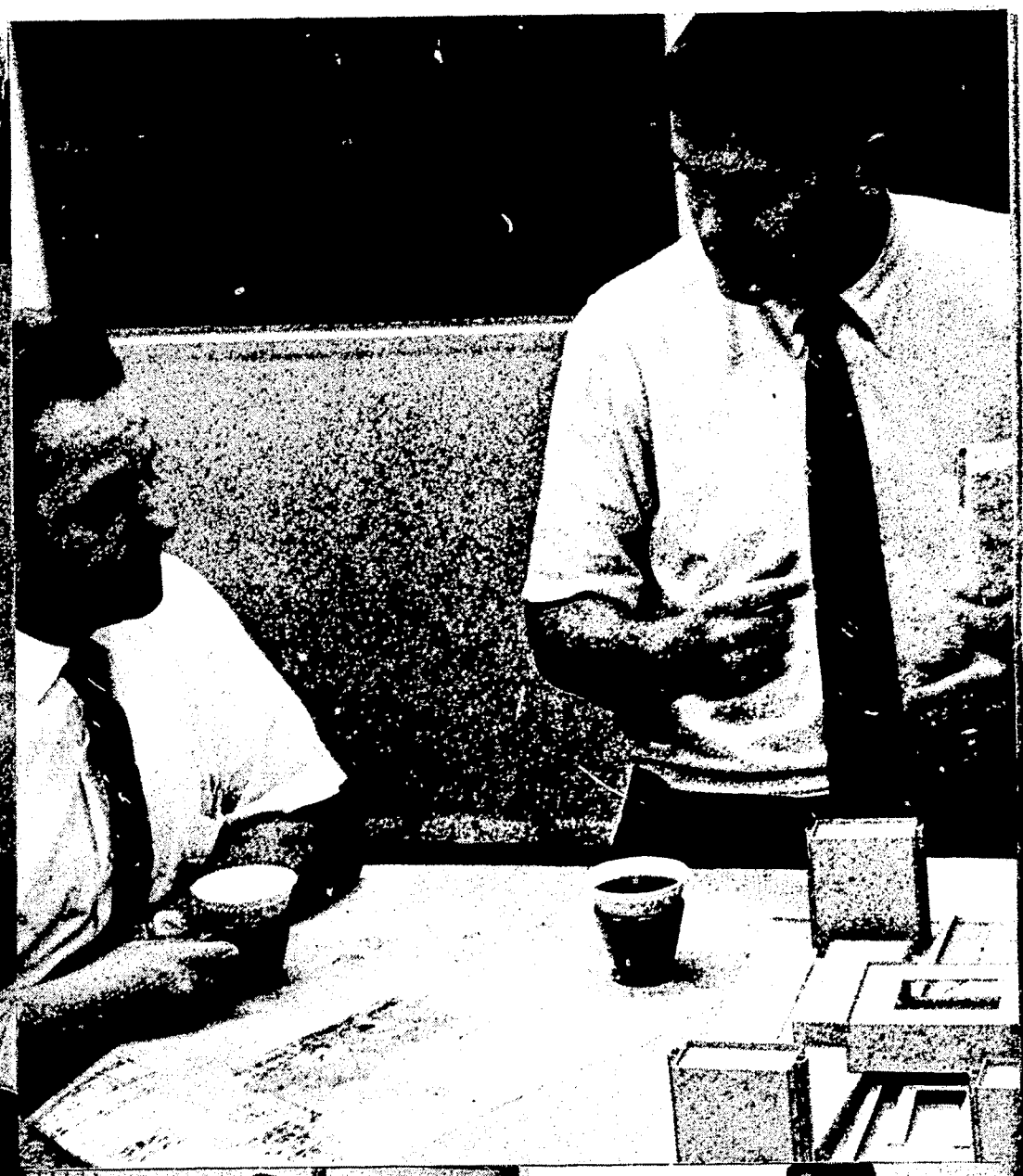
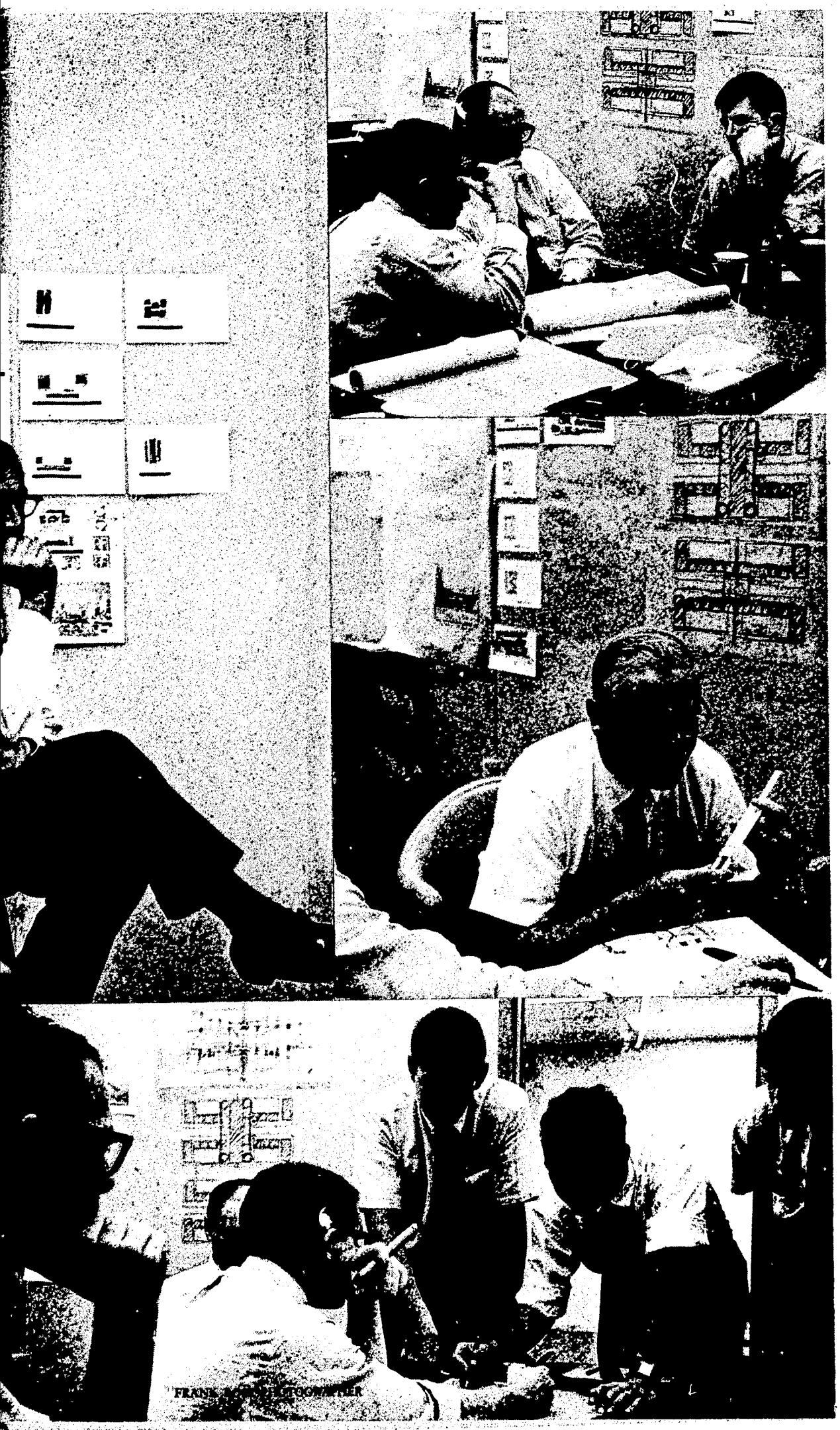
THE DESIGN OF THIS FACILITY FOR A PROPOSED SCIENCE CENTER BEGAN WITH AN ANALYSIS OF COMMUNICATIVE NETWORKS AND OTHER RELATED CONCEPTUAL IMPLEMENTS. EMPHASIZED WERE--(1) FUNCTIONAL RESOURCE LOCATION, (2) INFORMATION EXCHANGE, (3) COMPLIMENTARY FACILITIES, (4) ADAPTATION TO ACTIVITY, (5) ELECTRONIC COMMUNICATIONS AND SPACE, AND (6) ADAPTIVE FLEXIBILITY. ADAPTATION OF THE BUILDING TO SITE AND AREA CONDITIONS, ALONG WITH SOLUTION OF FUNCTIONAL AND STRUCTURAL PROBLEMS, COMPRISE A SECONDARY DESIGN PHASE. SIMULATED BUILDING OPERATION WAS ANALYZED BY A PROTOTYPE COMPUTER PROGRAM. SKETCHES AND DIAGRAMS ARE INCLUDED TO ILLUSTRATE IMPORTANT CONCEPTS. (MH)



