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A general guide to the architect regarding the academic requirements for a chemistry facility. Subject organization is in terms of--(1) general academic building planning criteria, (2) three summaries of space required, (3) specific space requirements, and (4) functional relationship diagrams. Specific academic areas being researched include chemistry, audiology, and speech sciences (LD)

PURDUE UNIVERSITY

SCHEDULES AND SPACE

ADDENDUM

TO THE

Building Program Statement For the Chemistry Addition

December 1967

ADDENDUM

TO THE

BUILDING PROGRAM STATEMENT FOR THE CHEMISTRY ADDITION.

COMPILED BY

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December 1967

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I. INTRODUCTION

Since the two primary plans in the original Building Program Statement for the Chemistry Addition did not meet the budget that was set for the facility, this document has been prepared as an addendum to the Building Program which was presented in April 1967. The alternate, "Plan C," specified in the original document, which was not detailed, did meet the budget requirements. Therefore, it was necessary to present additional detail regarding the distribution of the types of space as specified under "Plan C."

This Addendum, as well as the original Building Program Statement, is expected to guide the architect in a general manner regarding the academic requirements for this facility. It is intended that this document will be supplemented, if necessary, by appropriate detailed architectural specifications from the Department of Development Planning.

Chapters I, V, most of VI, and Appendices A and B of the original document are still applicable. The building planning criteria and specific space required have been modified somewhat to enable the building to be constructed within the $12.6 million budget. In addition, the functional relationships have been delineated as closely as possible and charted in the functional relationship diagrams in Chapter V of this Addendum.

However, in anticipation that additional space will be forthcoming within the $12.6 million because of possible design efficiencies which may be effected, a number of design electives have been included with their appropriate priorities. These design electives have been enumerated for both Chemistry and Audiology and Speech Sciences. It is hoped that each department will share proportionally in any additional space available or, conversely, will be reduced proportionally if the specified amount of space cannot be attained within the allocation of funds.

The Physical Plant should insure that this construction project will not interfere with the academic endeavors being conducted contiguous to this site.

II. ACADEMIC BUILDING PLANNING CRITERIA

A. General

Space for Audiology and Speech Sciences, and the Chemistry Departments should be provided in accordance with Plan C of this Addendum to the "Building Program Statement for the Chemistry Addition." The $12.6 million allocated should provide at a minimum the amount of space specified in Plan C.

All aspects of planning should proceed at a pace which will allow meeting a bid opening date of April 1969.

Space should be designed for Audiology and Speech Sciences contiguous to its present basement level space - preferably with one-third or more of the new space directly on soil.

Charts of some of the more significant functional relationships in the Chemistry Department are included in section V of this Addendum. The architect should strive to design spatial relationships consistent with these functional relationships.

B. Acoustics

The acoustical properties of teaching laboratories, classrooms, conference areas, corridors and offices should be suitable to the functions of each area. In general, classrooms should have a reverbation time of 0.5-1.0 seconds. Vibratory and acoustical interference between the spaces occupied by Chemistry and Audiology should be minimized.

C. Air Conditioning

In general, the entire project should be air conditioned. Special air conditioning and ventilation requirements for specific areas will be specified

by the departments during consultations with the architect. Air movement should be designed so as to minimize the transfer of odors between areas, especially between areas occupied by Audiology and Chemistry and between the new addition and Heavilon Hall. Joining of the new addition to Heavilon Hall to improve the air conditioning of Heavilon Hall is specifically eliminated as a planning criterion although this feature may be included if it does not adversely affect the other planning criteria.

D. Audio-Visual

All requirements for audio-visual equipment should be coordinated with the campus Audio-Visual Department, Physical Plant Electronics Shop, and Television Unit before inclusion in the final specifications for the building. In general, all classrooms, seminar-conference rooms and teaching labs should also provide for later addition of remote AV systems, such as TV.

At this time, requirements for television conduit are somewhat inconclusive and use of television is not really envisioned by the Chemistry Department. However, conduit should be installed to allow future use in teaching labs, classrooms and seminar rooms. The appropriate campus authorities should be consulted to help reach a decision on conduit for telephones, intercom, and television (Dr. Hayt, Mr. Miles, Mr. Townsley, Mr. Terwilliger, Mr. Moses, Mr. Baker and the General Telephone representatives).

E. Building Efficiency

The assignable space should be maximized with a target ratio of net assignable to gross area of 60-62% or more.

F. Display Cases and Bulletin Boards

Glass-covered display boards must be provided near teaching laboratories and at other locations throughout the building to be specified after preliminary plans.

G. Chalkboards

All chalkboards installed should be easy to write on, easy to erase, and easy to read. In general, this requires high-quality high-contrast chalkboards. A small (4' x 6') chalkboard should be installed on one wall of each research laboratory and office.

H. Class Bell System

A class bell system to indicate class changes should be installed on all levels of the new addition and synchronized with the campus central system. If a separate fire alarm system is not provided, the class bell system as an evacuation alarm should be investigated.

I. Clocks

Centrally-controlled, programmed clocks should be located in the corridors of this building on all levels. Non-corrective clock outlets should be provided in all clerical pool offices, lounges, teaching laboratories and other locations which will be determined when the schematic plans are made available.

J. Columns

All instructional laboratories should be free of obstructing columns.

K. Corridors

Corridors, with special attention to corners, should be of sufficient width (say 8-10 feet) to allow ready movement of bulky equipment and also accomodate appropriate traffic densities throughout the new addition and between it and the present Chemistry Building.

Direct passageways between the new addition and the Chemistry Building on levels corresponding to the basement, second, third and fourth floors

should be provided. The possibility for passageways now or in the future between the new addition and Heavilon Hall on the basement, ground, main and at least one upper floor should be considered.

L. Custodial Areas

Custodial rooms with floor sink, hot and cold water, appropriate shelving and lighting should be provided on each floor, but should not exceed 50 square feet each. One main custodial room should be provided on the lower level to accommodate custodial equipment such as floor polishers, etc. This room should not exceed 150 square feet. A room of about 100 square feet should be provided for the building engineer.

M. Directory Cases

Directory cases should be provided in all the corridors and stairwells of the building. The exact location of these directory cases and bulletin boards will be specified when schematic plans are available.

N. Electrical Outlets

The numbers, types, and locations of specific electrical outlets will be indicated for each room after the preliminary drawings. Generally, routine 110 volt outlets should be conveniently provided in all areas, 220 volt and 220 volt-3phase should be provided as directed by the department on preliminary drawings. Special low voltage DC distribution systems may be necessary in some areas.

O. Elevators

In view of the anticipated research equipment which may be required to be transported from floor to floor, the following general specifications are

submitted for consideration. One freight elevator of approximately 5 tons capacity should be provided serving all floors of the new addition. The platform should be a minimum of 8 feet by 12 feet. A minimum doorway width of 7 feet should be provided at each end. The door clearance should be as high as the corridor ceilings or a minimum of 8 feet high. The freight elevator should open onto an area at each floor level which is large enough to maneuver the large items of equipment which may be carried on the elevator. The number and size of the passenger elevators should be sufficient to accommodate the expected traffic.

P. Equipment and Furniture

Equipment and furniture layouts will be included in the architect's plans as specified by the department after preliminary plans. Areas for students' coats and books should be provided in all instructional facilities.

