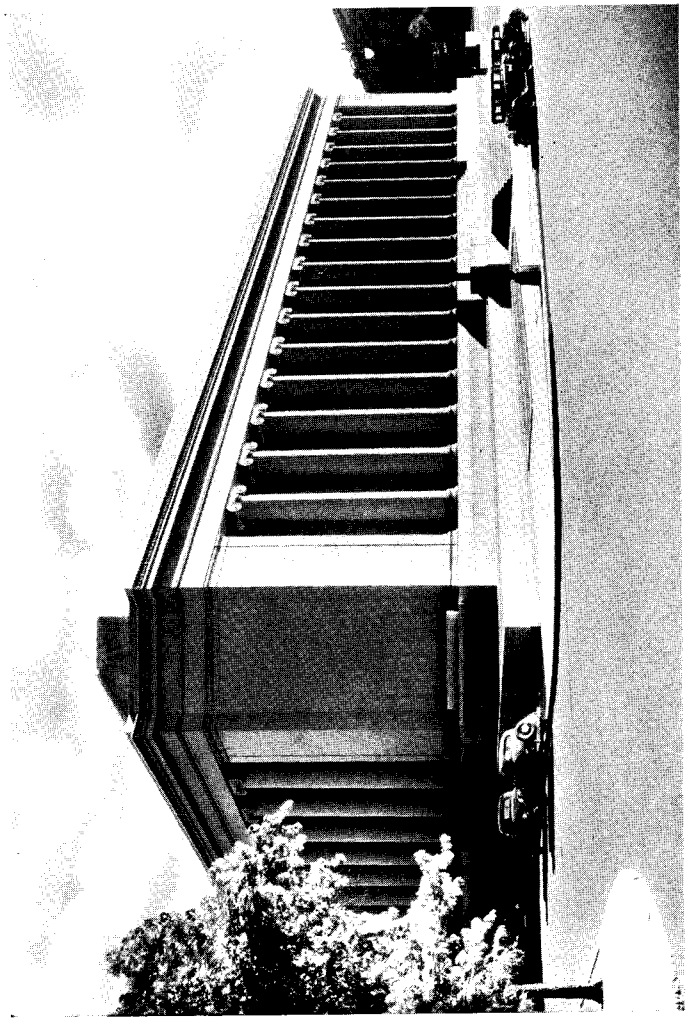
# A TRIP THROUGH MELLON INSTITUTE



The New Home of Mellon Institute

# A TRIP THROUGH THE NEW BUILDING OF MELLON INSTITUTE

PITTSBURGH, PENNSYLVANIA

1937

*This booklet has been published for distribution to persons interested in the new home of Mellon Institute on the occasion of the dedication and formal opening of that building, May 6-9, 1937.*

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a clearinghouse of technical information adaptable to public advantage.

*History of the Institute's Fellowship System*

The Institute, as it exists today, has grown from a smaller organization that was brought together by Andrew W. Mellon and Richard B. Mellon to develop in Pittsburgh the industrial research procedure conceived by Robert Kennedy Duncan. Knowing that in Europe industry and science were working in harmonious co-operation, Duncan became convinced that the United States would benefit greatly if some method could be evolved to assist industry in employing scientific technology in place of the traditional rule-of-thumb production practice then followed generally. His idea took form in a practical plan for studying long-time industrial problems under the auspices of an educational institution.

In 1907, while Duncan was professor of industrial chemistry at the University of Kansas, he had the first opportunity to submit this concept to actual test. He proved its merit. He was invited by Andrew W. Mellon and Richard B. Mellon to come to the University of Pittsburgh in 1910, to put his idea into effect on a broader scale, and the operation of the Industrial Fellowship plan was begun here in 1911. They followed Duncan's progress with close interest and soon became convinced that the procedure was sound—that it served both to benefit the public through scientific accomplishments and to train young men for useful research careers. They founded Mellon Institute as such in 1913 and later placed its Fellowship System on a permanent basis. Their broad views of the proper spheres of service of the





institution are reflected in the support they have given to its researches in pure science.

In 1915 the Institute moved from its original small frame laboratory into the building that has been its home until the present. The organization carried on its work as a part of the University of Pittsburgh until the Institute was incorporated in 1927. Since then its affairs have been managed by its own Board of Trustees through an Executive Staff. The Institute continues, however, in close co-operation with the University.