A CENTER FOR CONFERENCES AND CONTINUING EDUCATION







A report
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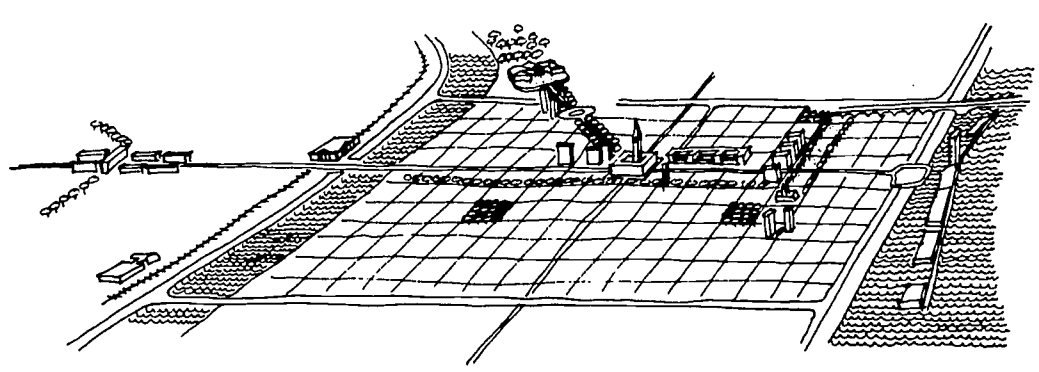
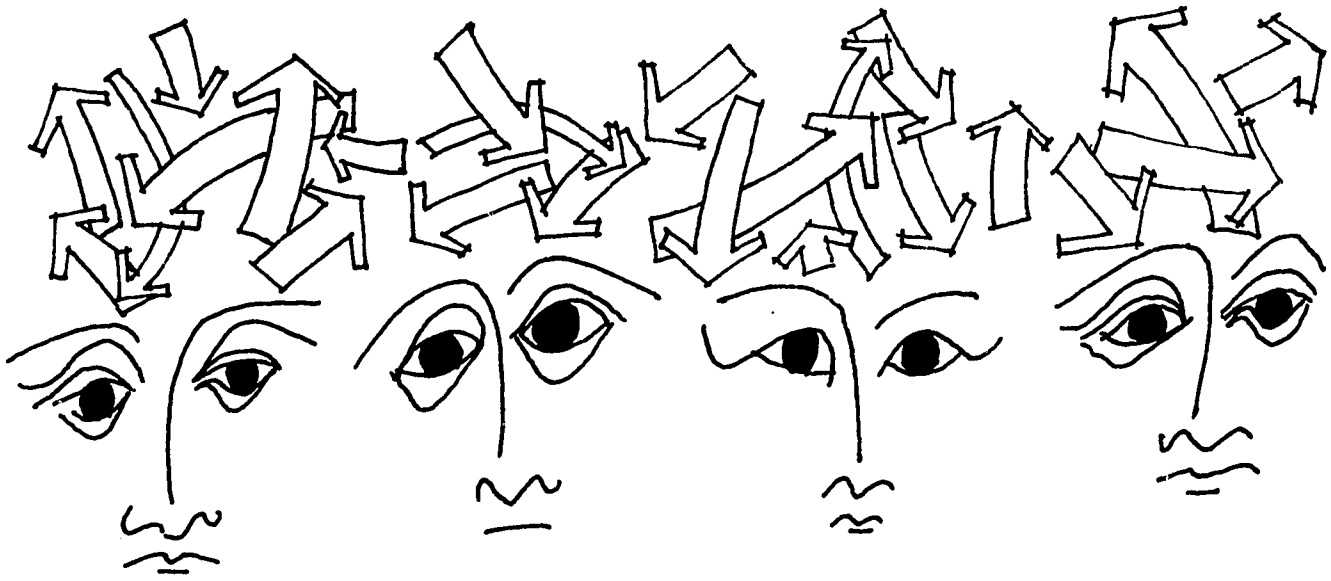


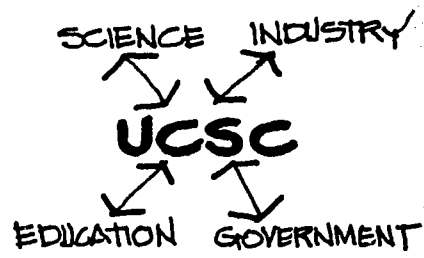
"Nothing else in the world
. . . not all the armies
. . . is so powerful
. . . as an idea whose time has come."

VICTOR HUGO



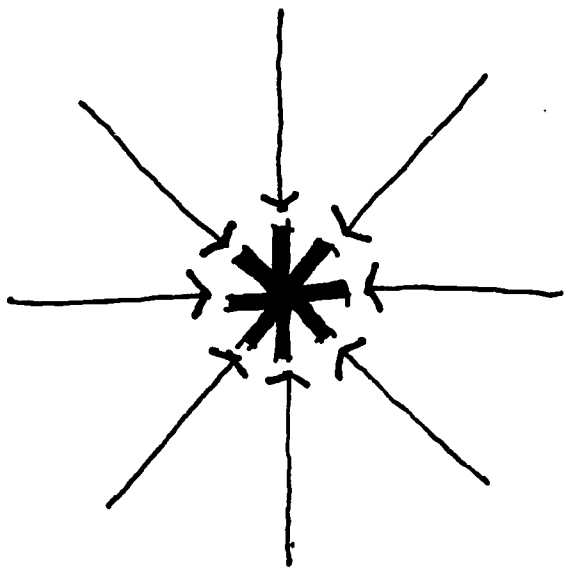
The Idea. It is necessary to find better ways to engage men of knowledge with other responsible members of our communities. Knowledge is accumulating faster than it can be disseminated or assiminated. Progress increasingly requires information which now exists but which is often inaccessible.

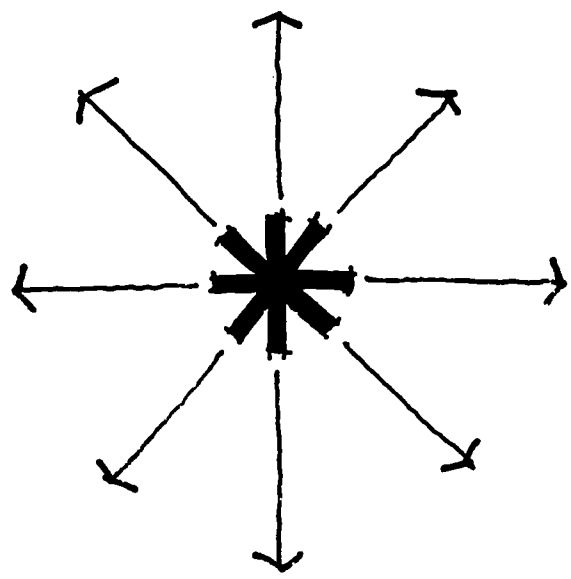
The University City Science Center provides the means for the engagement of those who are developing scientific information with those who have professional need for it. It brings together the powerful capabilities of eighteen institutions for research and higher education with the needs of government and industry. Its immediate neighbors include 27 medical, educational, and technical institutions within a 570-acre complex in the newest redevelopment area of Philadelphia. 200 of the 570 acres are currently in urban renewal projects in this reawakened area, providing land for $377 million of new structures for education, research and community facilities. Located at the heart of the new developments, the Science Center has a unique opportunity to incorporate in its design and function the most vital elements of the urban life climate.