Q. Flexibility

In all aspects of planning this facility, attention should be given to providing flexibility so that changes in use of the space can be accomodated at minimum future expense. In addition to provision being made for inexpensive conversion of most of the new addition to laboratory use sometime in the future, design of laboratories and furnishings should be such that changing research requirements can be easily met (e.g. research furniture should be modular).

R. Floor Coverings

It is suggested that floor coverings be included in all areas except those where heavy loads will be transported and in certain utility and service areas.

S. Floor Loadings

Because of the department's anticipated need for heavy floor loading capabilities in several research laboratories, it is suggested that a portion of the building (say 10% of the space) on all floor levels be designed with very heavy floor loading capabilities, possibly 5-10 times normal. All areas should probably be designed for a live load not less than 125 pounds per square foot. Those areas which will carry more concentrated load capacity will be indicated during preliminary design, consistent with the structural design of the new addition.

T. Lighting

Adequate lighting in all areas shall be provided for maximum visibility for the activity in that area. Illumination throughout classroom and office areas should be 100 foot candles at the reading level and should be planned so that shelving and other equipment is interchangeable without changes in the lighting accommodations.

U. Locking

Locking system should be consistent with departmental requirements and specified by the departmental representatives before occupancy of the building.

V. Offices

All offices should be designed in accordance with Purdue University's "Design Considerations for Private Offices." In general, all offices should be no longer than 13 feet in length and no less than 8 feet in width. All single full-time equivalent (FTE) offices should be no less than 100 square feet nor no more than 130 square feet in area except for those rooms specifically enumerated in the program statement. A single FTE office will house

either a full-time staff member or three teaching assistants. Generally, electrical and telephone outlets should be wall mounted. Floor outlets might be considered in large clerical areas. The equipment specified for each office depends upon its intended occupant(s) and their functional equipment requirements as generated by the responsibilities and duties which they are required to perform. An office equipped for a typical full-time staff member might include a double pedestal desk approximately 30" x 60" with 3 file drawers, 2 box drawers and a 26" wide center drawer. Hook strips should be mounted on the wall to allow for at least 90 lineal feet of wall-mounted bookshelves; however, only 50 lineal feet of shelving should be installed initially (5 - 10' x 10" shelves). An 18" to 20" deep credenza should be provided to be located the full length of the shortest wall and should include at least four file drawers. A comfortable wooden swivel chair and two side chairs (one with arms) should be provided. A chalkboard approximately six feet in length should be provided on one wall. One metal wastebasket should be provided in all offices. One wall-mounted 2 or 3 prong coat hanger should be installed in each office (preferably behind the door). In general, office furniture should be standardized and not custom fitted.

Offices outfitted for graduate teaching assistants should include three single pedestal desks with two file drawers and one center drawer each. A section of chalkboard approximately six feet long should be installed on one wall. Wall-mounted hook strips should be installed to allow for at least 90 lineal feet of bookshelves. However, only 30-40 lineal feet of shelving need be installed for use by teaching assistants, but this does provide the flexibility to use these rooms interchangeably as staff offices as well. One straight-back chair in each office should be provided for each

desk and one additional straight-back chair in each office. (It is doubtful that there will be students conferring with each of the teaching assistants simultaneously; therefore, there is little need for more than one additional straight-back side chair in each 3-man teaching assistant office. In fact, most of the time, all three teaching assistants will not be in the room at the same time.)

W. Plumbing

Consideration should be given to installation of "T's" wherever possible for future flexibility of laboratory rearrangement and/or changes. The materials used in drains, etc., should be chosen with consideration to the types and kinds of chemicals to be used in each area (e.g. avoid lead traps).

X. Programmed Areas

The architect is requested to indicate on a separate schedule the programmed and the designed area of each room.

Y. Receiving Area

A new receiving area should be located on the northeast corner of the new addition to enable the occasional transfer of heavy equipment directly from delivery trucks to a high-capacity (10 tons) hydraulic elevator which would serve from truck level to all lower levels.

Z. Research Laboratories

The requirements for the more specialized research facilities will be specified in the preliminary plans by the Chemistry departmental representatives as they work with the architect.

AA. Room Schedule Holders

Room schedule holders for classrooms and conference rooms and name plate holders and schedule holders for offices should be provided on the doors of each of these rooms.

BB. Safety

The placement of various specialized facilities which will house explosive or radioactive materials must be cleared with the appropriate campus, state and federal authorities before the final plans can be approved. Radioactive hoods should have separate exhaust and appropriate filters where required. Plans must be reviewed with the campus radiological control committee relative to the radiological control measures that should be taken. Emergency showers and eyewashers should be provided at reasonable intervals throughout the building, at least one in each teaching laboratory and one in each research complex. Recognition should be given to the potential safety value of windows in designing the laboratory areas of the building.

CC. Site

The facility should be located within the area bounded by Central Drive, Grissom Hall, Heavilon Hall and the present Chemistry Building with a height approximately equal to that of the present Chemistry Building. Aesthetic considerations should be maximized vis-a-vis location relative to other structures, landscaping, student traffic patterns and student rest/waiting areas.

DD. Telephones

The Chemistry Department staff desires that telephone service be installed in most offices and intercom and telephone service conduit be

installed into all offices, teaching labs, and research laboratories. The telephone system for the total building will include a central switchboard in the main office (and will allow telephone conferences with more than two individuals). This may eliminate the need for an intercom system to be installed in the building. Areas for public telephones should be provided in convenient locations.

EE. Traffic Flow

The interference of teaching and research activities should be minimized. Teaching activities should be located on the lower street level floors while research activities should occupy areas further from the main traffic flow. Cross-traffic between Chemistry and Audiology personnel and students should be minimized.

It is suggested that the need for entrances beyond those at the east and west ends of the building be investigated thoroughly and provided only if necessary to accommodate essential traffic.

FF. Wall Finishes

Wall finishes should be of a material that is easily cleaned and durable enough to withstand the abuse from heavy traffic in the corridors.

III. SUMMARY OF SPACE REQUIRED

TABLE 1 (TABLE 13 - Revised)

