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

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THE SCHOOL OF DENTAL MEDICINE NEW RESEARCH AND TEACHING BUILDING FOR THE UNIVERSITY OF PENNSYLVANIA.

PENNSYLVANIA UNIV., PHILADELPHIA

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DESCRIPTORS- *BUILDING DESIGN, *DENTAL SCHOOLS, *FACILITY GUIDELINES, *FACILITY REQUIREMENTS, *PROGRAMING, BUILDING EQUIPMENT, CAMPUS PLANNING, CONTROLLED ENVIRONMENT, DESIGN NEEDS, FLEXIBLE FACILITIES, SCIENTIFIC RESEARCH, SPATIAL RELATIONSHIP,

IN PLANNING A NEW RESEARCH AND TEACHING BUILDING FOR THE SCHOOL OF DENTAL MEDICINE, A PROGRAM WAS DEVELOPED OUTLINING THE DESIGN NEEDS AND THE SPACE AND FACILITY REQUIREMENTS. MAJOR AREAS OF THE PROGRAM WERE--(1) GENERAL DESIGN AND CONSTRUCTION COMPONENTS, (2) THE RESEARCH COMPONENT, AND (3) THE BASIC SCIENCE TEACHING COMPONENTS. SPACE REQUIREMENTS ARE GIVEN FOR TYPES OF BUILDING SPACE FOR SPECIFIC DEPARTMENTS. SPECIFICATIONS INCLUDE CONSTRUCTION MATERIALS, MECHANICAL SYSTEMS, ACCOMMODATION FOR ELECTRON MICROSCOPE, FIXED AND MOVABLE EQUIPMENT, AND GENERAL DESCRIPTIONS OF THE SCIENCE PROGRAM AND RELATIONSHIPS WITH THE CAMPUS PLAN. (MM)

*project program*

# THE SCHOOL OF DENTAL MEDICINE NEW RESEARCH AND TEACHING BUILDING for the University of Pennsylvania





University Planning Office • February 1965

## PREFACE

This program is for the project currently referred to as the School of Dental Medicine's New Research and Teaching Building. This program was approved by the University's Executive Planning Committee on the Physical Plant on January 11, 1965.

The purpose of this program is to provide a permanent reference document which defines the space and facility requirements of the New Research and Teaching Building. It provides criteria and information for the architects and consultants who will develop the designs and contract documents, and for the reviewing University authorities.

This program has been prepared in collaboration with the Project Planning Committee for the School of Dental Medicine's New Research and Teaching Building.

Dr. Lester W. Burket
Dr. D. Walter Cohen
Dr. Charles E. Wilde, Jr.
Dr. Ned B. Williams, Chairman

The Committee's work has been a major factor in the development of this program and is gratefully acknowledged by the University Planning Office.

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## LIST OF ILLUSTRATIONS

# INTRODUCTION

This project will provide a new facility for fundamental research in the modern subdisciplines of biology and for training students of dental medicine. It is the fourth phase of the School of Dental Medicine expansion program.[1]

Although academic dentistry has derived much benefit from the biological sciences, it has never had its own "critical mass" of research scholars whose efforts and interests create the academic atmosphere appropriate to a maturing profession. As in medicine, the major advances in dental medicine have come about through research in the fundamental sciences.

With the assistance and continuous encouragement of the University, the School of Dental Medicine has turned away from parochial approaches to dental research and education. It is now placing increasing emphasis on the employment of scientists who work in a variety of disciplines and who can serve as the foundation of the School's research and teaching programs. One primary objective of the School's research activities is, therefore, to stimulate the student through involvement in research and by example. This objective applies to both students working for their degree in dental medicine and to graduate students.

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1. For brief description of expansion phases, see subsection titled: "School of Dental Medicine Expansion."

In this manner, the base of both research and instruction will be broadened to provide dental students with the scientific skills and techniques required for research and clinical practice.

The present project will provide an important physical element in the School's expansion program for accomplishing the above stated objectives in fundamental research and student training. In addition, this project will increase the facilities for other School research activities by freeing space in the existing building for an expansion of clinical research.

The New Research and Teaching Building and the use of its facilities will be administered by the Office of the Dean of the School of Dental Medicine.

## GENERAL SCIENTIFIC PROGRAM INFORMATION

The scientific program to be housed in the new facility will draw upon all of the disciplines of modern biology as they are related to the dental and medical arts. In this sense, the new facility staff will function as a multidisciplinary cooperating research group whose efforts will be directed at an understanding of the function of man in his environment. This research group will be analagous to a modern department of biology or to the fundamental sciences group of a medical school or school of veterinary medicine. Since it will be physically part of the School of Dental Medicine, the new facility's staff will act as a base in research and training for the clinical staffs of the School.

The far-reaching program which the new facility's staff will be responsible for will have varying emphases as advances are made in the life sciences. Broadly speaking, research efforts in the new facility will lie at the molecular, subcellular, tissue, organism, and environmental levels and will choose for experimental models a variety of living systems ranging from microbes to man. The methods of experimentation will be chemical, physiological, and morphological. In view of their virtuosity, the individual scientists will employ the most modern techniques and will require the most modern equipment, efficiently housed.

## UNIVERSITY CAMPUS DEVELOPMENT PLAN

All construction projects on the University Campus must be carried out within the context and the intent of the established University Campus Development Plan.[1] The design of any project should reinforce the evolving campus pattern of open spaces and pedestrian and vehicular circulation.

The site for the New Research and Teaching Building is located along Locust Street. The site dimensions are approximately 195' EW and 100' NS, giving a gross ground area of 19,500 sq. ft. This site is within the area allotted to the School of Dental Medicine for its ultimate expansion. (See Figures 1 and 2.)

In accordance with the Development Plan standard, 37 off-street parking spaces will be provided for this project in the following manner.

1. Initially, these spaces will be located on a surface lot to be constructed adjoining the Building site.

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1. University of Pennsylvania Development Plan, March 1961.

2. At the time the surface lot is required for a later phase of School of Dental Medicine expansion these spaces will be permanently housed in a University parking terminal.

The site study for the School of Dental Medicine expansion area (Figure 3) has been prepared in accordance with the University Campus Development Plan. This project needs to be designed within the context of all adjacent University buildings, existing and proposed for the future. It is for this reason that the site study is shown on Figure 3 for a portion of the Undergraduate Men's Housing area east of 40th Street.

## SCHOOL OF DENTAL MEDICINE EXPANSION

In addition to renovation Phases I, II, and III for the existing building, the following expansion program is currently envisioned:

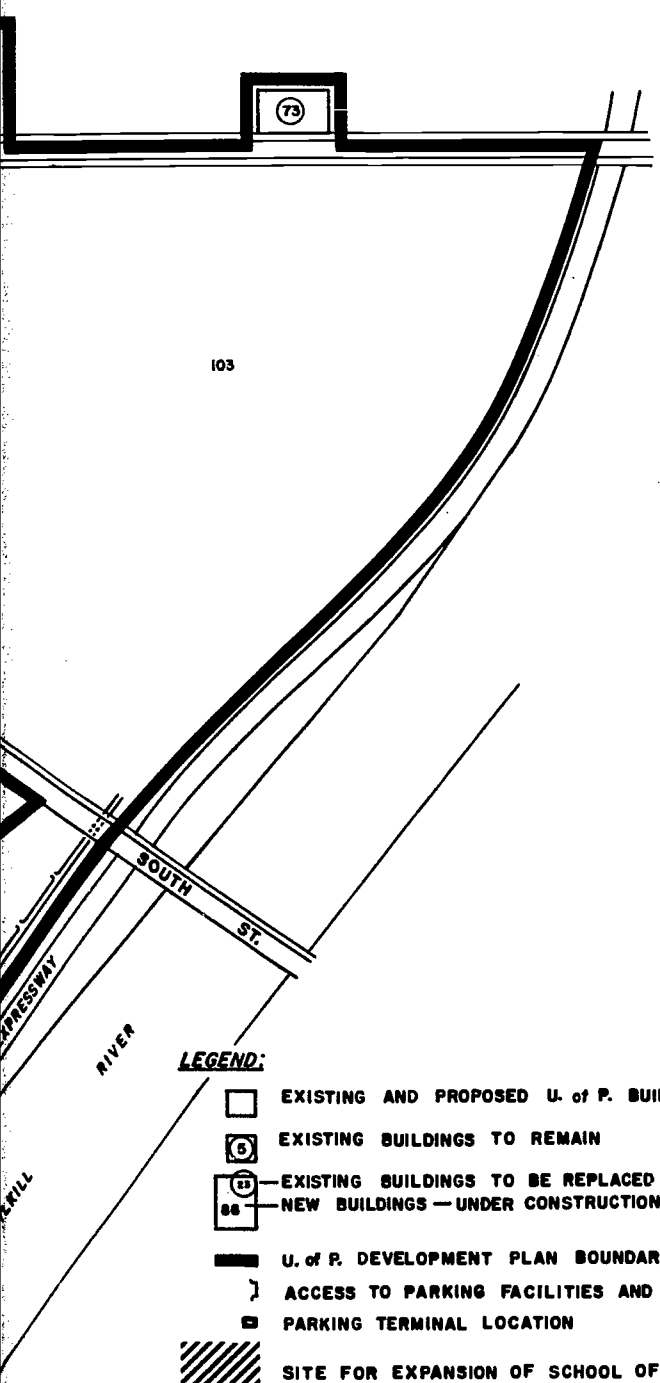
| Phase | Program |
|---|---|
| IV | Construction of New Research and Teaching Building (the facility for which this is the program) |
| V | Rehabilitation of space vacated in existing building for staff offices and clinical research |
| VI | Construction of Postgraduate Study Building |
| VII | Possible Expansion of Phase IV building to accommodate additional fundamental science departments |
| VIII | Construction of a professional building for full-time practitioners. This project will not be located within the School of Dental Medicine expansion area shown on Figures 2 and 3 |