This report deals with the Center for Conferences and Continuing Education in the Science Center. This building will be the single element used by all the Science Center's clients and personnel. It will be designed to meet the primary requirements of science and technology — maximum accessibility to information, talent and ideas.

With all the recent development in communications, there is still no substitute for bringing people together. Indeed, the need for face-to-face meetings seems to grow more intense as communications of other kinds proliferate. The Center for Conferences and Continuing Education is designed to fill this need.





Research for this study was made possible by a grant from Educational Facilities Laboratories. It was developed by Caudill Rowlett Scott. William LeMessurier and Associates, Consulting Engineers, investigated the structural implications of the site with the Caudill Rowlett Scott team.

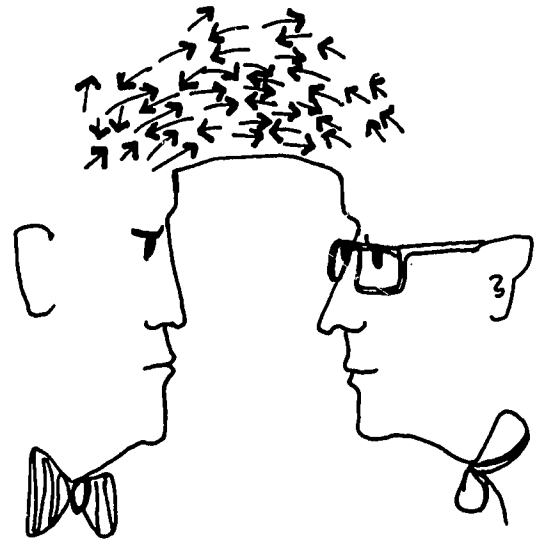
The ideas developed in the following pages resulted from many discussions among the staff of the University City Science Center, the architects, and men and women currently engaged in producing, analyzing, and communicating new knowledge in more than 60 science-based industries, government agencies, educational and medical research institutions.

The report is sponsored by the University City Science Center.

Centrifugal and Centripetal. The Center for Conferences and Continuing Education is based upon a two-way communication concept in which knowledge flows simultaneously from the community into the Center, and outward from the Center to the entire community.

The program and facilities of the Center will be designed to initiate and maintain this centrifugal and centripetal flow.

For example, concurrent scheduling of conferences which deal with related subjects can be a catalyst for cross communication, thereby producing new knowledge. Reports from each of the conferences, reproduced within the Center, can be bound and given to each conferee as well as distributed to other institutions.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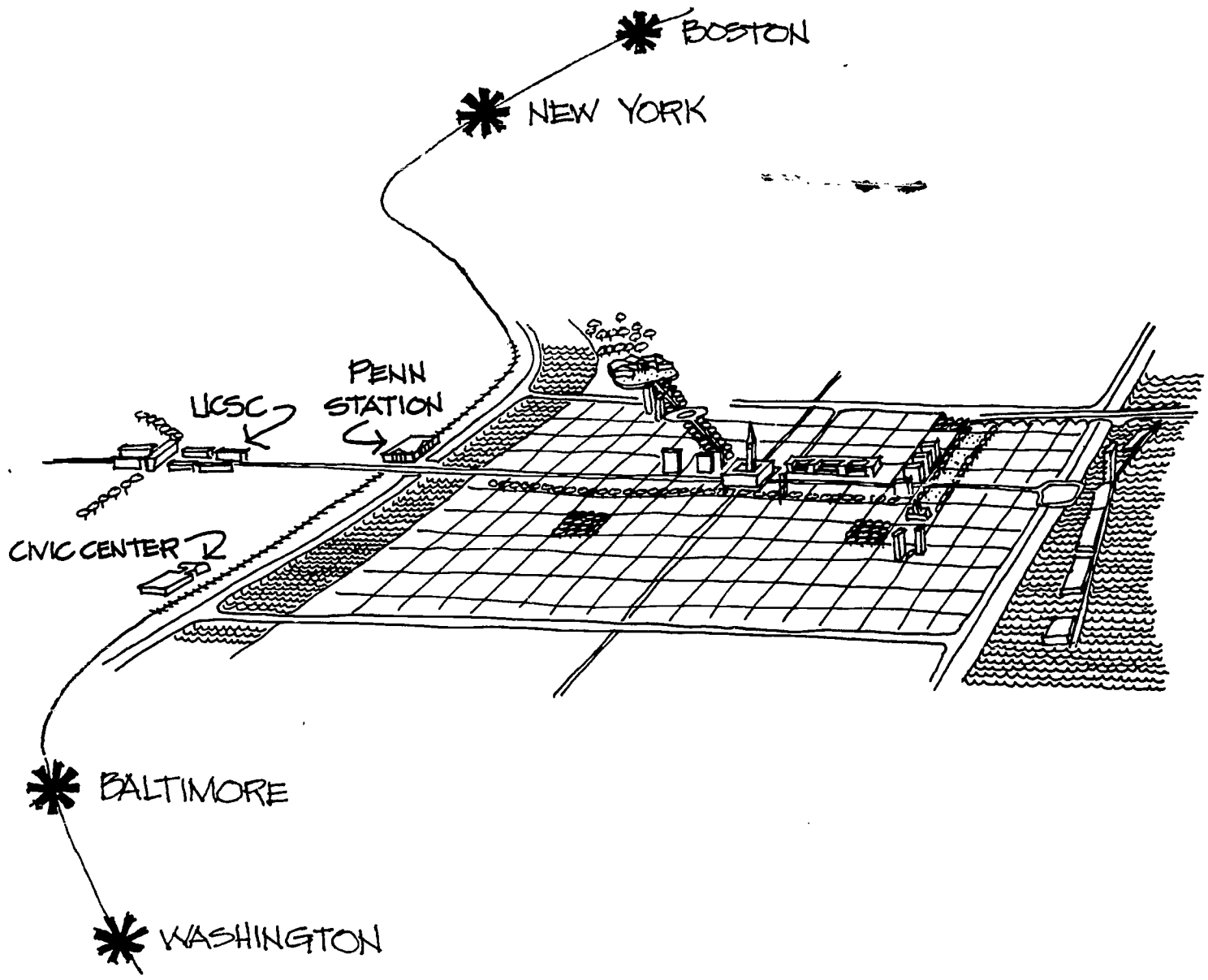
While the services and facilities of the Center for Conferences and Continuing Education will be available for scientific activity in business and industry, they will be an unusual and special benefit to educational and non-profit institutions in the Greater Philadelphia area.

Space will be provided in the Center for local and national offices of professional and technical societies. Such offices will be surrounded by others of related interest and have immediate access to special equipment and shared facilities to carry on their business more effectively. Their presence will draw conferences and learned papers which may be documented within the Center and be disseminated to other regional institutions. There will be a wide range of programs in the Center to which the twenty-two degree awarding institutions in the area may send faculty members, administrative staff members, trustees, and selected students.

These institutions will have direct and prompt access to the proceedings of many of the specialized conferences, seminars and short courses held in the Center.

The Center for Conferences and Continuing Education will also provide many teachers and professors with opportunities to conduct specialized seminars and conferences not offered in normal college curricula.

Innovations in communications technology which will be at the heart of the Center will provide insight and practical experience to teachers from primary and secondary schools.


BOSTON
NEW YORK
PENN STATION
UCSC
CIVIC CENTER
BALTIMORE
WASHINGTON

Home for Dinner. Distances are fast becoming a matter of time only, and Philadelphia is centrally located, perhaps the most easily accessible point on the Northeast seaboard. Furthermore, University City Science Center is well located within Philadelphia. Five blocks east on Market Street, connected by subway, is the main commuter station of the Pennsylvania Railroad which connects to all East Coast cities.