PART I - CHEMISTRY

PRESENT AND FUTURE USE OF CHEMISTRY BUILDING
AND FUTURE REQUIREMENTS UNDER PLAN C TOGETHER WITH DESIGN ELECTIVES

	PRESENT BUILDING USE				PLAN C (550 GRAD STUDENTS)			
TYPE SPACE	NET AREA PRESENT USE	DELETIONS	ADDITIONS	NET AREA PROPOSED USE	TOTAL REQUIREMENTS	WITH DESIGN ELECTIVES	NET AREA TO BE PROVIDED	WITH DESIGN ELECTIVES
A.Classroom & Class Serv	13,868	1,050	- 0 -	12,818	15,318	15,318	- 0 -*	2,500
B.Seminar-Conf	893	206	- 0 -	687	2,487	2,487	1,800	1,800
C.T-Lab	19,360	1,330	2,842	20,872	56,642	59,742	35,770	38,870
D.T-Lab Serv (Chm)	2,176	1,040	753	1,889	11,289	11,639	9,400	9,750
E.Research	42,224	5,200	4,379	41,403	83,300	88,760	41,897	47,357
F.Res Serv (Chm)	10,764	926	4,384	14,222	17,160	18,300	2,938	4,078
G.Office (Chm)	10,323	4,441	206	6,088	29,386	30,263	23,300	24,175
H.Office Serv (Chm)	1,424	941	- 0 -	483	1,233	1,233	750	750
I.Commons	528	528	- 0 -	- 0 -	1,400	1,400	1,400	1,400
Merch Serv	222	222	75	75	75	75	- 0 -	- 0 -
Shop (Dep'l Maint)	4,638	- 0 -	222	4,860	4,860	4,860	- 0 -	- 0 -
Storage	1,603	- 0 -	361	1,964	1,964	1,964	- 0 -	- 0 -
Misc	- 0 -	- 0 -	141	141	141	141	- 0 -	- 0 -
SUB-TOTAL (CHM)	108,023	15,884	13,363	105,502	225,257	236,182	117,255	130,680
J/1.T-Lab Serv (C.St.)	3,915	- 0 -	- 0 -	3,915	5,115	5,115	1,200	1,200
J/2.Res Serv (C.St.)	10,662	3,036	- 0 -	7,626	10,826	11,926	3,200	4,300
Office (C.St.)	1,562	- 0 -	216	1,778	1,778	1,778	- 0 -	- 0 -
SUB-TOTAL (C.St.)	16,139	3,036	216	13,319	17,719	18,819	4,400	5,500
Office (Libr)	158	- 0 -	↓	158	↓	↓	- 0 -	- 0 -
Study Hall	1,962	227	↓	1,735	↓	↓	- 0 -	- 0 -
Libr Serv	131	- 0 -	↓	↓	↓	↓	- 0 -	- 0 -
Stack	3,012	- 0 -	↓	↓	↓	↓	- 0 -	- 0 -
SUB-TOTAL (Libr)	5,263	227	4,142	9,178	9,178	9,178	- 0 -	- 0 -
TOTAL ASSIGNABLE	129,425	19,147	17,721	127,999	252,154	264,179	121,655	136,180
GEN BUILDING	97,298	- 0 -	1,426	98,724	----	----	----	----
TOTAL NET AREA	129,425	19,147	19,147	129,425	----	----	----	----

*2,500 sq.ft. requirement to be satisfied by use of Heavilon Hall

TABLE 1 (TABLE 23 - Revised)

PART II - AUDIOLOGY AND SPEECH SCIENCES

SUMMARY OF NEW SPACE TO BE CONSTRUCTED

TYPE SPACE	NET AREA TO BE PROVIDED	WITH DESIGN ELECTIVES
A. Teaching Laboratories	1595	1595
B. Research Laboratories	3600	3600
C. Research Service	840	1040
D. Clinic	2060	3140
E. Office	6720	6960
F. Library	300	500
TOTALS	15,115 sq. ft.	16,835 sq. ft.

TABLE 2 (TABLE 11 - Revised)

SUMMARY OF NEW FACILITIES REQUIRED-PLAN C WITH DESIGN ELECTIVES

PART I - CHEMISTRY

		TYPE SPACE REQUIRED	NEW SPACE	d-e PRIORITY
A. CLASSROOMS				
A/1/d-e	3	Classrooms (500 sq.ft. and 30 sta. each)	1,500	d-e #1
A/1/d-e	1	Classroom (1,000 sq.ft. and 100 sta.)	1,000	d-e #1
		(Sub-Total)	(2,500)	
B. SEMINAR - CONFERENCE ROOMS				
B/1.	2	Seminar - Conference (450 sq.ft. and 24 sta. each)	900	
B/2	3	Seminar - Conference (300 sq.ft. and 12-15 sta. each)	900	
		(Sub-Total)	(1,800)	
C. TEACHING LABORATORIES				
C/1	18	General Chemistry Labs (1,550 sq.ft. and 24 sta. each)	27,900	
C/1/d-e	2	Ditto	3,100	d-e #2
C/2/a	3	Type A Analytical Labs (1,400 sq.ft. and 20 sta. each)	4,200	
C/2/b	1	Type B Analytical Lab (1,200 sq.ft. and 20 sta.)	1,200	
C/2/c	1	Type C Analytical Lab (720 sq.ft. and 8 sta.)	720	
C/3	1	Glass-Blowing Lab (250 sq.ft. and 6-10 sta.)	250	
C/4	1	Chemistry-Education Lab	1,500	
		(Sub-Total)	(38,870)	
D. TEACHING LABORATORY SERVICE SPACE				
D/1/a/i	9	Type A Gen Chem Instrument Rooms (350 sq.ft. each)	3,150	
D/1/a/i/d-e	1	Ditto	350	d-e #2
D/1/a/ii	6	Type B Gen Chem Instrument Rooms (350 sq.ft. each)	2,100	
D/1/a/iii	1	Type C Gen Chem Instrument Room	600	

D/1/b	2	Gen Chem Preparation/Dispensing Rooms (one about 1500 sq.ft., the other about 1000 sq.ft.)	2,500	
D/2/a	1	Analytical Instrument Room	600	
D/2/b	1	Analytical Preparation Room	250	
D/2/c	1	Analytical Sample Storage Room	200	
		(Sub-Total)	(9,750)	

E. RESEARCH SPACE

E		General Flexible Research Labs (in modules of about 12' x 25')	41,897	
E/d-e		Ditto-1	3,000	d-e #3
E/d-e		Ditto-2	2,460	d-e #4
		(Sub-Total)	(47,357)	

F. RESEARCH SERVICE SPACE

F/1	1	Instrument and Electronics Shop	2,500	
F/1/d-e		Add to above	1,000	d-e #4
F/2		Special Equipment Rooms	438	
F/2/d-e		Add to above	140	d-e #3
		(Sub-Total)	(4,078)	

G. OFFICE SPACE

G/1	1	Department Head Office (180-200 sq.ft.)	190	
G/2	8	Division Head Offices (150-160 sq.ft. each)	1,240	
G/3	*57	Professorial Offices (Perm. staff) (120-130 sq.ft. each)	7,125	
G/4	9	Professorial Offices (Temp. staff) (120-130 sq.ft. each)	1,125	
G/5	*28	Post-Doctoral Offices (120-130 sq.ft. each)	3,500	
G/5/d-e	*10	Ditto	1,250	d-e #3
G/6	2	Fellows Offices (120-130 sq.ft. each)	265	
G/7	20	Clerical Offices (100 sq.ft. each)	2,000	
G/8	1	Clerical Office (Dept. Head Secy) (150 sq.ft.)	150	
G/9	1	Clerical Supervisor Office (120-130 sq.ft.)	125	
G/10	2	Clerical Pool Offices (500-700 sq.ft. each)	1,200	

G/11	3	Administrative Assistants Offices (120-130 sq.ft. each)	380	
G/12	*48	Teaching Assistants Offices (120-130 sq.ft. each)	6,000	
G/12/d-e	*-3	Deduct from above (120-130 sq.ft. each)	-375	d-e #4
		(Sub-Total)	(24,175)	

*[If architectural design considerations will permit, it would be desirable to provide the space generated by Professors (Perm.), Post-Doctorals, and Teaching Assistants in the following distribution:

	Professorial (Perm.):		
G/3/a/alt	15 @ 140-150 sq.ft.	2,175	
G/3/b/alt	8 @ 130-140 sq.ft.	1,080	
G/3/c/alt	34 @ 120-130 sq.ft.	4,250	
		7,505	
	Post-Doctorals:		
G/5/alt	28 @ 115-125 sq.ft.	3,360	
G/5/d-e/alt	10 @ 115-125 sq.ft.	1,200	d-e
		4,560	
	Teaching Assistants:		
G/12/alt	48 @ 115-125 sq.ft.	5,760	
G/12/d-e/alt	-3 @ 115-125 sq.ft.	-360	d-e
		5,400	
	Total	17,465	

(Total without this redistribution: 17,500)]

H. OFFICE SERVICE SPACE

H/1	1	General Chemistry Workroom	250	
H/2	1	Main Office Duplicating and Workroom	500	
		(Sub-Total)	(750)	

I. COMMONS

I	1	Staff/Student Commons (600 sq.ft. staff area dividable from 800 sq.ft. student area)	1,400	
		(Sub-Total)	(1,400)	

J. CHEMISTRY STORES SPACE

J/1	2	Gen Chem Storerooms (Not necessarily equally sized)	1,200	

J/2	1	Pyrex Warehouse	2,000	
J/2/d-e		Add to above	500	d-e #4
J/3	2	Research Storerooms (600 sq.ft. each)	1,200	
J/3/d-e	1	Ditto	600	d-e #4
		(Sub-Total)	(5,500)	
		GRAND TOTAL	136,180	
		(without design electives	121,655)	

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PART II - AUDIOLOGY AND SPEECH SCIENCES

		TYPE SPACE REQUIRED	NEW SPACE	d-e PRIORITY
A. TEACHING LABORATORIES				
A/1	1	Undergraduate Clinic Report Lab	395	
A/2	2	Graduate Teaching Labs (600 sq.ft. and 20 sta. each)	1,200	
		(Sub-Total)	(1,595)	
B. RESEARCH SPACE				
B/1	17	Research Labs (200 sq.ft. each)	3,400	
B/2	1	Dental Research Lab	200	
		(Sub-Total)	(3,600)	
C. RESEARCH SERVICE SPACE				
C/1	1	Equipment Issue Room	400	
C/1/d-e		Add to above	200	d-e #7
C/2/a	1	TV Studio	200	
C/2/b	1	TV Control Room	240	
		(Sub-Total)	(1,040)	
D. CLINIC SPACE				
D/1/a	14	Clinic Rooms (60 sq.ft. each)	840	
D/1/a/d-e	6	Ditto	360	d-e #1
D/1/a/d-e	4	Ditto	240	d-e #3
D/1/a/d-e	4	Ditto	240	d-e #5
D/1/b	2	Clinic Rooms (120 sq.ft. each)	240	
D/1/b/d-e	2	Ditto	240	d-e #1
D/2	4	Parent Consultation Rooms (80 sq.ft. each)	320	
D/3	4±	Observation Areas	540±	
D/4	1	E.N.T. Examination Room	120	
		(Sub-Total)	(3,140)	

E. OFFICE SPACE				
E/1/a	34	Staff Offices (100-130 sq.ft. each)	4,080	
E/1/b	18	Graduate Assistant Offices (100-120 sq.ft. each)	2,160	
E/2	2	Clerical Offices (100-130 sq.ft. each)	240	
E/2/d-e	1	Ditto	120	d-e #2
E/2/d-e	1	Ditto	120	d-e #4
E/3	1	Clinic Records Room	240	
		(Sub-Total)	(6,960)	
F. LIBRARY SPACE				
F	1	Departmental Library	300	
F/d-e		Add to above	200	d-e #6
		(Sub-Total)	(500)	
		GRAND TOTAL	16,835	
		(without design electives	15,115)	

TABLE 3 (Addendum to TABLE 9 of the preliminary program statement)

GENERATION OF CHEMISTRY DEPARTMENT OFFICE AND RESEARCH SPACE REQUIREMENTS - PLAN C

TYPE STAFF OR GRADUATE STUDENT	PLAN C	SPACE REQUIRED OFFICE	OFF.SERV.	RESEARCH	RES.SERV.
A. Administrative	4	500	40	---	---
Aa. Adm. Adjustment	---	70	---	---	---
B. Professorial-Perm.(People & FTE)	86	10,750	860	---	---
Bb. Adm. Adjustment	---	300	---	---	---
B1. Res. Programs (People)	68	---	---	8160	2040
B1a. Teaching (FTE)	28	---	---	---	---
B1b. Course Revision (FTE)	4	---	---	---	---
B1c. Direct Research (FTE)	36	---	---	---	---
B2. Non-Res. Programs (People)	18	---	---	---	---
B2a. Teaching (FTE)	7	---	---	---	---
B2b. Adm. & Other (FTE)	11	---	---	---	---
C. Professorial-Temp. (People)	11	1,375	110	---	---
C1. Teaching Only (FTE)	4	---	---	---	---
C2. Teach (.4) & Res (.6) (People)	7	---	---	840	210
D. Post-Doctorals (People)[a]	80-100	5000-6250	---	12,000-15,000	2400-3000
D1. Some (.1) Teaching (People)	20-25	---	---	---	---
D2. All Research (People)	60-75	---	---	---	---
E. Teaching Assts. (.5 FTE) (People)	242	---	---	---	---
E1. No Research (People) (.5 FTE)	146-136	6083-5667	---	---	---
E2. Research Also (People)	96-106	---	---	14,400-15,900	2880-3180
F. Research Assts. (People)	260	---	---	39,000	7800
G. Undergrad Research (People)	40-50	---	---	2400-3000	600-750
H. Fellowships (People)	40	---	---	---	---
H1. 1st year (Little Res.)	10	310	---	---	---
H2. 2nd year Res.	30	---	---	4500	900
I. Self-Support (People)	8	---	---	---	---
I1. 1st year (Little Res.)	2	---	---	---	---
I2. 2nd year Res.	6	---	---	900	180
J. Clerical (FTE)[b]	45	4500	225	---	---
K. Technicians (FTE)	10-16	---	---	---	---
K1. Operators	5-8	---	---	---	---
K2. Research Assts.	5-8	---	---	600-960	150-240
L. Service	55	---	---	---	---
L1. Managers	5	500	---	---	---
L2. Workers	50	---	---	---	---

TYPE STAFF OR GRADUATE STUDENT	PLAN C	OFFICE	SPACE REQUIRED-UNIT OFF.SERV.	RESEARCH	RES.SERV.
M. Total Teaching (FTE)					
M1. (B1a + B1b + B2a + C1 + C2 x 0.4 + D1 x 0.01 + E x 0.5)	168.8-169.3				
M2. Calculated Via Computer Simulation	168				
N. Total Course Enrollments (Excluding 698 & 699)	12,000				
O. Graduate Students	550				
O1. 1st year	170				
O2. 2nd year	130				
O3. Remainder	250				
O4. Number Research Grad (E2 + F + H2 + I2)	392-402				
TOTALS			29388-30222	1235	83300-88760 17160-18300

[a]This assumes that Post-Doctorals now generate research space whereas in the past and in the Capital Appropriation Study separate requirements for them have not been considered.

[b]An additional factor of 5 sq. ft. for clerical office service space was allowed.