*Operation of the Institute's Fellowships*

Under the Industrial Fellowship System, the various research problems are proposed by firms or associations to meet the needs of their particular fields. If a given proposal is of such scope as to be acceptable to the Institute, the investigation is organized under a contract with the donor for a period of at least one year.

The scientific worker, with training and experience that fit him for that particular research, is found and engaged by the Institute. He is accorded use of laboratories and facilities, guidance and advice of the Institute's Executive Staff, and co-operative aid of other Fellows. The donor of the Fellowship is kept continually in touch with the results of the work. Only one research is carried out on a particular subject at any one time.

Sixty-four Fellowships were in operation on March 1, 1937. One hundred seventy-seven scientists were members of the research staff during the fiscal year ended on that date.

The continuity of the Institute's research programs attests the soundness of its Fellowship System. One

Fellowship has been in continuous operation since 1911. Thirty-three of the present Fellowships have been maintained for five years or more, and of this number fifteen have been active for ten years, eleven have concluded fifteen years or more of research, and seven Fellowships are twenty years of age or older.

*Researches on Industrial Problems and in Pure Science*

During the twenty-six years since the first Fellowship was established nearly 4000 American companies have been served by the Institute on problems ranging from food and sleep to glass and steel. It has evolved many novel processes and products, some of which have resulted in the formation of entirely new industries. Its contributions to the literature of chemistry and allied sciences include 19 books, 143 bulletins, 744 research papers, and 1117 miscellaneous articles published in technical journals.

While the Institute is best known as a technologic and scientific experiment station, it has the innate function of serving as a training school in research methods and in special technical subjects. Because it recognizes the need of fundamental scientific research as a background and source of stimulus for industrial research, it also supports disinterested investigations not suggested by industry, but planned within the Institute and directed toward the study of more basic problems than those usually pursued in technologic researches.

Among the Institute's many comprehensive investigations in the realm of pure science, conducted for the benefit of the professions or the public, have been studies on smoke abatement and later on industrial dusts, re-





search into the cause and prevention of dental caries, a comprehensive investigation of sleep, a project to find a better way to diagnose tuberculosis in its early stages, and a search for new compounds of value in treating pneumonia. The work in pure science, carried on since 1911 and formally organized under the Department of Research in Pure Chemistry in 1926, has grown steadily in breadth and importance. Wider opportunities will be had by this function of the Institute in the new building. The results of researches in pure science are, of course, published and widely distributed as they are completed.

*Conception of the New Building*

Long before ideas of the physical form of Mellon Institute's new home had crystallized, two definite decisions were made: First, to fulfill its essential purpose, the building must be the most advanced scientific workshop that modern knowledge could provide. Secondly, it must be beautiful as a tribute to science and to the Institute's own achievements—appropriate to the ideals of its Founders and in keeping with the imposing architecture of companion buildings in Pittsburgh's civic center.

Although other types of architecture were considered, the preference from the outset was weighted heavily in favor of the Grecian school. The architecture of ancient Greece combines great beauty with the simplicity that is fitting to a home of science. And in the philosophy and the general intellectual curiosity of the Greeks of the golden age, modern science had its beginning. The architecture of the building, therefore, was

to be a tangible recognition of the link between the science of early days and the science of the present and future, exemplified in the Institute's purpose and work.

*The Institute from the Outside*

The requirements of the Institute made necessary a building of about six and one-half million cubic feet. The architectural treatment dictated that the building be very wide in proportion to its height—the very opposite from the proportions of a skyscraper. In order to secure this low, horizontal appearance, and yet provide the required space, it was necessary to build three stories below ground level, the lowest floor resting on bedrock. These lower three stories contain nearly half the total cubage of the building.

In treatment of the architecture, inspiration was drawn from the finest examples of classic Greek works, and some of their best features are represented in the Institute building. A colonnade was chosen with a simple entablature and stylobate with a deep porch behind the columns, a most beautiful classic feature that was used on nearly all Grecian temples. The great length and massiveness of the lower stylobate give solidity as a base for the extremely heavy colonnade, while its horizontal effect creates a fine contrast to the vertical lines of the columns. The platform immediately under the upper stylobate is paved in granite, which also is used in the lower stylobate. From this platform to its top, the structure is limestone of a splendid tone.

A total of 269 carloads of limestone and 62 carloads of granite was used in the construction of the building. Experts have expressed the opinion that the masonry





and especially the columns in the Institute rank with the finest stonework ever executed. The beautiful accuracy of the carving of the exterior ornamentation is worthy of particular notice.