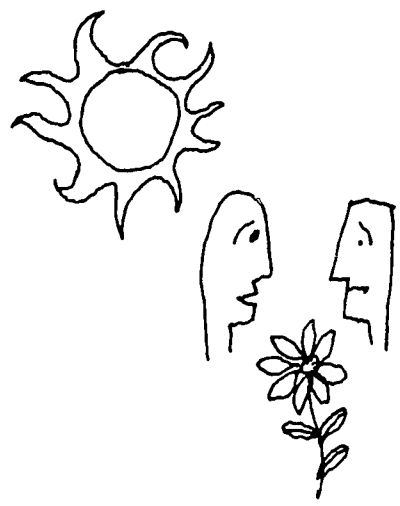
The new East Coast high speed railroad presently under development will use the Pennsylvania Station as a central terminal and will shrink distances even more. Also, a heliport will soon connect this station to the Philadelphia International Airport.

In the very near future it will be possible for two professors at lunch in Cambridge to decide to hear a paper that afternoon in Philadelphia and be home for dinner.

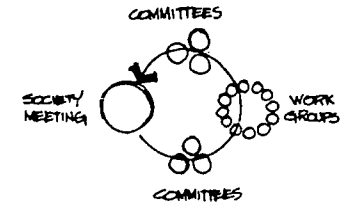
A Multiplicity of Resources. The Philadelphia Civic Center lies within a ten minute walk of the Center for Conferences and Continuing Education. The Civic Center has outstanding convention, display, and exhibition facilities. It will serve the science-related users of the Center for Conferences and Continuing Education who require larger spaces. The combined facilities will constitute a multiplicity of resources accommodating the most specialized as well as the largest requirements for conferencing.

International Marketplace. The advances of scientific and technical knowledge know no boundaries. Just as the great commodity markets deal in world wide exchanges of goods and services, the University City Science Center uses an international currency of knowledge. The Center for Conferences and Continuing Education will offer the stage for this exchange of ideas. Not only must instantaneous language translation facilities be available, but the functions of the Center itself must stimulate cultural translation and interaction.

Last year five thousand international scholars, government officials, and graduate students took part in the educational and cultural activities of the University City Institutions. The Center for Conferences and Continuing Education will make it possible to increase this number as well as enhance the conditions under which this exchange occurs.



All Work and No Play. In a typical conference, a large group divides into committees, then into work groups, back to committees, and finally re-forms as the large group. Scheduled meetings are for announcements and demonstrations, and to examine previously developed ideas. But, much of the exchange of ideas takes place in between — in the bar, at dinner, or during a bull-session.



The non-scheduled areas become essential to the success of the scheduled activities.

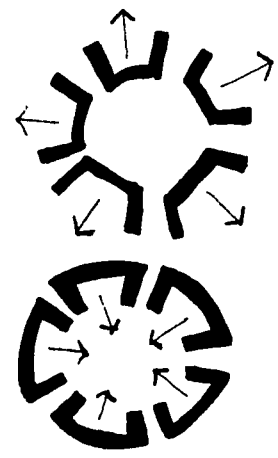
Complementary facilities are essential. They should include a small gymnasium and pool, outdoor spaces for informal conversation, a good bar, and the very best in dining facilities.

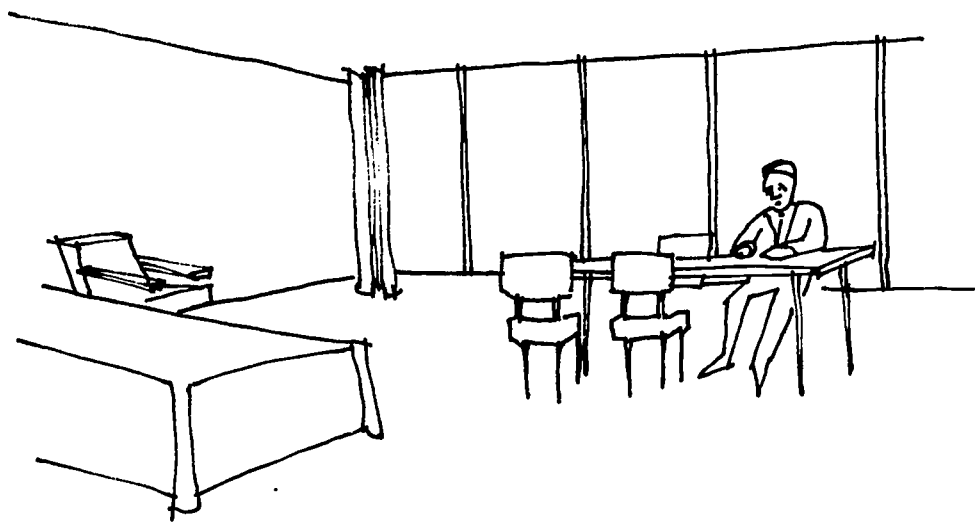
The outdoor spaces will be designed to produce a scholarly and informal atmosphere, an academic cloister. A place to get away from it all. Or put it all together.

Monk for A Day. An important function of the Center for Conferences and Continuing Education is to provide for day visitors who come for only a few hours, perhaps to present a paper. Since overnight accommodations are not necessary, simple monk-like cells will do. These rest and work areas relate to all levels of conference communications and provide stop-over facilities for visitors to nearby institutions as well.

A **HOTEL** FOR CONVENTIONS, VACATIONS, AND SALESMEN IS DESIGNED FOR PRIVACY AND **SEPARATION** OF GUESTS.

A **CONFERENCE** CENTER MUST ENCOURAGE **COMMUNICATION**



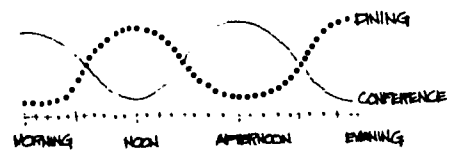


A New Breed of Cat. Every opportunity for allowing communication to occur will be exploited in the design.

For example, the hotel rooms should be designed for small conferences. They should contain a large table for a small meeting or work session. People taking short term courses in the Center should be able to do their homework there. It should be easy to rearrange the rooms to provide for the informal communication that occurs at the small spontaneous cocktail party frequently held at conferences. Some sleeping rooms may well be located near the meeting rooms so that they may be used for small work sessions during the day.

All this will produce a room quite different from the usual hotel room designed to serve vacationing families or traveling businessmen.

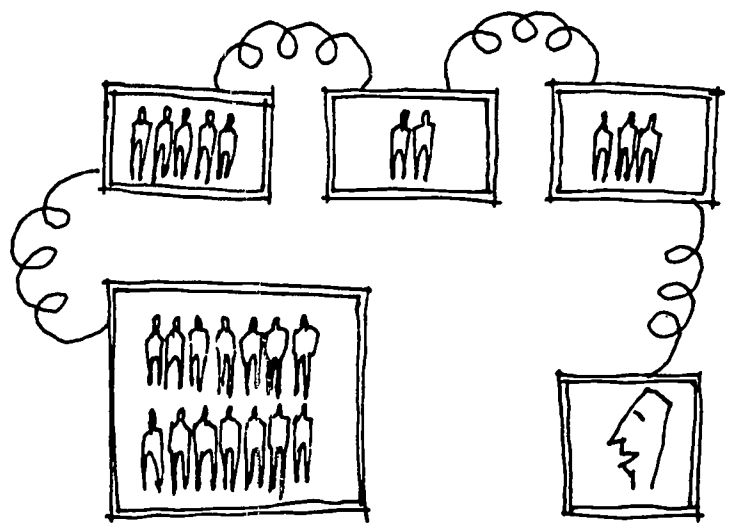
The dining facilities will be affected too. Because dining and conference times are 180° out of phase, some dining rooms may be designed to alternate as conference rooms.



PEAK DEMANDS FOR DINING ROOMS AND CONFERENCE ROOMS OCCUR AT DIFFERENT TIMES.

SOME ROOMS SHOULD BE DESIGNED FOR BOTH PURPOSES.

Teak, Concrete, and Space. Commercial hotel facilities often provide an atmosphere of occasion and festivity. More appropriate to the scholarly atmosphere of this building is fundamental quality through generous quantities of space and the genuine use of simple but excellent materials.