IV. SPECIFIC SPACE REQUIREMENTS

PART I - CHEMISTRY

The specific requirements detailed in this section are limited to those which involve space in the new addition. Enrollment projections, where shown, are included only to aid the architect in designing the space. No requirements for remodelling of the present building are included. For additional information regarding these omitted points, reference should be made to the original "Building Program Statement for the Chemistry Addition", dated April 1967.

A. Classrooms

Under Plan C as funded by the University, no space for classrooms was included. This lack of funding did not imply, nor was it meant to imply, that additional classrooms were not required for Chemistry's growth during the next decade. Rather, it was intended that the Department of Chemistry would meet its need for five additional recitation-type classrooms by using some of those presently existent in Heavilon Hall. Realizing that the permanent availability of space in Heavilon Hall is not a certainty at any given point in time, and recognizing that it is much more desirable for Chemistry's classrooms to be located within its own buildings, the classroom requirement generated under Plans A and B has been reinserted into Plan C as a design elective. The 2500 square feet of classroom space should be designed as three recitation rooms at 500 square feet each and one small lecture room of 1000 square feet.

Each recitation-type classroom should seat about 30 students in multiple aisle pedestal mounted tablet arm chairs. The rooms should be rectangular in shape with the length being no more than 1 1/2 times the width. Chalk-

boards should be installed across the entire front wall (the narrowest width) and all other available wall space and adequate coat hooks and book shelf space provided. Projection screens and down lights for visual presentations should also be installed.

The 1000 square foot classroom should provide seating for approximately 100 students in multiple aisle pedestal mounted tablet armed chairs. The room should be rectangular in shape with the length no more than 1 1/2 times the width. Chalkboards should be installed across the entire front wall (the narrowest width), one entire side wall, and the rear wall. Adequate coat hooks and book shelf space should be provided as well. Two or more doors to the room should be provided, at least one at the front and at least one at the rear. The room should be designed in a manner which will enable its ready conversion at low cost to two recitation rooms each seating about 30 students. (This implies, for example, that the lighting be switched separately for each half of the room, with switches located at each end of the room.) The floor of this room should be sloped up to the rear, this to be accomplished through a series of wooden risers which could be removed if the room were to be converted into two recitation rooms.

B. Seminar-Conference Rooms

Two seminar-conference rooms should be provided, each about 450 square feet, containing sufficient tables and chairs to allow their use by about 24 people at one time. (One of these rooms should be located in the Departmental Office complex, with access from a corridor.) Coat hooks should be provided along with some book storage shelves. Blackboards should be mounted on all of the remaining wall space.

Three additional seminar-conference rooms should be provided, each with area of about 300 square feet and with sufficient tables and chairs to enable use by 12 to 15 people. Besides coat racks and book shelves, chalkboards should be mounted on all available wall space.

All of these seminar-conference rooms should be provided with variable intensity lighting (0 - 100%) and with screens for audio-visual presentations.

C. Teaching Laboratories

1. General Chemistry Laboratories

Eighteen General Chemistry teaching laboratories, each about 1550 square feet, are to be provided in the basic Plan C, with an additional two laboratories as a design elective. (Since present enrollment projections do not indicate a need for the 19th and 20th laboratories, unfinished space should be set aside within the General Chemistry area which can later be finished for this purpose, or for other use if the General Chemistry need never develops.) It is essential that the General Chemistry laboratories, together with the other General Chemistry facilities, be designed so that the entire operation can be conducted as effectively and efficiently as possible. The General Chemistry facilities must be located on as few different floors as possible, preferably on just the first and second floors of the new addition (i.e. corresponding to the first and second floors of the present Chemistry Building). The laboratories should be grouped around the supporting facilities - the General Chemistry Office, the preparation/dispensing rooms, and the storerooms. Special attention must be paid to minimizing both student and staff traffic throughout this area.

To maximize the effectiveness of these laboratories and to preclude the necessity of requiring classrooms for pre-lab discussions, the laboratories should be designed as complete functional units. This means that only one section under the supervision of one teacher should occupy one laboratory. The laboratory should be designed in such a way that pre-laboratory discussions, laboratory problem sessions, and experiment demonstrations can all be carried out in the one room. This, too, implies that the room have a capacity of only one section (no more than 24 students) that all the students face one way, that the instructor be given a prominent (preferably raised) demonstration table, that adequate blackboards be provided, and that the student desks be constructed in such a way that one can comfortably be seated for reasonable periods of time.

Some specifications for these laboratories are outlined below:

1. Each laboratory should accommodate at least 24 student stations.
2. Total bench space per student station should equal at least 60 lineal inches.
3. Individual or shared (2 stations) sinks should be provided.
4. One or more larger (e.g. 3' x 4') sinks should also be provided in the room.
5. All benches should face one direction - toward a demonstration table on a raised platform in the front of the room.
6. Utilities should be distributed throughout the benches in such a manner that vision is not obstructed. (Height of utilities or downdraft hoods over the bench top should be no more than 9 or 10 inches.)
7. Downdraft hoods should be provided at each station.

8. Student lockers (16 per station) should be contained within the room, located such that a maximum use of space is made.
9. Lockers should (if possible) be arranged in either an even number of rows or an even number of columns allowing possible simple conversion to double size drawers if instructional requirements were to change in the future.
10. The knee holes in the lab benches should be about 24 inches wide.
11. About 12 to 16 feet of conventional hood space should be provided in each room.
12. Chalkboards should be provided across the front of all rooms at a height above the demonstration table.
13. A 4' x 4' section of cork bulletin board should also be provided in each room, as well as lockable glassed-in bulletin boards outside of all laboratories in the hallways.
14. A reagent bench of approximately 8' x 30" with storage cabinets below should be provided.
15. Storage space for equipment (e.g. centrifuges) should be provided on shelves or in cabinets at the side(s) of the room.
16. Conduit (only) for TV should be provided.
17. Services required at each station include gas, air, tap water, and electricity (110V AC). Distilled water should be available in the room, possibly at the end of each bench.
18. To preserve flexibility, provision should be made for later addition of all normal research laboratory services (e.g. stubbed-off in the utility shafts).

2. Analytical Laboratories

a. Type A Analytical Laboratories

Three rooms are required for Chemistry 224 and 321, each about 1400 square feet. The two courses will share these three rooms, with Chem 224 requiring 16 lab-section-periods per week and Chem 321 requiring 14 lab-section-periods per week, each lab session being four hours in length.

Some specifications for these laboratories are outlined below:

1. Provide at least 20 student stations with about 72 lineal inches of bench space per station.
2. Benches should be designed without a center utility island on top if the benches are two-sided, or such additional depth should be provided on each side of the bench so that large equipment can be accommodated.
3. Modular furniture should be used so that a station can be pulled out if necessary and the configuration of the lab changed without undo difficulty.
4. These laboratories presently require only six drawers per station (because of the large hourly requirements per student), but for future flexibility it is desirable that nine drawers per station should be designed into the benches if adequate sizing can be maintained.
5. Space should be provided for three 18" x 18" x 12" drying ovens or their equivalent and arranged so that heat and fumes given off are exhausted.
6. Twelve lineal feet or more of chalkboards should be provided at convenient locations in the rooms.