*Pillars of Science*

Much of the grace and sculptural quality of the façades is attributed to the fact that the columns are monoliths and thus have smooth, beautiful shafts that are unbroken by disturbing horizontal lines. Only 63 blocks of limestone had to be quarried to produce the 62 columns—the one rejection being caused by a defect in the stone. As they came from the quarry, the blocks each weighed approximately 125 tons, the finished columns weighing almost 60 tons each. None of the shafts varies more than one-eighth inch from established measurements.

The stone column bases are more than seven feet in diameter and two feet in height, each weighing approximately five tons. The average diameter of the monolithic shafts is slightly less than six feet, and they are about 36 feet high. The carved capitals surmounting the shafts have outside dimensions of approximately five feet by seven feet and weigh more than six tons. The total weight of all 62 columns, including bases and capitals, each with an over-all height of more than 42 feet, is 4432 tons: here is the largest monolithic column installation in the world.

*General Plan*

The outside of the building is in the form of a hollow square, with center and connecting wings in the shape of a cross. It is approximately 306 feet wide at the front,

227 feet wide at the rear, and 334 feet from front to rear. The outside sections are nine stories high, with an average height of 112 feet from the pavement of the interior courts. The height of the building from sidewalk level is about 85 feet. The interior center wing, intersecting the square from front to rear, is also nine stories high. The cross wings, which connect the center wing with the east and west outside sections, are four stories high.

The building was designed to include four interior courts as the main natural light sources. There are 1151 windows in the court walls. More than 30,000 square feet of plate glass was used in the building.

The major portion of the building has been finished in final form at the time of the dedication, but certain parts have been held in reserve to provide for the installation of special facilities and research groupings. There is a total of 355 rooms in the finished portion.

The main or fourth floor is occupied by the executive offices, general office, and library. The three lower floors contain the various general service departments and the sections for large-scale experimentation. The fifth to eighth floors, inclusive, are given over to laboratories, while the ninth floor houses much of the ventilating apparatus.

### *Main Lobby*

The main entrance of the building is from Fifth Avenue at the fourth floor level. The visitor gets his first glimpse of the interior in the main lobby, a beautiful room representing an appropriate transition between the monumental exterior and the utilitarian interior. Almost square in shape, the lobby has been carried out in very simple Grecian style. The floor is laid in squares of Bot-





A View in the Main Lobby

ticino marble, accented by thin, dark strips of Nebo marble. Walls and ceiling are also of Botticino marble, the fine execution of the ceiling being particularly no-

table. The architectural quality of the room is enhanced by six marble piers. Carved in marble above the interior doorway of the lobby is a bas-relief, taken from Greek mythology, which depicts the creation of scientific knowledge and symbolizes the spirit that guides the work of the Institute.

The main elevator lobby is in the corridor leading from the main lobby. The elevator doors, constructed of aluminum, are ornamented with alchemical symbols. It is a fact that the building contains a larger amount of aluminum than has ever been used in a single structure. Not only are the 400 doors and all the window frames fabricated from the anodic finished metal, but also stair handrails, trim, many laboratory fittings, doorknobs, escutcheon and switch plates, grilles, distilled water pipe and fittings, chairs, and a large part of the roof are made of aluminum.