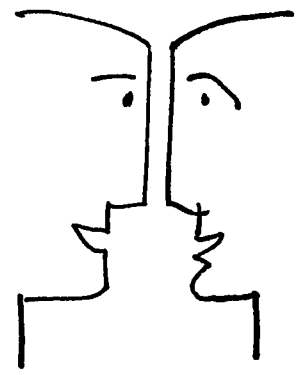


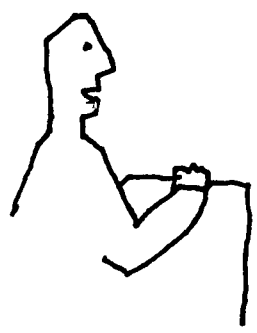
Electronic Space Flexibility. A new kind of building and schedule flexibility can be designed. Closed circuit television will allow all meeting spaces in the Center to be linked together as one. A videotaped meeting could transmit information to 500 people instead of requiring five meetings of one hundred.

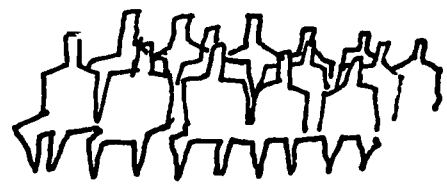
A library will exist to allow specific collections to be assembled for individual conference activities. Publishers and other libraries in the region will be the sources of this material.

Other library-related facilities will exist. Often a conference will bog down for want of a small fact. To overcome this a small staff connected to the library will provide a research service to conferees at nominal cost.

Scientists rarely complete the papers to be delivered at conferences until the eleventh hour. A security-cleared printing service will provide reproduction services.







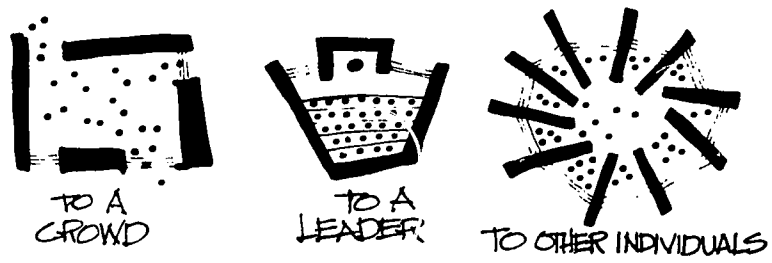
Life On Mars. A firm we can call Orbit Electronics, Inc. hosts a group of specialists in environmental science to define theories, concepts, and problems of the Martian atmosphere. In addition to spaces for lectures, seminars, group discussions, and demonstrations, special technological support will be needed to provide a continuum of communication in and between all these activities — all within Department of Defense security classifications.

Another firm, Pharmaceuticals, Inc., convenes a meeting of research chemists and bio-technicians from nearby graduate institutions to explore proposals for developing a new marketable drug to relieve hypertension. Market analysts are included in the meetings to discuss market value.

An economics professor from a member institution is needed to plan and conduct an intensive short-term seminar on the economics of the electronic industry. The professor is located and invited by the University City Science Center staff. His seminar participants would bring highly specialized interest into the Center and he would bring his professional expertise both as an economist and as a college level instructor. The course lasts fifteen days, employing the total communication technology of the Center. Twenty-five engineers in new product design will live and study in the building during the course.

A professional society in oceanographic technology sponsors an international meeting at which many papers are given. Invited graduate students from nearby institutions view the proceedings on closed circuit television in the Center. Scholars attending from abroad receive simultaneous translations. Video tapes store the proceedings for future retrieval and distribution.

SUBDIVISION OF **SPACE** INFLUENCES THE RELATIONSHIP OF ONE INDIVIDUAL TO OTHERS



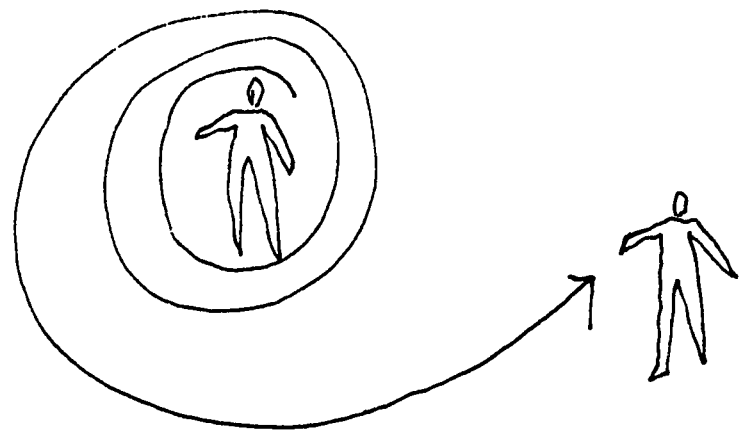
Space and Communications. A man may relate to others and communicate in these ways: to a crowd, random and casual; to a leader, highly organized and formal; and to his peers, direct and informal.

In the Conference Center these different levels of communications will be recognized by similar kinds of spaces.

There will be places such as the lobby, exhibition areas, or the bar, where crowds will provide opportunities for chance meeting between colleagues.

Highly organized spaces will occur. The Continuing Education function will require rooms where information will be demonstrated or transmitted in one direction, as in a lecture.

But the most exciting challenge is in the design of previously unstudied kinds of learning spaces where individuals communicate in an equal, informal, and direct method. These areas will be furnished and equipped to handle not only a lecture situation but the conference of equals which occurs at a give-and-take level. These rooms will be for the communication of knowledge among specialized and informed individuals, a process which is entirely different from the transmission of knowledge in a classroom atmosphere. In the latter a student comes to learn and to receive. In the former the combination of knowledge creates new knowledge.



Man Doesn't Change. The rapid march of technical achievements that makes professional abilities become obsolete also affects buildings. The next fifteen years will see an era of extreme technological advance. The design and building concepts of today are based on the last fifteen years. In order to design a building of this kind properly, staid concepts of architecture must be jarred loose and unseated.

New techniques relying less on intuition and more on careful analysis can be employed. The architecture should provide every opportunity for adaptability to future change, particularly such changes as addition of communication cables, changes in heating and air conditioning techniques, and power supply for electronic equipment.

We can anticipate some things about the future unless the physical requirements of man change. It is probable that sleeping accommodations will undergo little change. In the last 100 years, only toilets and television sets have been added to hotel rooms. Fans have been exchanged for air conditioning. We have gone an additional step by including an ample work table. But fifty years from now, men will still want a view from their rooms.

The meeting rooms are the reverse. They are susceptible to the impact of change from the advance of communication technology. They require long spans and windowless walls.

A proper appreciation of permanent human values and evolving technological innovations is the key to a successful plan.