# UNIVERSITY OF PENNSYLVANIA DEVELOPMEN

## GENERAL BUILDING LOCATION


Figure 1. Project Site

# NT PLAN

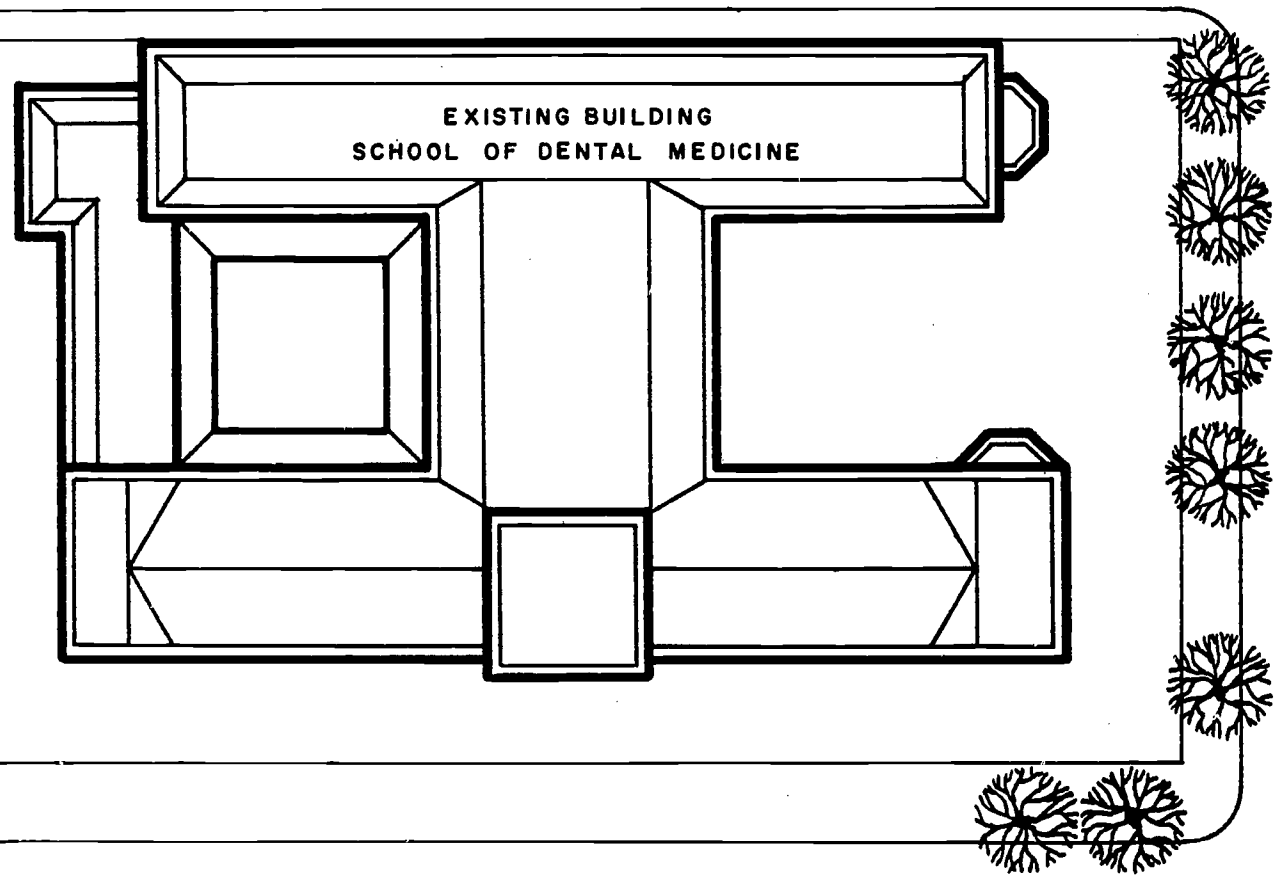



1. EVANS INSTITUTE *(Dental School)*
2. FELS INSTITUTE OF LOCAL & STATE GOVERNMENT
3. PRESIDENT'S HOUSE
4. CHAPLAIN'S HOUSE
5. ALLIED MEDICAL PROFESSIONS
6. VETERINARY SCHOOL AND HOSPITAL
7. HILLEL FOUNDATION *(University Assaciated)*
8. SKINNER HALL *(Faculty Club)*
9. CHRISTIAN ASSOCIATION *(University Assaciated)*
10. FRATERNITY HOUSES
11. NEWMAN CLUB *(University Assaciated; Original Replaced by 81)*
12. DIETRICH HALL *(Whartan Schaal)*
13. WISTAR INSTITUTE *(University Assaciated)*
14. SCHOOLS OF MEDICINE
15. ALFRED NEWTON RICHARDS MEDICAL RESEARCH BUILDING
16. MEN'S DORMITORIES
17. ENGLISH HOUSE
18. PEPPER, ROBERTS, AND STERN DORMITORIES AND COMMONS
19. LAW SCHOOL
20. POTTER *(replaced by 87)*
21. SERGEANT HALL *(see 88)*
22. COLLEGE HALL
23. NEW SCHOOL OF FINE ARTS *(farmer Library; see 30, 40)*
24. IRVINE AUDITORIUM
25. HOUSTON HALL
26. HARE BUILDING *(replaced by 86)*
27. LOGAN HALL
28. KINGSCOURT
29. BLANCHARD HALL *(replaced by 72)*
30. CHARLES PATTERSON VAN PELT LIBRARY *(University Library)*
31. BENNETT HALL
32. FINANCIAL OFFICES *(replaced by 89)*
33. MOORE SCHOOL AND ADDITION
34. TOWNE BUILDING
35. DEVELOPMENT OFFICES *(replaced by 75; see 73)*
36. JOHN MORGAN BUILDING *(replaced by 75)*
37. GENERAL LABORATORIES BUILDING *(replaced by 90)*
38. CHEMISTRY LABORATORY
39. PHYSICAL SCIENCES BUILDING
40. EXISTING SCHOOL OF FINE ARTS *(replaced by 91; see 23)*
41. DECATUR HALL *(replaced by 93)*
42. TANDEM ACCELERATOR
43. PALESTRA
44. THOMAS B.K. RINGE SQUASH COURTS
45. HUTCHINSON GYMNASIUM
46. WEIGHTMAN HALL
47. FRANKLIN FIELD
48. UNIVERSITY MUSEUM
49. WOMEN'S RESIDENCE HALLS
50. UNIVERSITY HOSPITAL
51. RAVDIN INSTITUTE *(University Haspital)*
52. TENNIS COURTS
53. NEW BIOLOGY BUILDING
54. ZOOLOGICAL LABORATORIES
55. GREENHOUSES
56. UNIVERSITY MAINTENANCE & REPAIR *(replaced by 72)*
57. THE WHITE HOUSE
58. ANNENBERG SCHOOL OF COMMUNICATIONS
59. VICTORIA APARTMENTS *(replaced by 81)*
60. ILLMAN CARTER *(replaced by 78)*
61. BIOLOGICAL ABSTRACTS
62. MEN'S RESIDENCE HALLS
63. HAROLD C. MAYER GRADUATE APARTMENTS
64. VETERINARY SCHOOL EXPANSION
65. SOCIAL SCIENCES CENTER
66. MEN'S RESIDENCE HALL
67. PHYSICAL SCIENCES BUILDING ADDITION *(see alsa 93)*
68. ACADEMIC FACILITY
69. MEDICAL AFFAIRS EXPANSION
70. MEDICAL AFFAIRS EXPANSION
71. LAW SCHOOL ADDITION
72. DANIEL W. DIETRICH MEMORIAL LIBRARY *(University Library)*
73. ADMINISTRATION *(see alsa 73)*
74. ACADEMIC FACILITIES *(Graduate, Professianal, Research)*
75. HUMANITIES - PHYSICAL SCIENCES BUILDING
76. LABORATORY FOR RESEARCH ON THE STRUCTURE OF MATTER
77. EVANS INSTITUTE EXPANSION *(Dental Schaal)*
78. MEN'S RESIDENCE HALLS
79. GRADUATE HOUSING CENTER
80. ALUMNI CENTER
81. SOCIAL SCIENCES EXPANSION
82. ACADEMIC FACILITIES *(Graduate, Professianal, Research)*
83. SKINNER HALL EXPANSION *(Faculty Club)*
84. WISTAR INSTITUTE EXPANSION *(University Assaciated)*
85. MEDICAL AFFAIRS EXPANSION
86. HUMANITIES EXPANSION
87. ACADEMIC FACILITIES *(Graduate, Professianal, Research)*
88. WOMEN'S RESIDENCE HALLS
89. MOORE SCHOOL EXPANSION
90. CHEMISTRY EXPANSION
91. PHYSICAL SCIENCES & ENGINEERING
92. PHYSICAL SCIENCES RESEARCH *(Particle Physics Laboratary)*
93. PHYSICAL SCIENCES FACILITY
94. ATHLETIC FACILITIES
95. ATHLETIC FIELDS
96. UNIVERSITY MUSEUM EXPANSION
97. SCHOOLS OF MEDICINE AND UNIVERSITY HOSPITAL DEVELOPMENT
98. ACADEMIC FACILITIES *(Graduate, Professianal, Research)*
99. ST. MARY'S CHURCH
100. FREE LIBRARY OF PHILADELPHIA
101. PARKING GARAGE
102. PHYSICAL SCIENCES *(Research Offices)*
103. PHYSICAL SCIENCES-ACADEMIC-ATHLETIC FACILITIES
104. BOTANICAL GARDEN
105. RIVER FIELDS
106. ESCALATOR HEAD HOUSE