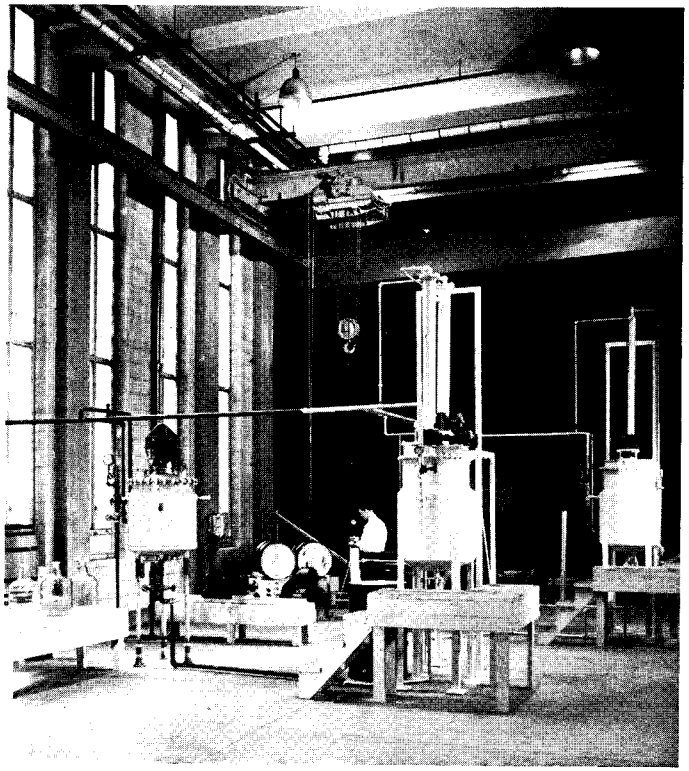
*First Floor*

The first floor is almost three stories below ground level on the Dithridge Street side of the building, and about two stories on the Bellefield side. A pit, excavated in solid rock under the first floor level, provides a location for elevator machinery and other equipment, thus eliminating the necessity for machinery houses on the roof, which were prohibited because of the architecture of the building.

Equipment for supplying compressed air, vacuum, hot water, and refrigerated drinking water is located on the first floor. Other general equipment includes air-conditioning machinery for the auditorium, freight elevator machinery, the main switchboard, motor gener-







A Unit Plant

ator sets, and the main plugboard for special currents.

On this floor and the other lower floors a large amount of space is provided for unit-plant installations in individual rooms and especially in the large engineering laboratories, which occupy an L-shaped area two stories

high covering parts of the south and east sides of the building. Here machinery and processes are developed and applied to translate laboratory methods into sub-commercial production. Special facilities are also provided for physical testing equipment and for certain general operations, such as crushing and grinding.

Mention should be made of the use of architectural terra cotta for facing all interior court walls; and of glazed terra cotta for all corridors (except those in marble on the second, third, and fourth floors), all laboratories, and a majority of the special engineering laboratories on the lower floors. The total exterior and interior area faced with terra cotta is about 400,000 square feet, which is said to be the largest use of this material in any one building.

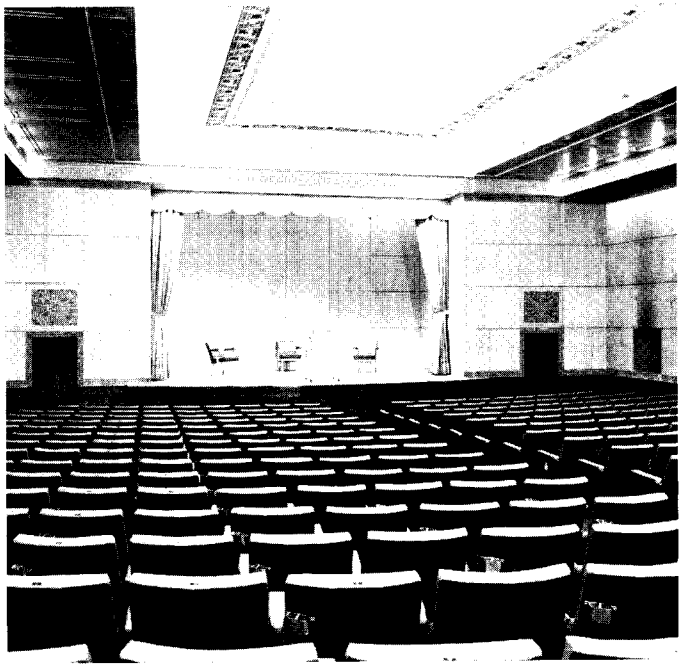
*Second Floor*

The auditorium occupies the entire space in the center wing from cross wings to rear section, is two stories high, and has a seating capacity of about 350. In design this room is Neo-Greek, and a warm cheery effect has been produced by the judicious selection of woods and colors. The paneled walls have been accented with pilasters and are finished in golden-toned wood, contrasting pleasantly with the red upholstery of the seats. The auditorium lobby has been carried out in Botticino marble, and on both sides are special stairways leading to the third floor near cloakrooms and the Bellefield Avenue entrance. When desired, the auditorium and its entrances may be isolated by gates from all the rest of the building.