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 44      TEST  NE    S*2     X*5     57
*                                          BRANCHES WHEN EQUAL
*                                          I.E. NO ROOM AVAIL.
*                                          FOR CONF. TYPE
 45      SAVEVALUE  *6+    1
*                                          STORAGES 20-24 FOR NO.
*                                          OF CONF. ROOMS OF EA. TY
*                                          OCCUPIED.  MAX. NO. ROOM
*                                          EA. TYPE IN X1-X5
 46      ENTER      *2     1
 47      ADVANCE    FN*4
*                                          INDIRECT SPEC. FOR LENGH
*                                          OFCONF. BY FUNC. 2-6
 48      LEAVE      *2
 49      TRANSFER           58
 50      TERMINATE
*                                         FLIP-FLOP TO ALLOW CONF.
*                                          USE BETWEEN 9 AM - 11 PM
 51      GENERATE   96     0       12
 52      LOGIC S    2
 53      TERMINATE
 54      GENERATE   96     0       68
 55      LOGIC R    2
 56      TERMINATE
*                                          STORAGES 25-29 FOR
*                                          FULL ROOM TYPE CORR. TO
*                                          20-25 PLUS 5
 57      ENTER      *3     1
 58      TEST  L    C1     X7      60
*                                          END 1YR SIM. TIME TRANS.
*                                          CONTROL TO XIT
 59      TERMINATE
 60      ASSIGN     12     K5
 61      SAVEVALUE  11     0
 62      ASSIGN     11     V6
 63      ASSIGN     10     V7
 64      SAVEVALUE  13     V1
 65      TEST  LE   80     X13     68
*                                          LESS THAN 80 PERCENT
*                                          REQ. FILLED REDUCE NO.
*                                          ROOMS BY ONE FOR EACH
*                                          TYPE LESS THAN 80
 66      SAVEVALUE  *12-   1
 67      TRANSFER          70
 68      TEST  G    90     X13     70
 69      SAVEVALUE  *12+   1
*                                          ADD 1 TO NO. ROOMS OF EA
*                                          TYPE WHERE MORE THAN 90
*                                          PERCENT REQ. FILLED
 70      LOOP       12     61
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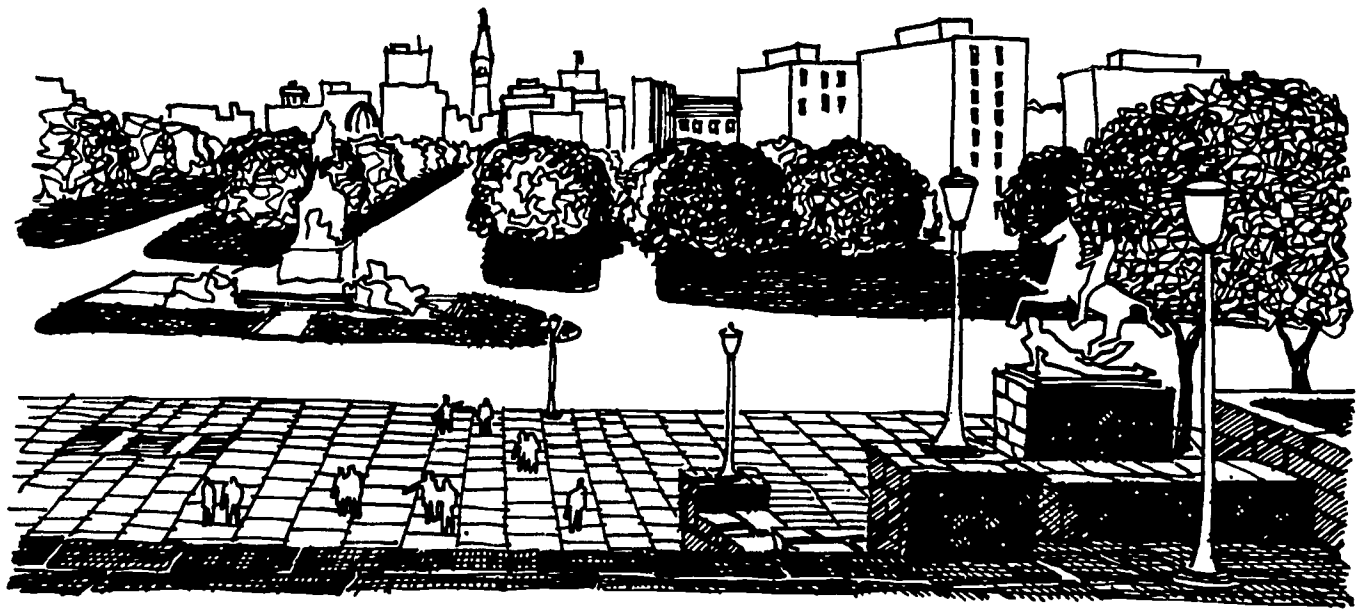
A New Design Tool. There is little precedent for a building of this type. The form will have to be as original as the building's purpose — and as specialized as the building's site.

Although an economic study has been made to analyze and size this facility, most studies to date have been primarily qualitative. The economic study has been outdated by new ingredients.

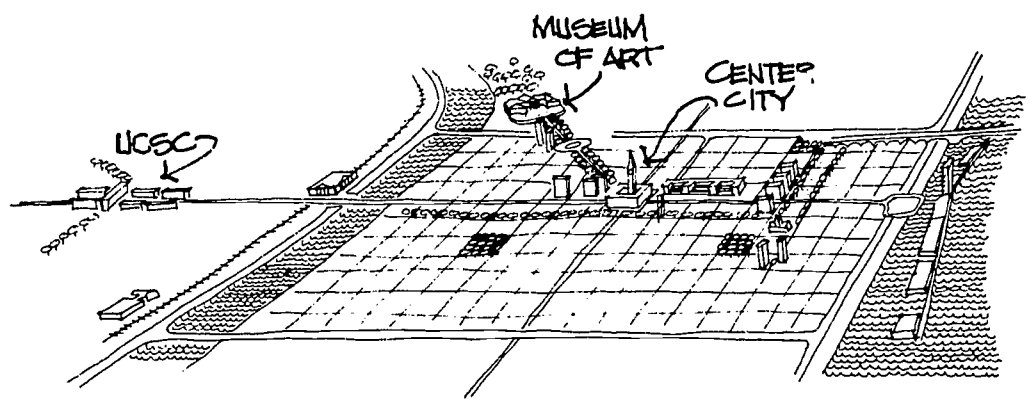
Additional future research should pin down specific numbers such as quantity of sleeping rooms, dining room sizes, capacities of meeting rooms, and most importantly, the proper relation and balance of these facilities with each other.

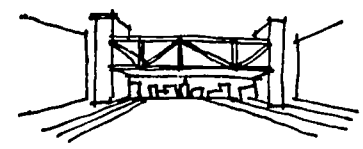
This report is based in part on work done with a computer to determine the feasibility of simulating the operation of the building and to test the validity of the new concepts which are being attempted. A small functioning model of some of the facilities was built and run on the IBM 7040 in the University City Science Center Building. The model was oversimplified and revealed little about the building itself. Nevertheless, the experiment was successful in demonstrating the probable eventual success of such a process as a design tool — to be used when the time comes to detail the exact nature of the project in precise terms.

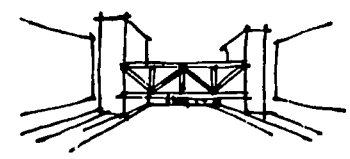


The Visual Role. Besides the functions of conferencing and communications, there are some unusual visual and functional roles that the Center for Conferences and Continuing Education must play as a major building in Philadelphia.

Its relationship to the Center City is similar in character to that of the Philadelphia Museum of Art. The important view from above Market Street will be similar to the view from the elevated plaza in front of the Museum. Just as the Museum's plaza has become one of Philadelphia's memorable spaces, the Center for Conferences and Continuing Education should also become a major element in the City. The building should have a basic visual orientation to Center City.

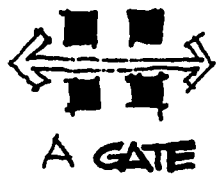

MUSEUM
OF ART
CENTER
CITY
UCSC





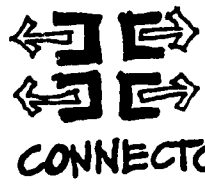
Related to this view of Center City is the view from a car. Market Street crests just before it descends into downtown Philadelphia at the site of the University City Science Center. For the thousands of people who drive to Philadelphia daily via Market Street, the Center for Conferences and Continuing Education will frame the first view of downtown. The height of the lowest floor above Market Street, therefore, is a problem which deserves considerable study. If it is too low, it will destroy the view. If too high, circulation within the building will be difficult.