40th

LOCUST ST.

IRVING ST.




SPRUCE ST.

LEGEND

SITE FOR RESEARCH AND TEACHING BUILDING

FUTURE EXPANSION AREA FOR CENTER

UNIVERSITY DEVELOPMENT BOUNDARY

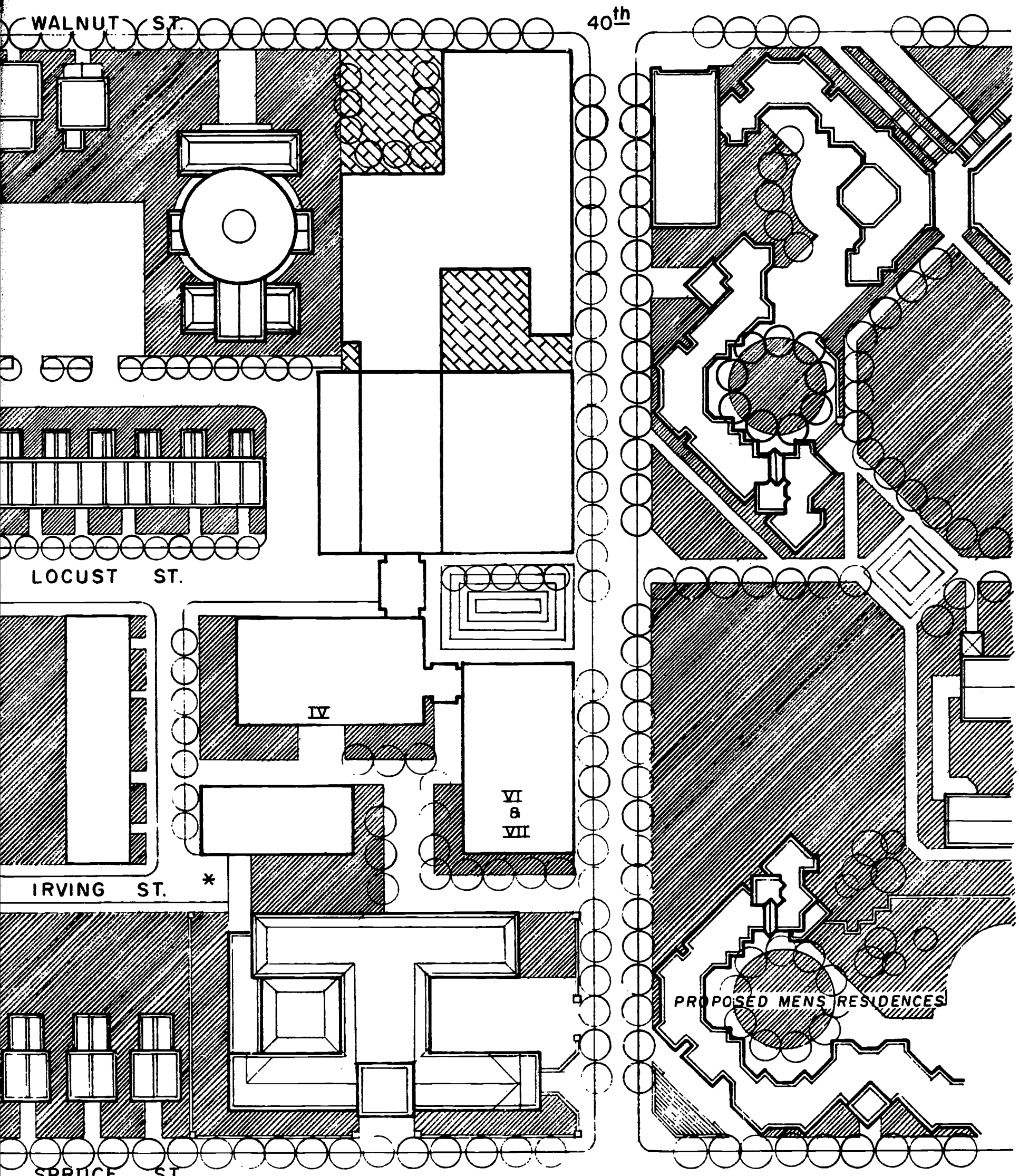
# DENTAL MEDICINE EDUCATION AND RESEARCH CENTER

SITE LOCATION

0' 10' 30' 60' 90' 120'

UNIVERSITY OF PENNSYLVANIA

FIGURE 2




# DENTAL MEDICINE EDUCATION AND RESEARCH CENTER

SITE STUDY

* FUTURE SERVICE FACILITY FOR CENTER

0' 50' 100' 150' 200'

UNIVERSITY OF PENNSYLVANIA

FIGURE 3

## GENERAL DESIGN AND CONSTRUCTION CONSIDERATIONS

The Chairman of the Project Planning Committee should be consulted on all matters relating to the organization and use of this Building, location of fixed equipment, and the location of all service outlets.

While it is not the intention of the program to impose a particular design approach or limitation, experience and study have shown that consideration of the following factors is desirable.

### FUNCTIONAL NEEDS

The New Research and Teaching Building needs to be designed to permit the greatest possible flexibility in rearranging the interior space, either in whole or in part, when required.

Three dimensional modular design should be used in floor, ceiling, and wall systems; and all mechanical systems should be coordinated to these basic modular measurements.

Stations should be established at modular intervals where "plug-in" to all required utilities can be accomplished.

Fixed equipment should be, wherever possible, coordinated in dimensions with the basic modular dimensions.

Partition and ceiling systems, as well as exterior walls, should be capable of effectively controlling acoustical transmission at acceptable levels.

