

## Designing a Technical Information Center—In Retrospect\*

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**There are many variables which must be considered in designing a technical information building. This paper explores the effect of some of these variables on the Technical Information Building designed for the Hercules Research Center. These variables are considered from the perspective of the effectiveness of the building, which was constructed in 1957, in meeting the changing needs of the environment.**

The opportunity to design a technical information center is generally a once-in-a-lifetime event. Consequently, most of us do not have the opportunity to gain first-hand knowledge and experience. We can, however, gain considerable knowledge and experience from those who have had the responsibility for designing a technical information center, a library, or any functional building. Furthermore, a competent architect, who certainly would be involved in the undertaking, can contribute considerable education, training, and experience to the designing and construction of a technical information center. Even though the literature on the design of buildings for information operations and services is somewhat meager, consulting and studying this literature is a profitable experience.

There are two areas of knowledge and experience in designing a technical information center: the how and the what. The difference between the two is illustrated by the surgeon who, when asked to explain his bill of \$500 for an operation, explained that the operation required him to know *how* to cut and sew, for which his charge was \$25. For knowing *what* to cut, his fee was \$475.

As pointed out in an earlier paper (5), the successful design of a technical information center is based on an understanding of the following factors:

1. Site
2. Prevailing architectural style
3. Number of structures and future growth
4. Environment being served
  - a. Organizational structure
  - b. Number and kinds of groups
  - c. Distance of various groups from Center
  - d. Range of scientific disciplines and research interests
5. Information operations and functions
  - a. Document collections and growth
  - b. Information services
  - c. Information specialists

None of these factors is invariant. They are highly complex variables and are subject to change. Although information

operations and functions are related to and determined by the environment being served, they are also affected by developments in equipment, machines, and external information services (1, 3).

This paper explores the effect of some of these variables on the Technical Information Building designed for the Hercules Research Center.

Construction of the building was completed in April 1957. Figure 1 is a recent aerial view of the Hercules Research Center. The large building in the left foreground is the major laboratory building which was designed in 1929. Most of the early expansion was behind and to the side of the water tower. In the early 1950's, studies and evaluations by research management led us to an over-all plan for expansion in which the Technical Information Building would be the physical center of the technical community. In keeping with this plan, the Materials Science Building was constructed next to the Technical Information Building. Future buildings will be constructed towards the foreground, in line with the Materials Science and Technical Information Buildings.

With site planning, there has been a decided trend away from traditional architectural design. This trend is also evident on university campuses. Air conditioning, an awareness of functional and operational work patterns, and the need to control building costs have contributed to this trend.

A relatively high degree of flexibility was designed into the Technical Information Building as we anticipated the need for changes in the floor plan arrangement. Thus, inside walls, except for the vault, are movable metal partitions. Although these increased the building costs slightly, maintenance costs have been lower than for masonry or plaster walls, and, most importantly, they permitted changes to be made easily and quickly. The major changes that have been made (most of them within the past several years) are illustrated in Figures 2 and 3 which give the floor plans as of 1957 and as they are today.

Actually, several areas, particularly Rooms 350 and 357 (Figure 2), have undergone several changes between 1957 and today. It is interesting to examine the factors behind these and other rearrangements of offices.

Our translation needs in the late 1940's and early 1950's required a staff of three technical translators (4). One

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Figure 1. Aerial view of Hercules Research Center