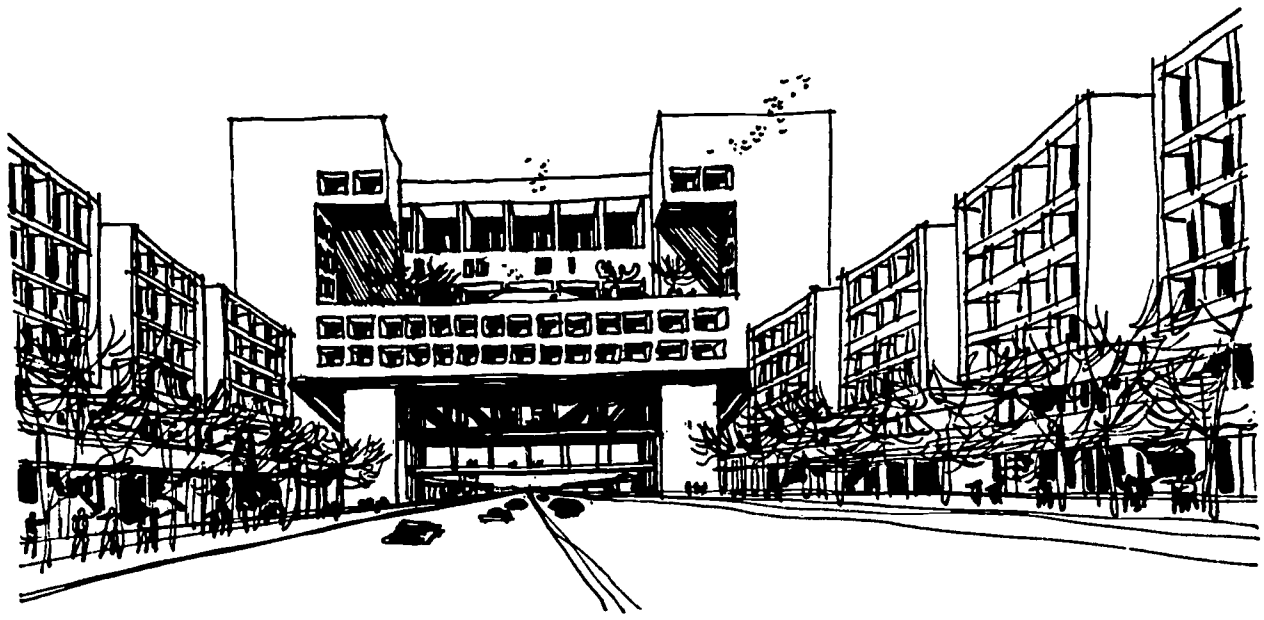
This position then becomes a visual entrance to downtown Philadelphia — and the building becomes a symbolic gateway.



It also becomes a pedestrian bridge. 37th Street will be closed in the near future and become a major pedestrian mall connecting Market Street to the University of Pennsylvania on one side and to the University of Pennsylvania Medical Center on the other side. The Center for Conferences and Continuing Education has an opportunity to make a pedestrian connection across Market Street. It will also be desirable to provide access to the subway at this point.

Furthermore, the Center for Conferences and Continuing Education must be a connector of the Science Center itself, joining both sides of the street and all of the diverse and related functions of the Science Center.

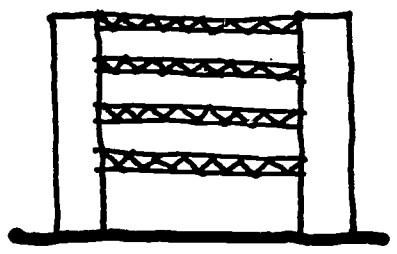




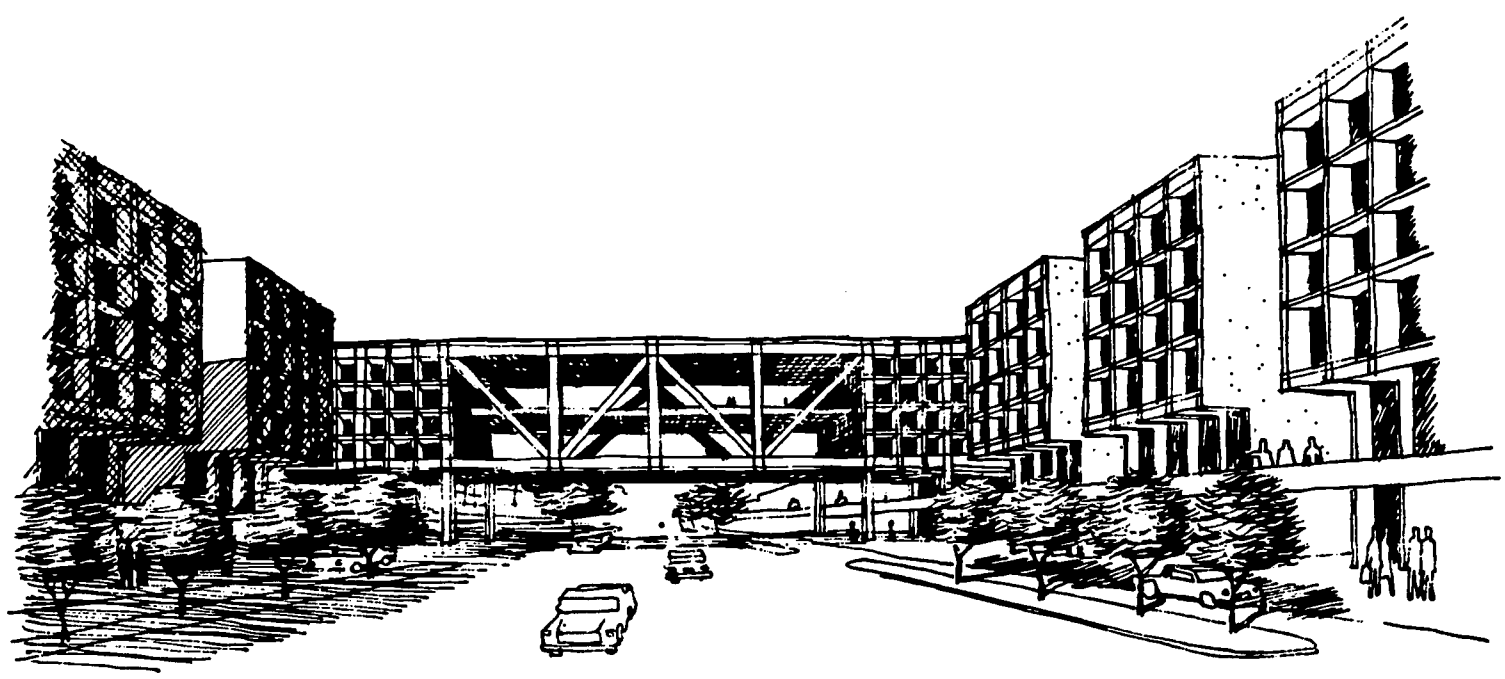
A Welcome Problem. This building has a dramatic site — the aerial rights over one of Philadelphia's major streets. The site brings a structural problem, the need for a long span. But it is a welcome problem. The long span will be an asset.

In truth, the problem could be avoided. Columns could be located in the center of Market Street and the curb lines at each side, limiting the span to only thirty feet. But the result would be meager. The street would become a tunnel through the building — a dark hole serving as the Gateway to Philadelphia Center City. The building must span lightly, and the space below it must be sunlit and open, uncluttered by columns. This span should convey a purposeful extension of Philadelphia's Center City and be a dominant major element in the redevelopment of University City.

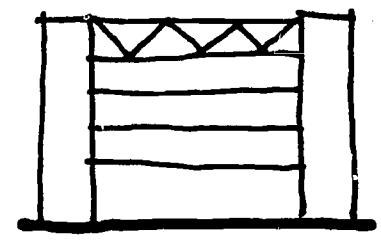
Several basic structural approaches have been examined.



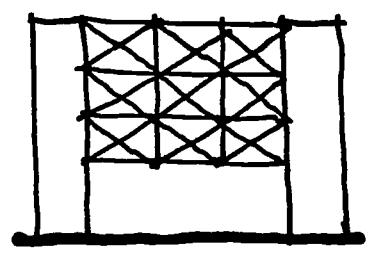
If each floor becomes a clear span across the street, large volumes of column-free space can be provided within the building, allowing considerable flexibility for future rearrangements of space. However, each



floor must solve the structural problem independently — which is expensive. Furthermore, exceptionally long spans without columns are not necessary.