Attention is called to the electron microscope installations and to the need for controlling and isolating at the source vibrations that may be created within the Building.[1]

The architect should use appropriate design means to insure the privacy and protection of all persons utilizing this facility. This design consideration includes assuring the privacy of areas on the ground floor and, to the extent possible, mitigating the traffic noises and fumes originating on nearby streets. The architect should also provide for the maximum amount of interior open space on the south side of the Building that is compatible with other design considerations.

## FUNCTIONAL RELATIONSHIPS

The following general functional relationships appeared to be most appropriate at the time this program was prepared. Such conclusions are, of course, subject to further study and recommendation by the architect.

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1. Regarding electron microscope, also see subsection titled: "Accommodation for Electron Microscope."

First level (basement)

Animal quarters (including cage washing)[1]
Central storage
Mechanical equipment
Service tunnel

Second level (ground)

Media Kitchen
Basic Science Teaching Component
Research Administration:
    Central Duplication
    Central Office Supplies

Third level

Microbiology (with a connecting lift to the Media Kitchen)

Upper levels

Each of remaining three department complexes[2] to be assigned an appropriate level

Top level

Animal quarters (including cage washing)[1]

VERTICAL ORGANIZATION

The laboratories designed for use of Type "C" level radiation should be arranged in a vertical line (in relation to each other) within the Building. The Project Planning Committee will determine with the architect whether or not the laboratories designed to accommodate electron microscopes also need to be arranged vertically.

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1. The relative desirability and cost of locating the animal quarters on the first or top level of the Building should be investigated by the architect, and a determination regarding the proper location will be based upon this investigation. Also see the subsections titled: "Expansion and Connection" and "Animal Quarters."
2. Histology-Embryology; Pathology; and Biochemistry, Oral Diagnosis, and Periodontology.

## SPACE STANDARDS AND REQUIREMENTS

The space standards and requirements cited below and elsewhere in this program are to be followed as closely as possible. If the architect's studies show that variations may be required because of budget limitations or building design, such variations will be reviewed by the University Planning Office in consultation with the Project Planning Committee.

## LABORATORY

The standard laboratory dimensions are: 20 feet wide with an aisle width of 5 feet between laboratory benches. Although a depth of 20 feet has been assumed for the purpose of estimating area requirements in this program, this is not a mandatory requirement.

## CHAIRMAN'S OFFICE

Due to the special research requirements of the departments to be housed in this project, a chairman's work area may include his laboratory bench. To the extent possible, the chairman's administrative and research work area (exclusive of the adjoining standard laboratory unit) should be provided within 190 net square feet.

## SEMINAR-LIBRARY-CONFERENCE ROOM

Each department shall have a conference room or area which is available for use by all the department's faculty. In the present project this room or area will be part of the above named complex of spaces and uses. Individual office

areas for research and/or the chairmen, and individual laboratories, are not to be enlarged to include a conference area. Other standard requirements for the seminar-library-conference room are: (a) it should be located on the building interior, if possible; (b) it should not be square; (c) there should be provision for central control of lights from faculty member's position when used as seminar room.

## SECRETARIAL/RECEPTION/FILING

Space for three secretaries in each department office and reception area should be provided within a range of 300 to 320 net square feet. This area includes space for seven to eight file cabinets. In addition, sufficient built-in storage space should be provided for department office supplies and the coat storage of office personnel. A check should also be made to determine whether additional space will be required for file cabinets in the future. If so, provision should be made to permit such expansion when required. In the Research Administrator's area, additional built-in space will also be required for the central storage of office supplies, central duplication facilities, and the central storage of such equipment as the portable slide and motion picture projectors. (See also subsection titled: "Research Administration.") The architect should standardize all such supply and equipment storage space in the Building.

## TYPIST/CLERK/FILING

If space for a typist or clerk is required, it should be provided within the space range of 48 to 72 net square feet per person as part of a larger office. The 72 net square feet includes space for four file cabinets.

## LOUNGES

The student lounge area has been calculated to accommodate 15 percent of the student population utilizing the Building, at 30 net square feet per person. The student lounge should, therefore, seat a minimum of 35 persons, using an informal arrangement of sofas and chairs.

The faculty lounge area has been calculated to accommodate 15 percent of the faculty population using this Building, at 30 net square feet per person. The faculty lounge should, therefore, seat a minimum of 40 persons, using an informal arrangement of sofas and chairs.

A serving alcove, composed of hot plate, an undercounter refrigerator, sink, electrical outlets and storage, should be provided in the faculty lounge. This serving alcove is not to be a full kitchen or kitchenette, and is not provided for the purpose of serving meals.

## VENDING MACHINES

The Project Planning Committee has determined that vending machines will not be permitted in this Building.

## USE GROUPING

Within each of the four department complexes,[1] the following grouping of uses is considered to be most desirable:

1. Laboratories and related research offices.

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1. Histology-Embryology; Microbiology; Pathology; and Biochemistry, Oral Diagnosis, and Periodontology.

2. Department administration, which should be adjacent to the chairman's office/laboratory area; the secretarial work, filing, reception area; seminar-library-conference area.

3. Supporting service areas.

## CONSTRUCTION MATERIALS AND SPECIAL CONSTRUCTION REQUIREMENTS

The materials used should be durable, economical in first cost and in maintenance, and have a familial relationship to those materials which help to establish the character of the majority of buildings on the campus. These materials are defined as brick, glass in dull finish metal frames which do not require painting, precast concrete and/or cut stone; with brick as the predominant masonry used.

Materials should be used consistently throughout the project in accordance with their inherent properties and characteristics. For economy of maintenance as well as for clarity, the number of different materials should be limited. It is University policy that economy of maintenance be a prime factor in the selection of materials for exteriors and interiors. Durable materials are especially required in public areas, because of the heavy use that can be anticipated.

Special construction requirements or objectives are identified elsewhere in this program and on the fixed equipment check list.

Applicable municipal and state building codes will regulate all construction.

## MECHANICAL AND UTILITIES[1]

The entire Building, with the exception of mechanical equipment areas, is to be completely air conditioned, zoned to assure acceptable comfort levels, and provided with exhaust systems sufficient to evacuate noxious and offensive air. The chilled water machinery for this project and (ultimately) for the entire Dental Medicine complex will be located in the Building's basement. The central cooling towers for the Dental Medicine complex will be placed on the roof of the Building. The architect is to allot a sufficient amount from the construction budget for this project to provide the chilled water capacity required for the Building. Steam will be provided to the Building from a central source.

Although it is recognized that all or some of the Building's mechanical equipment will need to be located in the basement (e.g., heat exchange equipment, air handling equipment, hot water generator), the architect should attempt to keep the basement level as open as possible to accommodate future installation and expansion requirements.

Electrical service for the Building will be from a substation located in the Building's basement to which 13,000 volts of primary power will be extended. The substation will require an estimated 1,000 square feet.

Telephone conduits shall be installed in the Building so that internal communication can be provided throughout as part of the University telephone system. Recessed pay telephone booths

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1. Regarding air conditioning and air circulation, also see subsection titled: "Ventilation and Air Recirculation."

shall be provided in or near lounge areas. Telephone outlets should be determined in consultation with the Project Planning Committee chairman.

Conduit for the future installation of closed circuit television reception and transmission shall be provided in each research seminar room, in the lecture hall, and in each of the two teaching laboratories.

Utilities are to be easily accessible so that repairs and new utility installations can be carried out in an expeditious manner, and without unduly disturbing the work of laboratory and office personnel.

Information on location and proposed extensions and connections to existing utilities will be furnished by the Department of Buildings and Grounds and all mechanical work must be coordinated with that Department. The architect shall establish anticipated loads as soon as feasible and consult with the Department of Buildings and Grounds so that utility cost estimates for budget purposes may be prepared.

A centralized control panel incorporating a schematic illustration of the mechanical and electrical systems, and indicating their vital points, should be provided for the project at a location selected by the Department of Buildings and Grounds. The panel should also contain indicators of operating conditions (e.g., temperature, humidity, and pressure) for specified equipment and areas.

## ELEVATORS AND SERVICE LIFT

At this time two elevators appear to be required, one of sufficient size to accommodate animal cages and with a capacity of 3,000 pounds.

A separate service lift (dumbwaiter or elevator) will also be required to move materials between the Media Kitchen, the Department of Microbiology, and the basement level. The latter requirement anticipates the future construction of a connecting service tunnel for the Dental Medicine complex. This lift should have a large capacity, move rapidly, and be automatically controlled.