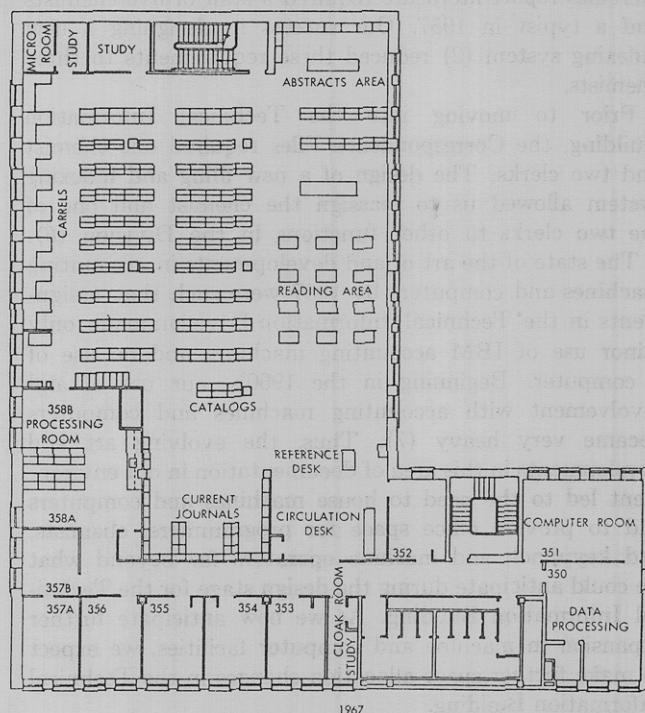
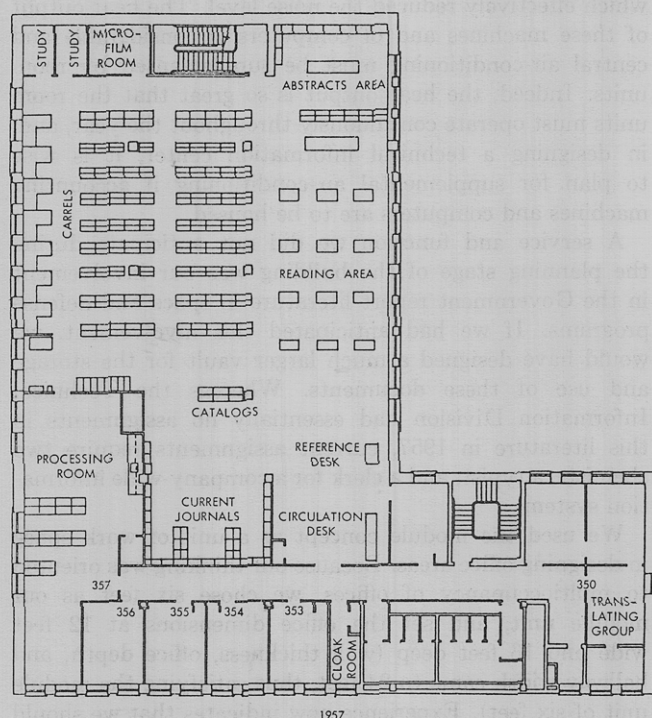


Figure 2. Floor plans of third floor of the Technical Information Building in 1957 and 1967

of the group's major activities was in the translation of Russian journal literature. As a matter of fact, the importance of the Russian journal literature during this period was such that many scientists at the Hercules Research Center learned Russian so they could do their own reading as many do for the German and French technical literature. During the 1950's and into the 1960's, most of the important Russian journals became available

in cover-to-cover English translations. Furthermore, many services for translating and for publicizing translations were introduced. These external services reduced our requirements for full-time staff translators. Although the Translating Group now consists of one translator and a typist, one-half of the chemists in the Technical Information Division can handle several languages when the need arises to augment our translating capabilities.