7. Hood space should be provided in each room, preferably with a few large (6-8 feet) hoods or, possibly, with down-draft hoods at each station.
8. High capacity electrical services are required (along with high capacity air conditioning to remove the resultant heat).
9. The possibility of piping helium and/or nitrogen to all stations should be investigated and if not possible, provision should be made for using many gas cylinders.
10. Storage space for special equipment should be included around the rooms.

b. Type B Analytical Laboratory

A laboratory room of about 1200 square feet is required for Chemistry 524 and 525L. At a 20 student capacity, Chemistry 524 represents eight laboratory-section-periods per week and Chemistry 525L represents two laboratory-section-periods per week, each session lasting four hours.

Some specifications for this laboratory are listed below:

1. Provide at least 20 student stations with about 72 lineal inches of bench space per station (60 square feet per station).
2. The benches used will be dictated to a degree by the equipment to be placed in the room (which will be specified during preliminary drawings).
3. No students lockers are required in this laboratory, but copious storage facilities should be included (some in benches).

4. Furniture must be modular and removable so that the laboratory can be redesigned with little difficulty.
5. Provision should be made for above average electrical loads.
6. Temperature and humidity control should be provided and be well regulated.

c. Type C Analytical Laboratory

One room of about 720 square feet is required for Chemistry 625L. It is estimated that this room will be in use eight, four-hour laboratory sessions per week. The specifications for this laboratory room are the same as for the Type B laboratory above, except that only eight stations are required and 50% additional space is required per student for the storage and use of large equipment.

3. Glass-Blowing Laboratory

The one course which requires this laboratory is Chemistry 500, which meets for one hour per week formally and the remainder as 'arrange hours'. The room, about 250 square feet, should be equipped with six to ten glass-blowing benches and should be adequately air conditioned to cope with the heat of the torches.

4. Chemistry-Education Laboratory

An area containing about 1500 square feet is required. This area should incorporate areas for laboratory work as found in the typical modern high school, a classroom-library area seating about 25 students, equipment storage areas, and should be adjacent to the offices for the two professors.

D. Teaching Laboratory Service Space

1. General Chemistry

a. Instrument Rooms

i. Type A General Chemistry Instrument Rooms

Type A instrument rooms must be integral with the teaching laboratories and should be shared by 2 labs. These areas should be about 350 square feet for each two teaching labs served. A total of nine will therefore be required (with a tenth as a design elective planned together with the two design elective General Chemistry Teaching Laboratories).

Specifications are as follows:

1. Must be immediately adjacent to labs and allow visual supervision from the lab.
2. Table top space of about 1 lineal foot per laboratory station served should be provided.
3. Cabinets should be placed where possible above and below the table tops for storage of equipment.

ii. Type B General Chemistry Instrument Rooms

Type B instrument rooms are similar to the Type A rooms except that they need not be integral with the laboratory; adjacency or reasonable closeness is satisfactory. In fact, it is desirable that these rooms be entered from the hallway and not directly from the lab. Six rooms of about 350 square feet are required.

iii. Type C General Chemistry Instrument Room

One Type C room of about 600 square feet is required. This room will probably have an attendant and house more expensive and voluminous equipment. It should be centrally located

to serve all General Chemistry laboratories. This room is to accommodate the required equipment and 10-12 students plus attendant at any one time.

b. General Chemistry Preparation/Dispensing Rooms

In order to handle the mass quantity reagent and unknown preparation for the some 6000 students w' . will have a General Chemistry laboratory each week, two preparation/dispensing areas totalling about 2500 square feet are required, one on each floor of General Chemistry laboratories. (Additional space elsewhere may be necessary for storage.) One area should be about 1500 square feet and the other about 1000 square feet. Each area should be located adjacent to the pertinent General Chemistry storeroom to allow for interchange of personnel and/or to allow for the possibility of uniting the two dispensing operations. A large dumbwaiter connecting the two preparation/dispensing rooms should be provided, possibly serving the storerooms as well. It is important that these preparation/dispensing rooms be as centrally located as possible to the General Chemistry teaching laboratories.

2. Analytical Chemistry

a. Analytical Instrument Room

An instrument room of about 600 square feet in size should be provided in a location near to the Type A Analytical Teaching Laboratories.

b. Analytical Preparation Room

A preparation room of about 250 square feet should be located near to the Type A Analytical Teaching Laboratories.

c. Analytical Sample Storage Room

A room of about 200 square feet should be provided for storage of student samples. While location near the Type A laboratories is desirable, students must not have access to the room.

E. Research Space

Plan C calls for 41,897 square feet of new research space, and together with design electives, a total of 47,357 square feet. While this research space was generated for the needs of a number of different types of personnel (professors, postdoctorals, graduate students, and technicians), the Department's intent is that no distinction be made in the specific design of research areas for the various types of personnel. Rather, the research space should be designed in a manner which will maximize flexibility for research in various types of chemistry. While unique features for specific laboratories will eventually need to be specified, in so far as possible, the research laboratories will be characterized by uniform specifications.

Since the present Chemistry Building incorporates a large number of relatively small research laboratories, the new addition should be planned with larger laboratories in mind. As a preliminary estimate, about 10% of the space should be in units of approximately 300 square feet, about 60% in units of approximately 600 square feet, and the remaining 30% in units of 900 square feet or larger.

The typical research laboratory module of 150 square feet should contain four feet of good hood space, 12 feet of modular and removable research benches, a two foot by two foot sink, space for a study desk, and some floor space for special equipment. The specific services to be provided in any particular laboratory will be dependent upon the occupant of that laboratory. However, as much as possible, all research services should be available at minimal

additional cost in all research space in the new addition. These services include gas, compressed air, nitrogen, water, distilled water, soft water, hot water, drains, oxygen, 110 volt AC, 220 volt AC, 220 volt 3-phase AC, and plug-in capability for DC.

All research laboratories should have an entrance which, on infrequent occasions, can admit bulky items of equipment (e.g. 5 feet). A second exit should be provided to all research laboratories which may be in the form of a "crash panel." Wherever possible, research laboratories should be provided with openable windows. Provision should also be made for increasing the air conditioning capacity of any of the research laboratories at a later date at relatively low additional cost, with not more than 20% of the laboratories requiring this additional capacity at any one time. Similarly, later addition of humidity control at low cost should be made possible throughout all research laboratories, limited to 20% at any one time.

Since an increasing fraction of the research within the Department involves the use of large pieces of equipment which are both heavy and extremely sensitive to vibration (even while producing vibrations themselves), something on the order of 15,000 square feet of the research and research service space should be provided on the bottom level of the new addition (i.e. on dirt).

F. Research Service Space

1. Instrument and Electronics Shop

About 2500 square feet, with a design elective of an additional 1000 square feet, should be provided for the instrument and electronics shop. Within this area there should be some moveable partitions installed which will permit the area to be subdivided into specific work areas,

changeable at a later date. This area could well be provided in the basement level of the new addition at the west end.

2. Special Equipment Rooms

About 438 square feet, with an additional 140 square feet as a design elective, is to be set aside in the new addition for special research equipment space. It is possible that as planning progresses, this type of space might be increased by as much as 2000 to 3000 square feet. This would, to an equal magnitude, reduce the research laboratory space provided in the new addition.