## WINDOWS

Large glass areas are not required, although visual links with the outside are desirable for exterior rooms or spaces.

All sash shall be a combination of fixed and key-operated units. All exterior rooms shall be provided with a key-operated sash which will allow an opening equal to 5 percent of the net floor area of the room. All glass shall be accessible for cleaning and provision for cleaning shall be incorporated in the Building's design.

Sash dimensions shall be such that replacement glass can be handled and installed by no more than two men.

Protection from solar heat and glare shall be provided for all windows exposed to east, south, and west sun. Tinted or shaded glass should be considered for use in all windows in this Building. This protection shall be considered from the standpoint of cost, design, and maintenance.

The following rooms or areas may be located on the Building interior or need not have extensive window area: seminar-library-conference rooms, photography and dark rooms, lecture hall, lecture laboratories, research laboratories, equipment rooms, and service rooms (e.g., janitors' closets).

## EXPANSION AND CONNECTION

The following expansion and connection considerations are relevant for the New Research and Teaching Building's design:

1. The Building should be designed to permit its future connection on all levels with adjoining projects.

2. The Media Kitchen in the Building will serve users in the existing building, the teaching laboratories, the Department of Microbiology, and future elements in the School's expansion program.

3. As noted in the "Animal Quarters" subsection, these quarters will require additional future space which is to be provided in the next adjoining project, if such additional space cannot be provided within this structure. When expanded, the animal quarters will house all the animals used in present and future research projects of the School.

4. A service tunnel will ultimately be required to connect the basement level of the Building with all elements of the Dental Medicine complex, including the central service facility described in the next subsection, "Service."

## SERVICE

As the first new element in the School's total expansion program, this Building must have an accessible on-grade service area. It is proposed that ultimately a central service area be located on Irving Street at the northwest corner of the existing building to serve the entire Dental Medicine complex. (See Figure 3.) The design for the Building should allow for

the fact that the on-grade service area will not be required when the service tunnel loop is completed and the central service area for the Dental Medicine complex is in operation.

## MAINTENANCE

The Department of Buildings and Grounds is responsible for the maintenance of all buildings, facilities, and utility systems. The Department's concern includes waste collection, delivery and pickup service, maintenance or operation of mechanical and electrical systems, routine maintenance connected with normal repair and housekeeping, and the general safety and security of the University population.

The Department will review all schematic, preliminary, and advanced design submittals with regard to specifications for fire extinguishers (including sprinklers) and their locations; control of entrances and exits; the collection, storage, and/or disposal of trash and garbage; housekeeping, maintenance, and repair; housekeeping supply and storage areas; service areas; loading and unloading facilities; and for compliance with the standards of all other areas of maintenance and operation over which it has jurisdiction.

## RADIATION SAFETY

The Radiation Safety Office is responsible for reviewing plans drawn for facilities where radiation sources are to be or may be used. This Office will, therefore, review all pertinent design and contract documents for this project, and will make available for the architect's information its "Radition Facility Planning Guide."

In addition, the following publication should be consulted for the special handling of such items as drains, hoods, and ventilation:

AECU-2226
U.S. Atomic Energy Commission
(Office of Technical Services, Department of Commerce, Washington 25, D.C.)

The minimum laboratory and design requirements for the use of radioactive isotopes in the New Research and Teaching Building are as follows:

1. Four Type "C" laboratories, permitting the use of moderate level radioisotopes, will be required; one for each of the four department complexes[1] identified in this program. These four laboratories should be placed in a vertical line to facilitate separate plumbing and ventilation arrangements.

2. Air supplied to all Type "C" laboratories must not be recirculated.

3. All other laboratories in the Building are to be designated and designed for use of low level (Type "B") radiation.

4. The architect should meet with the Radiation Safety Officer to determine which planning, construction, and mechanical requirements will require critical

1. Histology-Embryology; Microbiology; Pathology; and Biochemistry, Oral Diagnosis, and Periodontology.

examination at the preliminary schematic design stage as well as at the contract document stage. In addition, the architect should consult with the Radiation Safety Officer prior to the preparation of detailed drawings and specifications for materials, finishes, equipment, etc.

## ACCOMMODATION FOR ELECTRON MICROSCOPE

The New Research and Teaching Building will initially have one electron microscope (EM) installed; with provision for the future installation of a companion electron microscope. These initial provisions will be located on the Department of Histology and Embryology level. The remaining three research levels should each have a working laboratory area designed to eventually accommodate an electron microscope installation that is similar to the Department of Histology and Embryology installation.[1]

The four laboratories designed for the immediate or ultimate accommodation of electron microscopes should each:

1. Be located at least 30 feet from the elevator and the proposed location of the EM transformer.

2. Have approximately 80 percent of the bench area 30 inches high.

3. Permit the installation of two electron microscopes.

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1. See "Department of Histology and Embryology" subsection and check list for further information on EM installation.

4. Provide conduits for bringing sufficient 220 v AC lines to the laboratory to accommodate two EMs and accessory equipment (including service dark rooms). Each EM will require an independent and separate 220 v AC line -- with nothing else being served by this line.

5. Be dust free.

## VENTILATION AND AIR RECIRCULATION[1]

Experience in the existing School of Dental Medicine's research building has shown that air filters alone are not adequate to clean air supplied from outside the building. All air taken into the New Research and Teaching Building should, therefore, be cleaned by an air scrubber.

There should be no recirculation of the air that is supplied to the laboratories, Animal Quarters, and Media Kitchen. If it is not possible to recirculate air from the autoclaves and hot air ovens, these facilities should be provided with separate vents.

Air may be recirculated among all other areas of the Building, including (for example) administration areas, lecture hall, public areas (hallways, stairwells, toilets, etc.), lounges, walkin incubators, walkin refrigerators, special environment rooms, equipment rooms, and chemical storage rooms.

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1. Also see subsection titled: "Mechanical and Utilities."

In addition, the following considerations need to be kept in mind:

1. Nearly all of the laboratories, including the the teaching laboratories, contain fume hoods for especially noxious fumes (other than isotopes) or odoriferous chemicals. Air circulation requirements are, therefore, complicated. The fume hoods draw all air when running; and, when not in use, offensive odors could easily be spread throughout the building if air is recirculated. About fifty 6-foot fume hoods have been specified for the Building. It is estimated that about 60 percent of these will be working at one time. All fume hoods must have individual ducts.

2. Many areas require special consideration as far as air circulation requirements are concerned.

   a. Dust free and noxious fume free air is required in tissue culture, sterile cubicle, and electron microscope facilities. A slightly positive pressure in these rooms is required.

   b. The various types of constant temperature rooms will provide spent air that must be eliminated.

   c. The autoclaves and hot air ovens provide high humidity and elevation of temperature for long periods.

   d. The Media Kitchen often prepares culture media which yield offensive odors.

3. All exhaust systems should be placed at the roof level.

## CENTRAL STORAGE

As with all storage areas in the New Research and Teaching Building, the central storage areas must conform to all applicable codes and should be provided with the means for being securely locked.

Among the required central storage areas in the Building, are the following:

1. One area sufficient in size to accommodate two 50-gallon drums of alcohol.

2. A separate area for storing acids, equivalent in size to the alcohol storage area.

3. An area within which the Building's central supply of stacking chairs can be stored when not in use.

## FIXED AND MOVABLE EQUIPMENT

A check list of fixed equipment and utility requirements has been prepared for the architect's information. A list of movable equipment requirements has also been prepared. Each has been prepared as a supplement to this program.

## FIXED EQUIPMENT

Fixed equipment includes, by example, the following: mechanical equipment, conduits, laboratory benches, wall cabinets, fume hoods, chalkboards, tackboards, building directory, built-in bookcases (in seminar-library-conference

rooms, offices, laboratories, and other appropriate areas), sun control devices, signs, fixed seating, autoclaves, cage washers in animal quarters, dishwasher in Media Kitchen, walkin refrigerators, water still, fixed projection screens (both motor driven and manual), fixed slide and motion picture projectors, protective chair rails, lockers, lecture platform, demonstration table, lectern, public address system, intercommunication system, and other items that are an intrinsic part of the Building.

## Lockers

On each research level, six built-in lockers should be provided in each women's rest room for a change of clothes and the storage of personal items. In addition, there should be sufficient recessed area for the future installation of six more lockers.

Within the locker portion of the student lounge area, 80 small built-in lockers are to be provided.