On this floor are located also machine, woodworking,





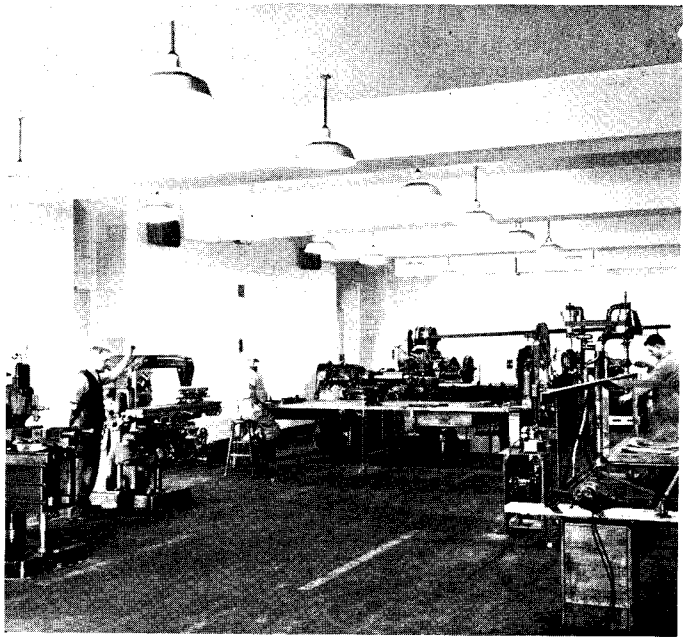


The Auditorium

pipe, sheet-metal, and electrical shops. Other facilities include a cold storage room, the electrochemical laboratory, and the electric furnace room.

*Third Floor*

The third floor is at street level on the Bellefield side and at the rear. The Bellefield entrance, intended primarily for use in connection with the auditorium, leads through a granite vestibule into a spacious square lobby



Main Machine Shop

finished in light and dark Botticino marble, and thence past cloak and retiring rooms to the auditorium stairways. The projection room, located between the stairways, is completely furnished with sound motion-picture projectors, stereopticon equipment, and an amplifying system.

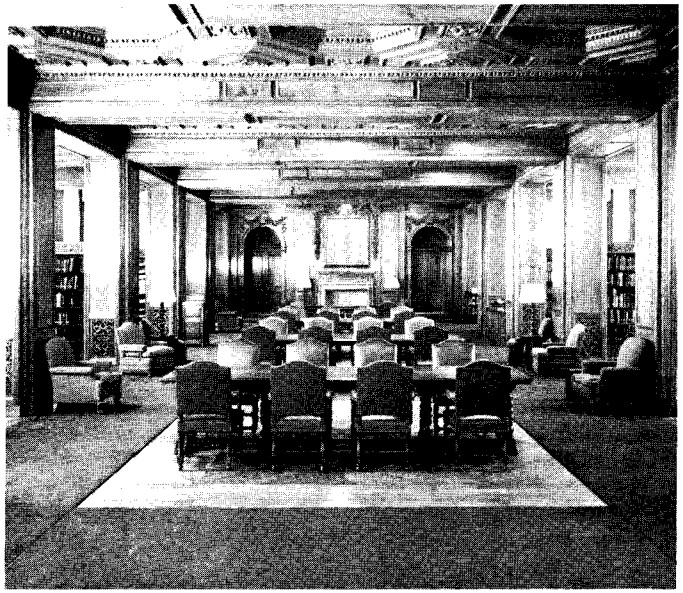
To the left of the Bellefield lobby is the social room, which is the largest of a suite reserved for recreational activities. Connected with this room is a large, well-





The Social Room

appointed kitchen, and beyond are the quarters of the Robert Kennedy Duncan Club, social organization of the Institute's research staff. Across the center wing corridor from these rooms are a group of photographic laboratories and storage facilities for special apparatus and instruments. Also on this floor are the building control room, the telephone switchboard, and the apparatus for the automatic telephone system. A shop where Fellows may work independently of mechanicians is located on this floor and is served by an adjacent tool and storeroom. The freight entrance to the building is at the rear of the floor.



The Library Reading Room

*Main Floor*

The fourth or main floor is applied chiefly to the administrative side of the Institute's work. Its feature is the library, which has the style of the Renaissance, with influences from the works of Sir Christopher Wren and Grinling Gibbons, and also from the beautiful Tirolese styles of the same period, about 1700. The treatment has produced a room that is quiet but alive, bookish but not stilted. The center area is framed by a row of five pillars on each side, and stands of book shelves