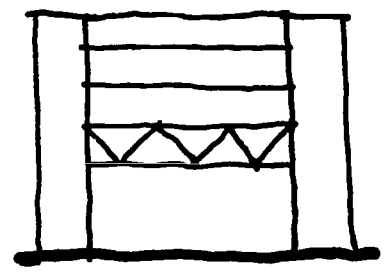


If a major truss is placed at the top of the building, individual floors could be supported with a suspension structure. However, it would be necessary to close Market Street while building the lower floors before the truss on top was put in place. Loads would have to be carried up to the truss and then back down each side -- a costly process by nature.



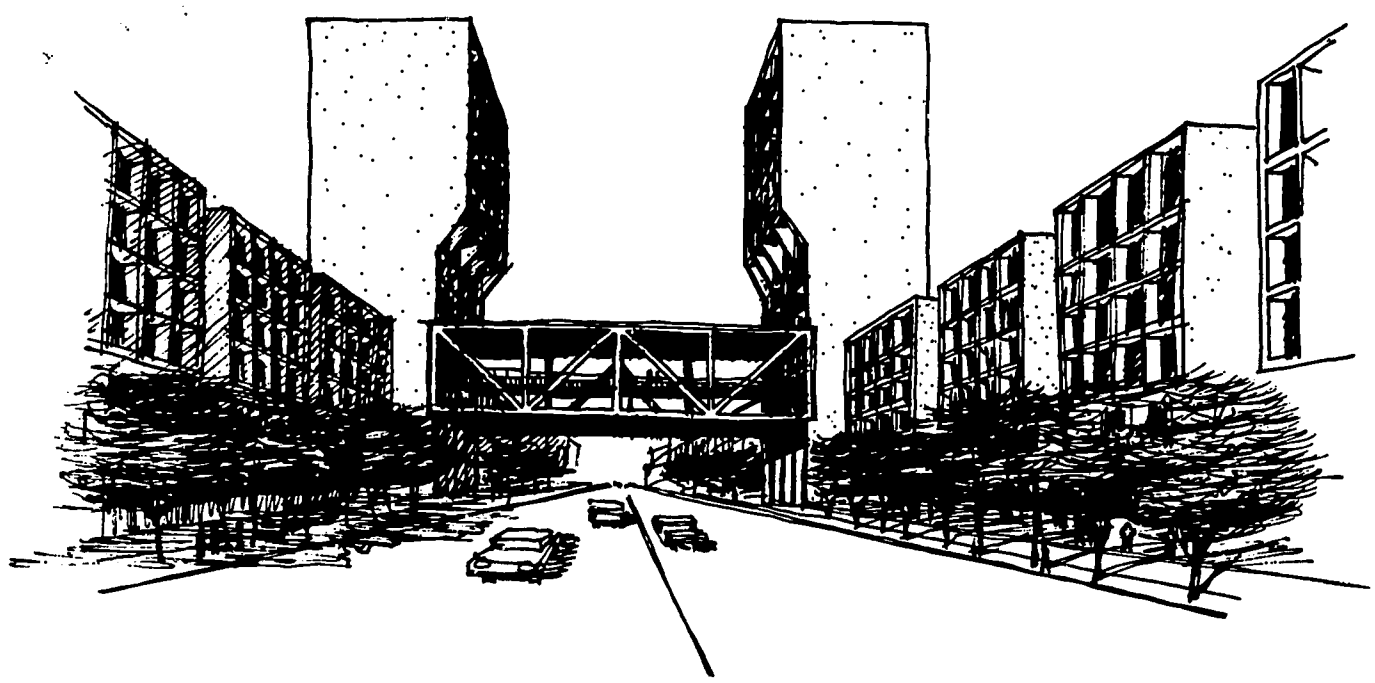
Another solution would allow the building itself to become the major structural element, weaving diagonal truss cords through the floors of the building. This would be economically sound, but the frequent penetration of diagonal cords through the spaces in the building would necessitate extremely small rooms and limit the flexibility of future partition changes.

Three of the approaches studied seem feasible.



One would locate a major truss at a lower level, providing a platform upon which a more conventional type of construction could be built. This would allow Market Street to remain open during construction and would provide many rooms with a good view up and down Market Street.

A second possibility would be to put the major facilities inside a large truss space spanning the street. The rest of the facilities could be located in two towers, located on each side of the street, which support the truss. This is a more economical direction. It reduces the load which has to be carried entirely across the street, but it limits the number of rooms with views up and down Market Street.



A third approach would be to construct a long, low building from Ludlow Street to Filbert Street. This building could have a structural pattern into which a truss could be integrated to span Market Street.

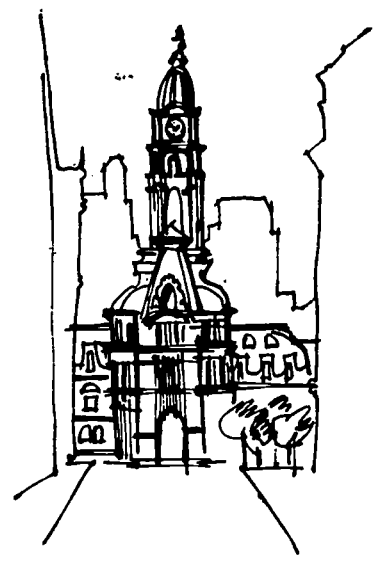
Some structural analysis has been accomplished. The principles are straightforward and direct. Economy lies in the depth of the members which must carry the long span. Approximately one to five depth to span ratios will be appropriate, giving a thirty foot depth for the 150 foot span. A truss will produce the most economical use of materials.

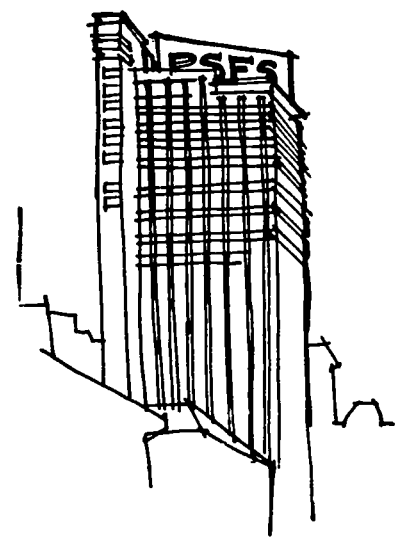
Analysis of the first and most expensive of the feasible solutions was made. Assuming a 150 foot span over the street with 60 foot spans for the use of meeting room areas above, the distribution of steel is as follows:

Trusses	7 pounds per square foot
Girders	9 pounds per square foot
Floor Beams	4 pounds per square foot
Columns	3 pounds per square foot
Miscellaneous Details	2 pounds per square foot
Total Steel Weight	25 pounds per square foot

Assuming twenty cents per pound, the structural cost equals about five dollars per square foot of building. Therefore, the cost of the trusses (the price of the long span) amounts to less than four percent of the building's construction cost.

If the second or third approach were pursued, the total weight of the steel would decrease from 25 to approximately 17 pounds per square foot in those areas not supported by the truss.

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Buildings Are Expressions of Values. Throughout history architecture has provided the physical expression of the dominant forces within a culture. Those values which men share most commonly, and believe in most firmly, produce the strongest architecture of the time. Thus, at a glance, a city reveals the values held by its inhabitants in the present and the past.

Philadelphia's major buildings are classic examples. The love of free government created Independence Hall and City Hall. Leadership in commerce and finance created the Philadelphia Savings Fund Society building, a prototype in office buildings. A deep awareness and respect for a cultural heritage has produced the Philadelphia Museum of Art.

Just as the values of the past have produced their building types, so will the scientific revolution and Philadelphia's advances in research and education produce new architectural forms.

Education and research have left behind their ivory towers. Government, industry and business are actively engaging the strength of institutions of higher education. Continuing education, the exchange of ideas between executives, inter-disciplinary research, communication among labor, management, business, and government are all emerging ideas of surprising power.

The primacy of these activities in Philadelphia will also find expression in a new building type. The Center for Conferences and Continuing Education must be a new combination of mutually supporting functions and activities.

It will become a new product — totally different from the simple collection of independent elements. It is an idea whose time has come.

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