## Office Supplies and Equipment Storage

See the subsection titled "Space Standards and Requirements" for built-in requirements for office supplies and equipment storage.

## Chalkboards and Projection Screens

Chalkboards and projection screens are to be mounted in the lecture hall, teaching laboratories, and seminar-library-conference rooms so that they will not obstruct each other and so that both can be used simultaneously.

## MOVABLE EQUIPMENT

The Purchasing Department is responsible for the acquisition of movable equipment for this project. The Department will be assisted by a Project Furnishings Committee. The architect will be invited to be a member of the Project Furnishings Committee. The Committee's membership will include the Dean of the School, the heads of the departments that will occupy this project, and representatives from the Purchasing Department and appropriate operating departments. The Committee's responsibilities will include reviewing the furniture and movable equipment items submitted for consideration.

## PHYSICALLY HANDICAPPED

The architect shall consult the American Standards Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped (A117.1-1961); and incorporate such recommended design considerations, facilities and fixtures as may be applicable. At least one entrance shall be without steps and provide convenient access to the Building's elevator(s). Appropriate hand rails shall be available in at least one toilet for each sex.

## TOILET FACILITIES AND JANITOR'S CLOSETS

The number and type of fixtures shall be in accordance with the requirements of the Philadelphia Plumbing Code.[1]

Each floor shall have a janitor's closet of adequate size.

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1. Also see subsection titled: "Physically Handicapped."

## MISCELLANEOUS ITEMS

The Building's name, as it is finally determined, shall be placed in an appropriate location, so that it can identify the Building to the passerby, and be part of the exterior Building design. The location of bulletin boards, telephone booths, building directory, mail boxes, fire alarm boxes, fire sprinklers and extinguishers, thermostats, other signs, and other miscellaneous items both inside and outside the Building shall also be given the necessary detailed design attention. Such design items include the door mat (or appropriate alternate) for cleaning and wiping the soles of shoes inside the Building's entrances. If a door mat is to be used, it should be placed in a recessed floor section so that the mat top is at the established floor level.

## DEPARTURE FROM STANDARDS AND REQUIREMENTS

When the architect may need or desire to depart from any of the above standards and requirements, he shall submit his design and request for changes to the University[1] for approval.

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1. See "Project Administration."

## RESEARCH COMPONENT

### DEPARTMENT OF HISTOLOGY AND EMBRYOLOGY

The Department of Histology and Embryology is concerned with investigations into the dynamics of cellular differentiation and morphogenesis. The techniques of molecular genetics, biochemistry, electron microscopy, tissue culture, cytology, radiobiology and experimental embryology are all used on current approaches to these problems. A wide variety of life forms are used where appropriate to the particular experimental design. Consequently, laboratory facilities for biochemical analysis, tissue culture, animal maintenance, and quantitative and electron microscopy[1] are required for the use of the Department.

One Department darkroom and two darkrooms associated with the EM laboratory are to be provided. One of the two EM dark rooms will be used for plate development, the other for enlarging and printing photographs. Each electron microscope requires an independent and separate 220 v AC line -- and nothing else is to be served by these lines.

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1. See subsection titled: "Accommodation for Electron Microscope."

The work of the Department requires cooperation with, and proximity to, the Departments of Biochemistry and Microbiology. It is expected that 20 men and 15 women will comprise the personnel of this Department.

## SPACE REQUIREMENTS

The following table outlines the approximate areas required for Department functions. All such estimated areas are, of course, subject to further study by the architect in accordance with the standards stated in subsection titled: "Space Standards."

| DEPARTMENT OF HISTOLOGY AND EMBRYOLOGY | APPROXIMATE NET SQUARE FEET |
|---|---|
| **RESEARCH:** | |
| Laboratory and research office 1, 2, 3, 4, (@ 600 sq ft ea) | 2,400 |
| Laboratory 5 (graduate research with four carrels) | 800 |
| Laboratory 6 (graduate research with four carrels) | 800 |
| Laboratory and office 7 (chairman) | 600 |
| Laboratory and office 8 (electron microscope) | 1,400 |
| Subtotal | 6,000 |
| **SUPPORT:** | |
| Preparation Room | 200 |
| Aquarium room | 150 |
| Insectary room | 150 |
| Sterilization and washroom | 200 |
| Chemical and glassware storage | 200 |
| Dark room | 200 |
| Constant temperature room | 200 |
| Cold room | 200 |
| Equipment room | 200 |
| Subtotal | 1,700 |
| **ADMINISTRATION:**[a] | |
| Secretarial and reception area (3 secretaries) | 300 |
| Seminar-library-conference room | 500 |
| Subtotal | 800 |
| TOTAL | 8,500 |

a. Administration unit is to be adjacent to the chairman's work area.

## DEPARTMENT OF MICROBIOLOGY

The Department of Microbiology is engaged in a wide range of investigations which vary from purely fundamental questions involving the structure and function of microbial subcellular particles through such applied questions as the effectiveness of chemotherapy or instrument disinfection. Close liaison is maintained with the clinical departments and other departments undertaking microbial studies, as a service area for media preparation, technical instruction, and consultation.

The Department's research program is aimed at investigations which will employ such specific methods as immunochemical analyses and electron microscopy in order to understand the ultrastructure of microbes. Such data will markedly influence the approaches to the biochemical bases of microbial pathogenicity, and relationships between structure and function, the mechanisms of biosynthetic control, and their applications to oral ecology.

The major research activities are associated with inoculation and study of infectious microbes in experimental animals and the use of radioactive isotopes in microbial metabolism. These studies require isolation chambers for maintenance of pure cultures, a radioisotope laboratory (as described in the "Radiation Safety" subsection of this program), fume hoods for chromatographic and other chemical analyses, soundproofed areas for noisy machinery (centrifuges, vacuum pumps, shakers, sonic disintegrators), constant temperature rooms (warm and cold), and an area for electron microscopy.

A media kitchen is also required. It is planned that the Media Kitchen (described in the "Basic Teaching Component" section of this program) will be located with direct access to the teaching laboratories. Since the Media Kitchen is a

very important support to the Department of Microbiology, it is necessary that there be access by a direct service lift (dumbwaiter or elevator) to a central area of the Department. An intercom connection should be installed between the Department and the Media Kitchen.

The equipment room is to be designed for the location of centrifuges and other noisy equipment. The room should be soundproofed. Drains should be low and easily accessible for water cooled equipment.

It is expected that 20 men and 17 women will comprise the personnel of this Department.

SPACE REQUIREMENTS

The following table outlines the approximate areas required for Department functions. All such estimated areas are, of course, subject to further study by the architect in accordance with the standards stated in subsection titled: "Space Standards."

| DEPARTMENT OF MICROBIOLOGY | APPROXIMATE NET SQUARE FEET |
|---|---|
| RESEARCH: | |
| Laboratory and research office 1,2,3,4,5 (@ 600 sq ft ea) | 3,000 |
| Laboratory and research office 6 (graduate research with 4 carrels) | 700 |
| Laboratory 7 | 400 |
| Laboratory and office 8 (chairman) | 400 |
| Laboratory 9 | 500 |
| Laboratory 10 | 400 |
| Subtotal | 5,400 |
| SUPPORT: | |
| Equipment room | 380 |
| Autoclave room | 200 |
| Special environment room | 200 |
| Photography and dark room | 200 |
| Walk-in refrigerator 1,2 (@ 200 sq ft ea) | 400 |
| Incubator 1, 2 (@ 200 sq ft ea) | 400 |
| Sterile cubicle room | 200 |
| Chemical and glassware storage | 200 |
| Equipment storage | 200 |
| Service lift | 30 |
| Subtotal | 2,410 |
| ADMINISTRATION:[a] | |
| Secretarial and reception area (3 secretaries) | 300 |
| Seminar-library-conference room | 500 |
| Subtotal | 800 |
| TOTAL | 8,610 |

a. Administration unit is to be adjacent to the chairman's work area.

## DEPARTMENT OF PATHOLOGY

The Department of Pathology will employ modern methods and procedures for the study of the structure and function of connective tissue in health and disease. Cytochemical methods will be used extensively, such as cytochemical staining methods, autoradiography, fluorescence microscopy, absorption spectrophotometry, and interference microscopy. Electron microscopy will be an important tool in these studies. Appropriate biochemical procedures will be employed for the isolation and characterization of biological compounds, such as extractions, electrophoresis, chromatography and pertinent analytical methods in conjunction with radioisotope work and the isolation of subcellular particles. In the study of the shape, size and charge of macromolecules and the determination of molecular fine structure, use will be made of methods such as viscosity, sedimentation, light scattering and X-ray diffraction. Cells and tissues from living animals and from tissue cultures will be employed in these studies.