The exact magnitude of the area for this type of space will be dependent upon the detailed architectural planning of the new addition and upon the specific assignments of personnel to the new addition. Each of the research divisions in the Department has need for special rooms for their special needs. For example, a number of rooms are needed for analytical and physical chemistry which would have the capability to handle extremely heavy floor loads in addition to providing thorough electrical noise shielding, high-capacity electrical power, and high-capacity atmospheric humidity and temperature control. Additional cold rooms, photographic darkrooms, and special preparatory rooms are needed. Space is needed for special instruments such as nuclear magnetic resonance, infrared, ultraviolet, electron paramagnetic resonance, and mass spectrometry, X-ray diffraction equipment, a small nuclear accelerator, and for optical rotatory dispersion apparatus. Space is also needed for radioactive tracer work, for high-pressure reactions, for research involving corrosive chemicals, as well as darkrooms equipped for research involving polarimetry and photochemical reactions.

To the extent that these areas cannot be built into the present building, they will have to be designed into the new addition. The areas should be adjacent to or in the vicinity of the pertinent research laboratory areas.

G. Office Space

A total of 23,300 square feet of office space, with an additional 875 square feet as a design elective, is to be provided in the new addition. The exact numbers of the various offices together with the square footages per office are detailed in Table 2.

Whenever possible, the 57 offices which will be occupied by permanent senior staff should have windows, and insofar as possible, all other offices should also have windows. The individual clerical offices should be intermingled with the professorial offices in a manner (e.g. no professor more than 100 feet from his secretary) which will facilitate communications and efficiency. Postdoctoral offices, if not contained within research laboratory areas, should be in close proximity to the research laboratories. Teaching assistant offices should be constructed in a manner which would allow their conversion to other types of space at minimal cost at some later date. All offices, with the possible exception of teaching assistant offices, should be intermingled with the research space to maximize efficiency within a research group and maximize flexibility of assignments (i.e. offices should not be located in a special area separate from other areas).

The Departmental Office, which will be included in the new addition, must be given careful consideration as to location. Since a great deal of traffic comes to this office each day both from within the department and from miscellaneous students and other visitors, it should be located as conveniently as possible both to the center of the space occupied by the

department in both buildings and to the entrances to the new addition. Thus, at this point, it seems that it should be located at the extreme west end of the new addition on the floor corresponding to the second or third floor of the present Chemistry Building. If economically feasible, the ideal location would be in the link joining the new addition and the present Chemistry Building. In addition to the department head's office at 190 square feet, the departmental office should include 125 square feet for the office of the clerical supervisor, 600 square feet of office space for a clerical pool, a reception area, three offices of approximately 125 square feet each for administrative assistants, a clerical office of 150 square feet for the secretary to the department head, a conference room of 450 square feet located near to the office of the department head, three clerical offices at 100 square feet each (for the secretaries of the administrative assistants), two division head offices at 155 square feet each, the main office duplicating and work room at 500 square feet, and a suite of offices for the fiscal officer and staffing including 125 square feet for the fiscal officer, a small waiting area, two offices at 100 square feet each for two secretaries, and a small clerical pool office at 400 square feet. If possible, this entire main office complex should be arranged to facilitate communications between all of the people located in this office.

The General Chemistry Office complex should be located within the General laboratory area, convenient to both staff and students. In addition to a clerical pool office of about 600 square feet, this complex should include the General Chemistry workroom at about 250 square feet, a waiting area, a division head's office at 155 square feet, a clerical office at 100 square feet, and a minimum of five professorial offices together with appropriate clerical offices. If possible, a number of the teaching assistant offices could also be located in this complex.

H. Office Service Space

1. General Chemistry Workroom

An area of about 250 square feet is to be planned adjacent to or integral with the General Chemistry Office (see General Chemistry Office description, above). This workroom will house the necessary duplicating machines to produce the voluminous printed materials necessary in General Chemistry.

2. Main Office Duplicating and Workroom

An area of about 500 square feet should be constructed in the immediate vicinity of the Departmental Office (see Departmental Office description, above) to be used for the office machines necessary to duplicate and/or print, collate, and bind various materials. Special attention should be paid to providing proper air conditioning for this room to adequately cope with the heat generated by the various machines.

I. Commons

One area totalling 1400 square feet should be designed for a staff and/or student lounge. The design of this area should be such that it is conducive to relaxation and informal discussion. Special attention should be paid to panelling the walls and carpeting the floor (through private donations if state funds cannot be used) since it is envisioned that this area would also serve as a reception room for the many visiting eminent scientists which the Department hosts weekly.

Of the 1400 square feet, 600 square feet is earmarked for a staff lounge and 800 square feet for a student lounge. However, neither of these areas is adequate for its intended singular use in view of the size of the Department. To help mitigate this problem, the room should be designed as a pleasant appearing whole dividable by a highly soundproof folding partition. (By 'soundproof,' it is intended that confidential faculty conversations should not be overheard in the student area with the partition closed.)

J. Chemistry Stores Space

1. General Chemistry Storerooms

To serve two floors of General Chemistry laboratories, two storerooms are needed with a total of 1200 square feet for the two rooms (they need

not be equally sized). It is absolutely essential that these rooms be located as centrally as possible to the General Chemistry laboratories, since a great deal of student traffic to these areas is a certainty. To minimize blocking of corridors by lined-up students, waiting areas should be provided outside of the storeroom counters.

Since the materials stocked in these storerooms are for the most part unique to General Chemistry, these storerooms should in no way be designed to serve research needs. A good sized dumbwaiter system should be provided which will permit transfer of materials between these storerooms as well as from other storerooms to these storerooms, with a terminal on the floor corresponding to the basement of the present building, hopefully in the area set aside for storage of glassware and other bulk Chemistry Stores materials.

2. Pyrex Warehouse

To replace the present dispossessed pyrex area, an area of about 2000 square feet, with an additional 500 square feet as a design elective, should be designed in the new addition on the level corresponding to the basement of the present Chemistry Building. This area should be located convenient to the loading dock planned for the east end of the new addition and should provide adequate entrances and proper design for the rapid transfer of materials to the Chemistry Stores system in the present building.

3. Research Storerooms

To serve the research laboratories, two storerooms totalling 1200 square feet, with a design elective of another adding 600 square feet, should be provided in the research areas of the new addition. These

rooms should be serviced with a dumbwaiter or other freight transfer means between areas as well as to the General Chemistry storerooms and to the pyrex storage room.

PART II - AUDIOLOGY AND SPEECH SCIENCES

In Table 1, Part II, the additional space to be constructed for the Department during the period through 1980 are presented. Overall, a total of about 15,000 square feet of assignable space is the minimum requirement to sustain the Department to 1980.

A. Teaching Laboratories

1. Undergraduate Clinic Report Lab

This room should be about 16' x 20' to 20' x 20' in size and should contain lockers with combination or key locks on both side walls and coat racks on both sides of the door. The room will be used by undergraduate students in writing clinical reports using records which connot be taken from the area. Workshelves should be provided on each side of the room with adequate lighting under the lockers. The room should be equipped with writing tables, a chalkboard and a corkboard.