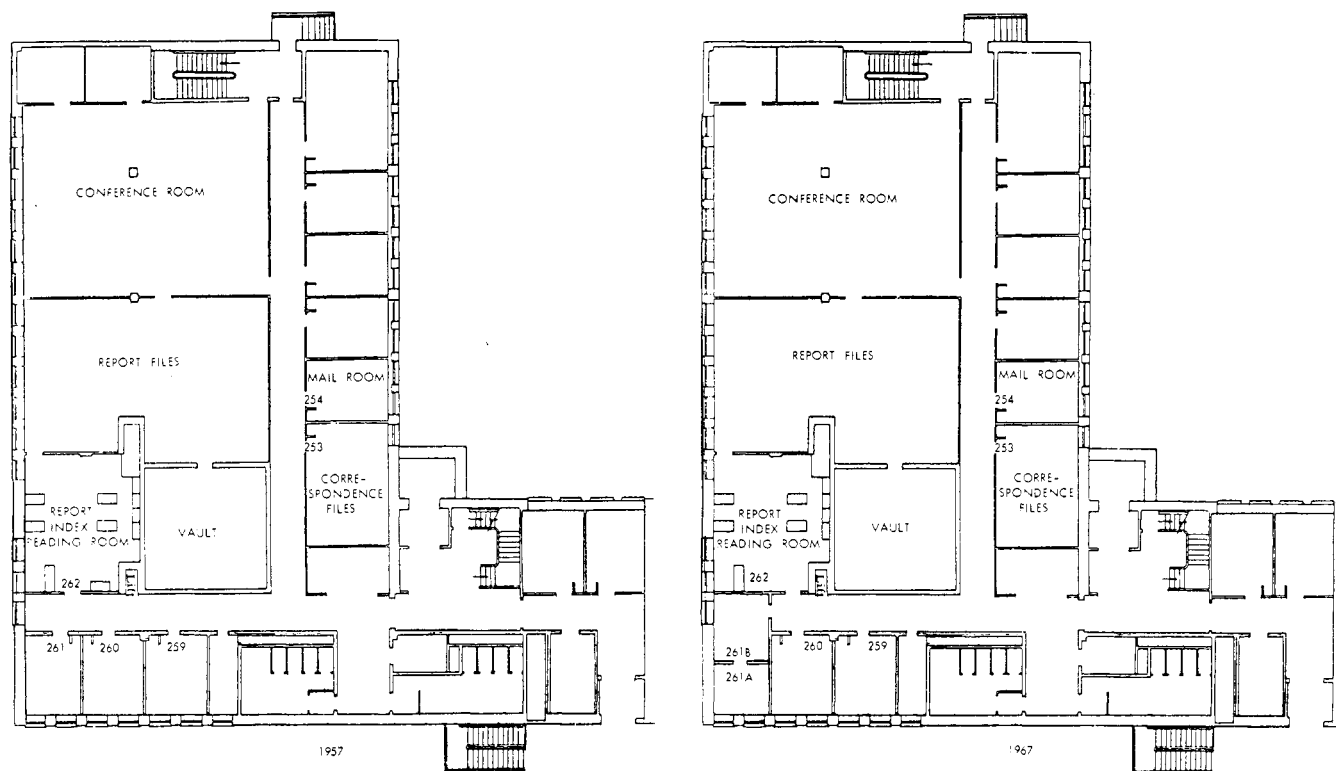


Figure 3. Floor plans of second floor of the Technical Information Building in 1957 and 1967

Indexing, abstracting, and literature searching in the Hercules report literature required a staff of five chemists and a typist in 1957. Our success in designing a new indexing system (2) reduced these requirements to three chemists.

Prior to moving into the Technical Information Building, the Correspondence Files required one chemist and two clerks. The design of a new filing and indexing system allowed us to reassign the chemist and one of the two clerks to other functions in the Division (6).

The state of the art of and developments in accounting machines and computers by 1957 were such that assignments in the Technical Information Division made only minor use of IBM accounting machines and no use of a computer. Beginning in the 1960's, our use of and involvement with accounting machines and computers became very heavy (7). Thus, the evolving art and developments in this area of documentation in our environment led to the need to house machines and computers and to provide office space for programmers, chemists, and keypunch and machine operators far beyond what we could anticipate during the design stage for the Technical Information Building. As we now anticipate further expansion in machine and computer facilities, we expect to make further space allocation changes in the Technical Information Building.

There are two factors that must be considered in arranging space for machine and computer facilities and for the people who use and operate the facilities: (1) the noise level of the equipment and of the people, and (2) the heat output of the equipment.

Because of the high noise level, we placed the machines and computer in the northernmost part of the office wing on the top floor where the lavatories and stairwell could be effective noise barriers. The machine area, which contains two keypunches, an IBM card sorter, an IBM 870,

and a Flexowriter, has been carpeted with Herculon (8), which effectively reduced the noise level. The heat output of these machines and of computers is considerable and central air-conditioning must be supplemented by room units. Indeed, the heat output is so great that the room units must operate continuously throughout the year, and, in designing a technical information center, it is wise to plan for supplemental air-conditioning if accounting machines and computers are to be housed.

A service and function we did not anticipate during the planning stage of the building was our involvement in the Government report literature in space and defense programs. If we had anticipated this involvement, we would have designed a much larger vault for the storage and use of these documents. Whereas the Technical Information Division had essentially no assignments in this literature in 1957, current assignments require two chemists, a typist, and a clerk for a company-wide information system.

We used the module concept as a unit of work space in designing office areas. Because our thinking was oriented to multioccupancy of offices, we chose six feet as our module unit, and set the office dimensions at 12 feet wide and 16 feet deep (wall thickness, office depth, and hallway width came to 24 feet, thus satisfying the module unit of six feet). Experience now indicates that we should have chosen a module unit of seven feet and an office depth of 13 feet. The advantage of the seven foot module over the six lies in what we now recognize as the need for private offices for information specialists. This need exists because of the highly intellectual nature of information work and the high involvement in telephone and person-to-person conversations between the information scientist and the scientists he is serving. With two or more information scientists sharing an office, the people involvement of one is often in conflict with the intellectual efforts

of the other. The area of a  $7 \times 13$  office is 91 sq. feet. One-half the area of a  $12 \times 16$  office is 96 sq. feet, or five sq. feet larger than the  $7 \times 13$  office. Yet two  $7 \times 13$  offices can house four people, should the need ever arise, considerably more comfortably than one  $12 \times 16$  office. The reason for this is that 12 feet is on the short side to accommodate two desks on opposite walls with two chairs back to back.