The following functional relationships are stressed as being of special importance: the photography and dark room should be near the laboratory area within which the future electron microscope installation will be made; the equipment room, cold room, constant temperature room, glassware and storage room, and the sterilization room should be located near the laboratories which will be designated for Histochemistry-Cytochemistry and Biochemistry use.

For the above reasons, it is desirable that the following laboratory and research offices be adjacent to one another: (a) 1, 2, 3; (b) 4, 5; (c) 6, 7; and (d) 8, 9, 10.

Laboratory and research office 4 should be equipped with utility services which will permit the immediate or future installation of two electron microscopes. If the two EMs are not available for installation at the time this Building is completed, the EM and dark rooms identified in the table on the next page will be combined to provide two laboratory-office areas containing 240 square feet each. At the time the EM installation is accomplished the total area (1,280 square feet) will be subdivided into the following spaces: two electron microscope rooms (each 144 square feet), two dark rooms (each 96 square feet), one laboratory (600 square feet), and one research office (200 square feet).

The Department will co-operate closely with other research groups in this Building in the form of joint research effort or consultation; and will work closely with the University's Laboratory for Research on the Structure of Matter in the use of such highly specialized equipment as the equipment for X-ray diffraction.

Initially, the Department of Pathology will consist of four subdivisions: Histology-Cytochemistry; Biochemistry; Electron Microscopy; and Surgical Pathology. Service support facilities will be shared by all four subdivisions.

It is expected that 21 men and 15 women will comprise the personnel of this Department.

## SPACE REQUIREMENTS

The following table outlines the approximate areas required for Department functions. All such estimated areas are, of course, subject to further study by the architect in accordance with the standards stated in subsection titled: "Space Standards."

| DEPARTMENT OF PATHOLOGY | | APPROXIMATE NET SQUARE FEET |
|---|---|---|
| **RESEARCH:** | | |
| Laboratory and research office: | | |
| 1 (chairman), 2 (@ 600 sq ft ea) | | 1,200 |
| 3 (graduate research with three or four carrels) | | 800 |
| 4 (electron microscope): | 800 | |
| EM room | 144 | |
| Dark room | 96 | |
| EM room | 144 | |
| Dark room | 96 | |
| Subtotal | | 1,280 |
| 5, 6 (@ 600 sq ft ea) | | 1,200 |
| 7 (graduate research with three or four carrels) | | 800 |
| 8 | | 500 |
| Laboratory 9 | | 300 |
| Laboratory 10 (diagnostic with four carrels) | | 400 |
| Subtotal | | 6,480 |
| **SUPPORT:** | | |
| Sterilization and washing room | | 200 |
| Photography and dark room | | 200 |
| Cold room | | 200 |
| Special environment room | | 200 |
| Special equipment room | | 200 |
| Glassware and chemical storage | | 150 |
| Subtotal | | 1,150 |
| **ADMINISTRATION:**[a] | | |
| Secretarial and reception area (3 secretaries) | | 300 |
| Seminar-library-conference room | | 500 |
| Subtotal | | 800 |
| TOTAL | | 8,430 |

a. Administration unit is to be adjacent to chairman's work area.

## DEPARTMENTS OF BIOCHEMISTRY, ORAL DIAGNOSIS, AND PERIODONTOLOGY

This research level will, initially, provide facilities for three departments: Biochemistry, Oral Diagnosis, and Periodontology.

### BIOCHEMISTRY

A chemical and physical approach to the problems of biology will dominate the activities of the Department of Biochemistry. Attention will focus upon the chemistry and enzymology of intermediary metabolism, regulation and control of physiological events, chemical parameters of cellular differentiation, properties of biomolecules, or any other aspect of biology which the biochemically trained investigator might pursue.

The research operations of this group will involve potentially all of the methods of laboratory analysis and procedures which are now a part of the technology of this discipline. These analytical methods would involve spectrophotometry, chromatography, isotope methods, sedimentation studies, gas exchange, electrophoresis, polarimetry, lyophilization, and any other of the methods of preparation and analysis appropriate to the research needs of a biochemist which are presently used or may be developed in the future. The biological materials to be used for study may involve plant, microbial, or animal tissues.

Working relationships with other departments or groups are to be expected as biochemists are becoming increasingly involved in interdisciplinary approaches to problems in biology. No service operations in the formal sense are contemplated; however, it is expected that normal intergroup co-operation will bring about a sharing of equipment and talents for special needs.

Special features of the biochemistry laboratories will include common preparation and analysis rooms for major items of equipment, walkin cold rooms for storage of biochemicals and preparation of heatlabile substances, constant temperature rooms for conducting precise analytical procedures such as chromatography or for tissue culture studies, and fume hoods for each laboratory. The Department will also utilize the provisions that will be made in the laboratory for working with and storing radioactive isotopes. (See "Radiation Safety" subsection of this program.)

## ORAL DIAGNOSIS

Research efforts of the Department of Oral Diagnosis are presently directed toward learning new and better means of recognizing the discernible degradations in cells that herald the onset of alterations in molecular biosynthesis terminating in cell metaplasia, hyperplasia, neoplasia, necrosis, and crosis, and other signs of advanced disease in human tissues.

Studies will be conducted to correlate normal and pathological changes in cell morphology. The effects of endocrines, malnutrition, viral and other infestations on protein synthesis and cell morphology will be investigated. Electron Microscopy, autoradiography, and cytochemical methods will be used in the analysis of cell changes which occur from origin to maturation and exfoliation from epithelial surfaces.

It is anticipated that part-time use of an electron microscope will be shared with other departments. It is further assumed

that provision will be made for co-operative use of operating rooms, central sterile supply, and animal space for small rodents and marmosets in the Animal Quarters.

## PERIODONTOLOGY

The efforts of the Department of Periodontology are and will continue to be devoted to multidisciplinary approaches to oral disease. The inclusion of a module concerned with such investigations in the new research facilities provides the opportunity to study many clinical facets in a stimulating atmosphere of fundamental science.

Extension and expansion of the varied approaches now employed by this group include such disciplines as neurophysiology, immunology, biochemistry, autoradiography, genetics, embryology, and electron mircoscopy. Techniques appropriate to any of these disciplines may be employed and biological models may include human patients, varieties of other mammals, and mirco-organisms. Interdepartmental co-operation and collaboration will be the desired and natural outgrowth of such multidisciplinary investigations.

## GENERAL

As indicated above, three separate departments will, initially, be provided with facilities on this level. The laboratory and research office space required by each department should, therefore, form a contiguous, self-contained unit; and the laboratories of one department should not be intermingled with those of another. However, the support facilities should be readily

accessible to all departments. It should be recognized that the three-department arrangement may be temporary. In the future one department (Biochemistry) may occupy the entire floor. To the extent possible, therefore, the plan should include both the separateness of three departments and the possibility of future use by one department.

It is expected that 38 men and 36 women will comprise the personnel of these departments.

## SPACE REQUIREMENTS

The following table outlines the approximate areas required for the functions of each department. All such estimated areas are, of course, subject to further study by the architect in accordance with the standards stated in subsection titled: "Space Standards."

| DEPARTMENTS OF BIOCHEMISTRY, ORAL DIAGNOSIS, AND PERIODONTOLOGY | APPROXIMATE NET SQUARE FEET |
|---|---|
| RESEARCH | |
| BIOCHEMISTRY: | |
| Laboratory and Research Office: | |
| 1 (chairman) | 600 |
| 2,3 (@ 500 sq ft ea) | 1,000 |
| 4,5 (@ 400 sq ft ea) | 800 |
| Subtotal | 2,400 |
| ORAL DIAGNOSIS: | |
| Laboratory and Research Office: | |
| 6 | 500 |
| 7,8 (@ 400 sq ft ea) | 800 |
| Laboratory 9 | 300 |
| Laboratory 10 | 400 |
| Subtotal | 2,000 |
| PERIODONTICS: | |
| Laboratory and Research Office: | |
| 11,12 (@ 400 sq ft ea) | 800 |
| Laboratory 13 | 200 |
| Laboratory and research office 14 | 300 |
| Laboratory 15,16 (@ 200 sq ft ea) | 400 |
| Subtotal | 1,700 |
| SUPPORT: | |
| Instrument Room 1,2 (@ 200 sq ft ea) | 400 |
| Photography and dark room | 200 |
| Cold room | 200 |
| Constant Temperature room 1,2 (@ 150 sq ft ea) | 300 |
| Subtotal | 1,100 |
| ADMINISTRATION:[a] | |
| Secretarial and reception area (3 secretaries) | 300 |
| Seminar-library-conference room | 500 |
| Subtotal | 800 |
| TOTAL | 8,000 |

a. To be located adjacent to Biochemistry Chairman's work area. This area to serve as message center and supply center for departments occupying this level.