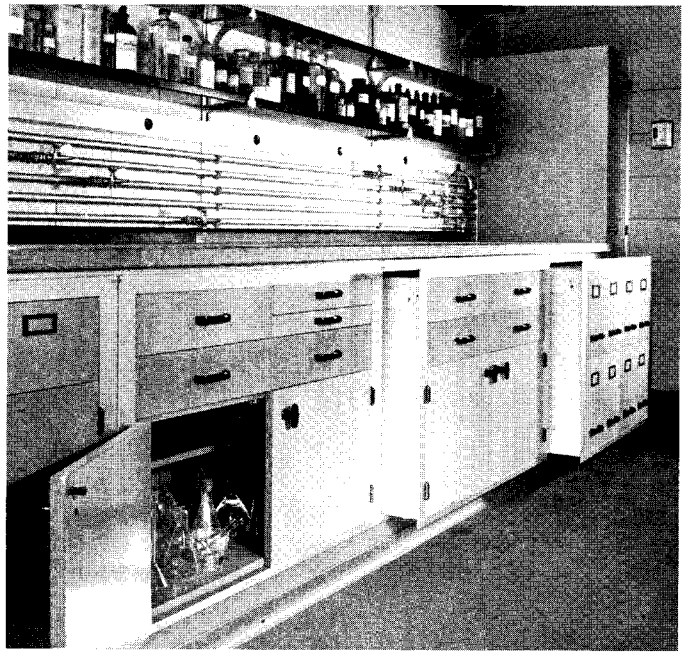
extend between pillars and walls. The floor is laid in broad boards of Slavonian oak, which also is used in the ceiling, and the walls are made of English oak. Especially noteworthy is the handsome symbolic wood carving with which the library has been embellished. Directly behind the library are its workroom and stack rooms.

In the cross-wing corridor to the east of the library are the mail room with lockboxes and a suite of four dictation rooms. The general office occupies most of the space on the Dithridge side, with a record vault in one end. The area on the Fifth Avenue side between the general office and the main lobby is for a museum of products evolved in the Institute. On the opposite side of the main lobby are the reception room, the Director's office, and the board room. Offices of the other members of the Executive Staff and of the accounting department occupy the remaining space on this floor.

*Laboratories*

The fifth to eighth floors, inclusive, are devoted to laboratory use. While each floor has special rooms, most of the space is occupied by the two types of laboratories adopted as standard by the Institute. Both types—the large and the small—have been included in the group of rooms facing on each of the courts in order to provide for flexibility in meeting the needs of the various research activities.

The small, or two-window, laboratories are 12 feet by 19 feet in size, and the large, or three-window, laboratories are 19 feet square. In design and equipment these laboratories represent the results of several years of experimental work by the Institute's Executive Staff.



Laboratory Tables

The attractive appearance of these rooms has been made possible by concealment of pipes and ducts behind easily removable panels of cement-asbestos board.

The construction of the laboratory tables allows for most efficient arrangement, because any section may be removed without disturbing the remainder. The use of vertical wall T-slots gives great flexibility in the arrangement of service and drain pipes, shelving, and other equipment. Standard services include air, gas, cold, hot and





A Fellowship Laboratory

distilled water, vacuum, steam, and single- and three-phase electric current; currents of special characteristics can be supplied readily through a plugboard system. The fume hoods, of novel design, are constructed of cement-asbestos board, and the sinks are made of a new material developed at the Institute. A combination desk and bookcase was devised for use in the laboratories.

### *Special Research Facilities*

A considerable proportion of the space on the fifth floor is assigned to the Department of Research in Pure

Chemistry and to the investigations which the Institute conducts in the interest of the public and the professions, for example, the studies on industrial air hygiene and on urban air pollution control.

On the sixth floor are located the general storeroom, as well as the analytical department and the glass blower's shop, the services of which are available to all research staff members. This floor also has constant temperature and humidity rooms, which are required in many types of research work.

Most of the investigations on the seventh floor are concerned with various aspects of organic chemistry, and special equipment is available for the furtherance of such studies.

The furnace room, which occupies the space at the rear of the eighth floor, is intended for research on ceramic problems; laboratories of ceramic Fellowships are conveniently located to permit use of such special facilities. The animal quarters for nutritional and pharmacologic researches are also on this floor.

### *Attic and Roof*

The attic is used for ventilating equipment.

The roof is of unusual design to preserve the architectural beauty of the building by concealing the outlets of flues and pipes essential in any laboratory structure. The sloping roof over the part of the building enclosing the hollow square is aluminum, while quarry tile covers the flat roofs of the center and cross wings. The roof contributes to the facilities of the Institute by providing ample area for weathering or exposure tests.