Prior to designing the Technical Information Building, we studied thoroughly the growth of our document collections, such as books, journals, patents, trade publications, correspondence, Hercules report literature, and Hercules research record books. In retrospect, this was an activity of high precision but only of reasonably fair accuracy, yet completely necessary.

Our prediction of journal subscriptions surprisingly was quite accurate. At the time we designed the library section of the building, we were subscribing to about 500 journals. Our growth studies indicated that we should plan for 750 within 20 years. We are now subscribing to about 700 journals. As our current journal stacks were manufactured specially from our own design and specifications, a poor prediction could have been extremely expensive.

Although we were relatively accurate in predicting the number of different journals we would be subscribing to, we were low in the number of subscriptions per journal we would need and considerably low in the storage area we would require in the library. What we could not predict in the early 1950's was the expansion of the journal literature in terms of thickness per volume. Examples of the unpredictable expansions are *Journal of Polymer Science*, *Journal of Organic Chemistry*, *Inorganic Chemistry*, and *Chemical Abstracts*, to name a few. Since moving into the building in 1957, the stacks in the library have been increased by about 25%.

Two important features in our design were the two studies and the seven carrels in the library (Figure 2). Because the carrels have been heavily used, we added three more without subtracting anything from the library. The demand for the studies by the laboratory scientists is such that we could use many more, but these could have been put in only in the design stage. Should we expand the building, many studies will be added.

During the planning stages in the 1950's, we gave considerable thought to the flooring in the library. Although our preference was strongly for carpeting, it was obvious that static electricity would be a major problem through the winter months. Our studies also disclosed that installation, maintenance, and janitorial costs would be relatively high, the last two because of wear and soiling. If we were designing the building today, however, we would specify polyolefin fiber carpeting for the library. The installation, maintenance, and janitorial cost of polyolefin fiber carpeting is competitive with or lower than other types of flooring. Superior wearing and soil resistance give it this advantage over other types of floors; freedom from static electricity makes it superior to other carpeting materials for a library.

Our predictions for the expansion of our own proprietary documents, such as Hercules reports and related literature, were accurate in terms of what the collection was and how it was growing in the early 1950's. The research and development programs today, however, are consider-

ably different from the earlier ones. The difference is both in number and kind in harmony with the expanding needs of an expanding growth company. Although the crystal ball we used in designing the building was a little bit on the small side, we are in relatively good shape because our space studies were based on the use of file cases for our proprietary documents. Several years after we moved into the building, we replaced the file cases in the Report Files with stacks. The stacks we installed are equipped with a solid backing to serve as a fire-stop. The advantages of stack shelving of reports are: documents are easier to handle, and twice as many can be stored in the same area as when file cases are used. Conversion to stack filing has made the area assigned to the Report Files more than adequate for years to come even though we are filing documents, such as chromatographic charts, which did not exist in the early 1950's. Further space economies may be possible in the future by the use of microfilm and microfiche for some classes of proprietary documents.

The Technical Information Building at the Hercules Research Center was designed to handle not only immediate needs but those which we anticipated for 20 years to come. The expansion area for this 20-year period is located below the library and in back of the Report Files. Until the need for the expansion area becomes critical, it is serving as a conference room with a seating capacity of slightly over 100 people. It has become the most heavily used conference room at the Hercules Research Center and has been almost in constant daily use since the building was constructed.

Activity and use are excellent measures of the effectiveness of the design of any functional building. The increasing activity in and use of the Technical Information Building over the years have been particularly gratifying to those of us who were involved in its design. In retrospect, we were successful to the degree that we could divorce our thinking, during the design stage, from the habits and customs of the past. Even though our predictions and plans for a 20-year future were better than we had hoped, we continue to look at our changing needs and to reshape the floor plans to fit the machines, equipment, information operations, and information functions of an evolving future.

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- (8) Registered trademark of Hercules Incorporated for polypropylene olefin fiber.