## ANIMAL QUARTERS

The School wishes to ultimately establish Animal Quarters which will serve as a central facility for the Dental Medicine complex. The Animal Quarters and its support facilities in this Building have been allocated an estimated 4,470 net square feet. This amount may be reduced to 3,500 net square feet. The future adjoining project (Phase VII), which will be constructed to provide additional space for the basic science departments, will include additional space for the Animal Quarters if such additional space cannot be provided within this structure. If the additional space is provided in the Phase VII project, the Animal Quarters in both the present project and the Phase VII project will need to be designed so that the dirty and clean corridors of each are conveniently linked together to permit the facilities in each building to be operated and used as a single unit.

The Animal Quarters should be designed for ease of cleaning. Floor and wall materials that are impervious to fecal matter and urine should be used. No floor drains should be installed in the Animal Quarters, except in the central cage washing room.

Special attention should be given to the efficient and sanitary disposal of animal wastes; the guiding principle being that wastes should be flushed away as immediately as possible in each case. Waste pans should be continuously cleaned, where practicable, by a constant flow of water over the pan to a flush type drain.

A station at the appropriate location within the Animal Quarters should be equipped with a heavy capacity flush drain for the direct disposal of waste from pans which require scraping.

Animal remains will be handled and disposed of by the University waste collection service. Provision for the sanitary and safe storing of such material between collections will be required.

## RESEARCH ADMINISTRATION

The increase in research activitiy resulting from the construction of this project will require the employment of a research administrator at the professional level. If possible, space for this function should be provided on a lower level of the Building. The requirements are for a suite consisting of the office of the research administrator, a general office for the secretaries and reception, and another area to house records, the central duplicating equipment and office supplies for the Building, slide and motion picture projectors, etc.

Not all faculty members who use the teaching laboratories and lecture hall in the Basic Science Teaching Component will have offices in this Building. A lounge and cloakroom should, therefore, be provided for faculty in an appropriate location within the Building. This lounge should seat a minimum of 40 persons, using an informal arrangement of sofas and chairs.

## SPACE REQUIREMENTS

The following table outlines the approximate areas desired for animal quarters and research administration. All areas are, of course, subject to further study by the architect in accordance with the standards stated in subsection titled: "Space Standards."

| ANIMAL QUARTERS AND RESEARCH ADMINISTRATION | APPROXIMATE NET SQUARE FEET |
|---|---|
| ANIMAL QUARTERS: | |
| Quarantine rooms (3 @ 180 sq ft) | 540 |
| Wash-sterilization area and cage storage | 580 |
| Food preparation, feeding and small office | 400 |
| Storage for floor cleaning and spraying machines, detergents | 100 |
| Personnel -- lockers, showers, toilets | 250 |
| Animal rooms (6 @ 255) | 1,530 |
| Animal work and operating rooms | 970 |
| TOTAL | 4,470 |
| RESEARCH ADMINISTRATION: | |
| Research Administrator's Office | 200[a] |
| Secretarial, reception, records | 400[b] |
| Faculty lounge and cloakroom | 1,000 |
| TOTAL | 1,600 |

a. Includes space for central storage of office supplies, central duplication facilities, and the central storage of such equipment as the slide and motion picture projectors.
b. Includes space for serving alcove.

## BASIC SCIENCE TEACHING COMPONENT

The teaching facilities in this project are to provide space for lectures, laboratories, and service laboratories for instruction in histology and embryology, microbiology, pathology, and materials science. These subjects are now presented within the existing building in quarters which are being vacated for future expansion of research by clinical departments. Since the teaching is done by sections and in different semesters, it will be possible for these departments to share common teaching areas in this project. Teaching laboratories located adjacent to a lecture hall and two service rooms will make the teaching simpler and more efficient.

The lecture hall should have a demonstration bench on the lecture platform and be wired to permit the installation of TV monitors.

The Media Kitchen is both an integral part of the Department of Microbiology as well as a service facility for the teaching, diagnostic, and research areas. It should have direct access to the teaching laboratories, and a service lift (dumbwaiter or elevator) should provide direct access to a central area of the Department of Microbiology.

A student lounge and cloakroom with 80 small lockers is required for between class waiting, for laboratory breaks, and to provide a space for books, coats, hats, and other personal property.

This lounge should seat a minimum of 35 persons, using an informal arrangement of sofas and chairs. The laboratories will accommodate 80 students and the lecture hall 160. As many as 240 students may, therefore, be in the teaching component at one time. The design for the teaching component should prevent crowding in the entranceways and halls.

## SPACE REQUIREMENTS

The following table outlines the approximate areas required by the functions of the teaching component. All such estimated areas are, of course, subject to further study by the architect in accordance with the standards stated in subsection titled: "Space Standards."

| BASIC SCIENCE TEACHING COMPONENT | APPROXIMATE NET SQUARE FEET | |
|---|---|---|
| Lecture Hall -- 160 seats | | 1,700 |
| Teaching Laboratory 1, 2 (40 students) (@ 1,800 sq ft ea) | | 2,600 |
| Preparation Service Rooms for teaching laboratories (@ 400 sq ft ea) | | 800 |
| Media Kitchen: | | |
| Media Preparation Room | 320 | |
| Walkin Refrigerator | 100 | |
| Sterile cubicle room | 100 | |
| Clean and sterile glassware storage | 200 | |
| Dishwashing and sterilizing | 480 | |
| Subtotal | | 1,200 |
| Student lounge and cloakroom (80 small lockers) | | 1,000 |
| TOTAL | | 8,300 |

## SPACE REQUIREMENTS FOR TOTAL PROJECT

The following table summarizes the space requirements for the total project.

| TOTAL PROJECT | APPROXIMATE NET SQUARE FEET |
|---|---|
| RESEARCH COMPONENT: | |
| Department of Histology and Embryology | 8,300 |
| Department of Microbiology | 8,610 |
| Department of Pathology | 8,430 |
| Departments of Biochemistry, Oral Diagnosis, and Periodontics | 8,000 |
| Animal Quarters | 4,470 |
| Research Administration | 1,600 |
| Subtotal | 39,610 |
| TEACHING COMPONENT | 8,300 |
| TOTAL | 47,910 |
| Add for central chillers and electrical transformer substation | 2,500 |
| GRAND TOTAL | 50,410 |

## PROJECT CONSTRUCTION BUDGET

A total building construction budget of $3,482,225 has been established for this project.

The project construction budget includes all the mechanical and fixed equipment, and other items that are an intrinsic part of the Building. The architect should also note the reference to centralized water chilling in the program subsection titled: "Mechanical Considerations." The above construction budget will cover the proportionate cost of the central water chilling equipment for this Building.

The University expects the architect to develop designs and contract documents which will be consistent with the established project budget. This obligation is mandatory. The architect shall present to the University[1] at each design stage a breakdown estimate of cost and, when required, suggest alternates for adjusting the program and design objectives. Such objectives shall not be changed, however, without University authorization.

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1. See "Project Administration."

## PROJECT ADMINISTRATION

The development of the design and construction phases of this project will be administered by the New Construction Department. This Department will coordinate all meetings and will schedule periodic reviews of each phase of the architect's work with the Project Planning Committee, the Design Review Committee, and with the University Planning Office to insure development consistent with the approved project program, the University Development Plan, and the approved project budget. The New Construction Department will also arrange for the review of the appropriate phases of the architect's work with the Department of Buildings and Grounds, the Radiation Safety Office, the Project Furnishings Committee, and other appropriate agencies of the University.

The New Construction Office will, in consultation with the architect, establish a work schedule which will include the expected completion dates for each architectural service stage; up to and including the dates on which final contract documents are expected to be completed, bids received, and construction contract awarded.



END