2. Graduate Teaching Lab

Two 20-station graduate teaching laboratories should be constructed in some adjacent manner so that 5 or 6 individually treated sound rooms can be shared. Each room should be about 17 feet wide and 26 to 30 feet long. Standing height workbenches should be installed along the two longest walls and as a center island. A two foot deep storage shelf should be provided above all wall counters. Each bench should be serviced by a separate 20 amp electrical circuit with a plug strip the full length of the table. Storage drawers should be provided below the benches within each three foot section and knee hole space of about 20 to 24 inches should also be provided. An instructor's table should be located at one end of

the room and be equipped with 20 amp electrical service, 100 psi air line and storage cabinets below. A pull down projection screen, fourteen feet of chalkboard, and pull down corkboards for mounting charts are to be installed. However, a more satisfactory alternative might be horizontal sliding chalkboards with a corkboard mounted behind. All floors should be tiled.

The 5 or 6 individually sound treated rooms should be about 5 feet wide by 7 feet long and treated for noise reduction from all directions as follows:

37.5 - 75 HZ	30 dB
75 - 100 HZ	45 dB
150 - 300 HZ	60 dB
300 - 600 HZ	75 dB
600 - 1200 HZ	80 dB
1200 - 2400 HZ	80 dB
2400 - 4800 HZ	80 dB
4800 - 9600 HZ	80 dB

It may be desirable to use portable sound treated rooms of the Industrial Acoustics Company type for this purpose.

B. Research Space

1. Research Laboratories

Space must be made available for staff research projects that are independent of thesis research. Since the graduate teaching faculty will be hired in part on the basis of their own research competency, time will be programmed for them to continue their own research. It is assumed that, on the average, four staff members can share a single laboratory of 200 square feet. For staff members assigned primarily to research, it is assumed that on the average one 200 square foot facility would serve two researchers. On this basis, the additional 1980 laboratory requirements (at 200 square feet per laboratory) would be 10 laboratories or 2,000 square feet.

Graduate thesis research activities are in progress at all times for approximately 28 percent of the graduate enrollment. Of this portion of the graduate enrollment, 20 percent of the projects will be directly related to on-going staff research and will use the same space as that assigned to the regular staff. For the remainder, it is estimated that, at most, an average of four students can be expected to share a 200 square foot laboratory space. This projection requires 1980 room assignments which generate a need for 7 new 200 square feet graduate research laboratories for a total of 1400 square feet.

Three types of research laboratories (200 sq. ft. each) are required (Types A, B, C). Each lab should have independent 3 wire 20 amp service through a full length plug strip 18" off the floor running the entire length of one of the longest walls. All rooms should be grounded to independent earth grounds. Hall doors should be of the noise reduction type (Riverbank Labs type).

Type "A" rooms (four required) should include IAC 1200 series sound room or equivalent, air line for 100 psi, a wash basin and R.F. shielding throughout. Type "B" rooms (twelve required) should include 100 psi air line and roughed-in plumbing for a wash basin. Type "C" rooms (two required) should include desk height tables along both walls. Two low and two high impedance outlets are needed along the wall side of the table every 30 inches of desk length. These lines are to be terminated at a panel in an adjacent type "B" room. Removable partitions two feet high every 30" of desk length should be installed for listening carrels. There should be 16 stations in each type "C" room. All rooms should be equipped with a 4' x 6' chalkboard and a 2' wide x 4' high corkboard.

2. Dental Research Labs

This room should be about 200 sq. ft. in size with a darkroom at one end. The darkroom need not be specifically treated for sound. A curtain over the passage to the darkroom will be sufficient. In the main room, standing height tables should be installed along the longest walls with storage cabinets above. An air line at 100 psi, a wash basin, and R. F. shielding are also required.

C. Research Service

1. Equipment Issue Room

In order to support the research, clinical and instructional programs, additional shop space will be required for maintenance, issue, and storage of equipment. It is estimated that 400 square feet will be needed for these purposes. This room should contain about 14 feet of modular benches for equipment maintenance with a wall mounted shelf above the bench. Electrical service is to be 220 and 110 volt at 30 amps and DC supply variable up to 200 volts. About 12 feet of cabinets or shelves for paper supplies and small parts should be provided. About 60 lineal feet of built-in floor-to-ceiling storage shelves are required. An issue counter with files space below should be installed in one corner of the approximately 20' x 20' room. Storage areas and issue counter should have electrical outlets forged separately from work benches. An additional 200 sq. ft. is specified as a possible design elective.

2. Television Complex

This complex is a group of two adjacent rooms designated as a TV studio lab (200 sq. ft.) and a TV control and storage room (240 sq. ft.).

The hall door to the studio lab should be sound treated (Riverbank Labs type). A three foot by eleven foot sound treated (three layer) one-way observation window should be installed between the studio lab and the control room. Coaxial cable should lead from a terminal panel in the control room to all clinical and laboratory rooms and to the studio. Variable light control should be provided in the studio with provisions for overhead spot lights. Provision should be made for temperature control in the studio when taping. All specifications for this complex should be checked with the appropriate campus television specialists.

D. Clinic Space

1. Clinic Rooms

The clinical training portion of the Department program will grow at the same rate as the enrollment in the undergraduate and graduate program. The space required for this activity is planned on the basis of 70 per-cent room usage on a 40 hour week. It appears that one-third of the graduate students in the program at any time will need 10 hours per week of clinical training and that one-fourth of the undergraduates will require 6 hours per week and an additional one-fourth of the undergraduates will require 2 hours per week. On this basis, the total-number of clinical rooms required in 1980 will be 37 or a net need for 14 new rooms of 60 square feet and 2 new rooms of 120 square feet each. An additional 1080 sq. ft. is specified as a possible design elective.

2. Parent Consultation Rooms

Four parent consultation rooms with a one-way glass and common obser-vation area should be provided. The consultation rooms should be about 8 feet wide by 10 feet long. The windows from the observation room

to the consultation room should be 2'6" x 5' one-way glass. There should be an intercom from each room to the observation area with four phone jacks to each room. Storage cabinets should be built in above the window and will also conceal the microphone. Except for their size, the clinical rooms of 60 sq. ft. and 120 sq. ft. each have the same specifications with the addition of a built-in desk height table along the window wall of each clinical room. All observation spaces should be a minimum of four feet wide and as long as the adjacent clinical room.

3. Observation Areas

An estimated 540 square feet have been allocated for observation rooms. See parent consultation rooms above.

4. ENT Examination Room

The Ear Nose and Throat examination room should be about 120 sq. ft. in size and be equipped with a wash basin and a 100 psi air line.

E. Office Space

1. Staff and Grad Assistant Offices

Office space must be made available to replace laboratories and clinic areas now being used to house staff and to provide for expected new staff which will be required to support the instructional, research, clinical and public service responsibilities of the department. A total of about 32 new staff offices, a minimum of 100 sq. ft. each, should be provided.

Office space is required for graduate teaching and research assistants at a ratio of one 120 sq. ft. office for each 3 teaching assistants or each 4 research assistants. Eighteen such offices are required to house 36 teaching assistants and 24 research assistants. Two 120 sq. ft. offices should be provided for the Staff Psychologist and Staff Social

Worker. Therefore, fifty-two 120 sq. ft. offices should be provided.

2. Clerical Offices

Two additional offices of about 120 sq. ft. each should be provided for the clinical clerical staff. An additional 240 sq. ft. of clerical office space is specified as a design elective.

3. Clinic Records Room

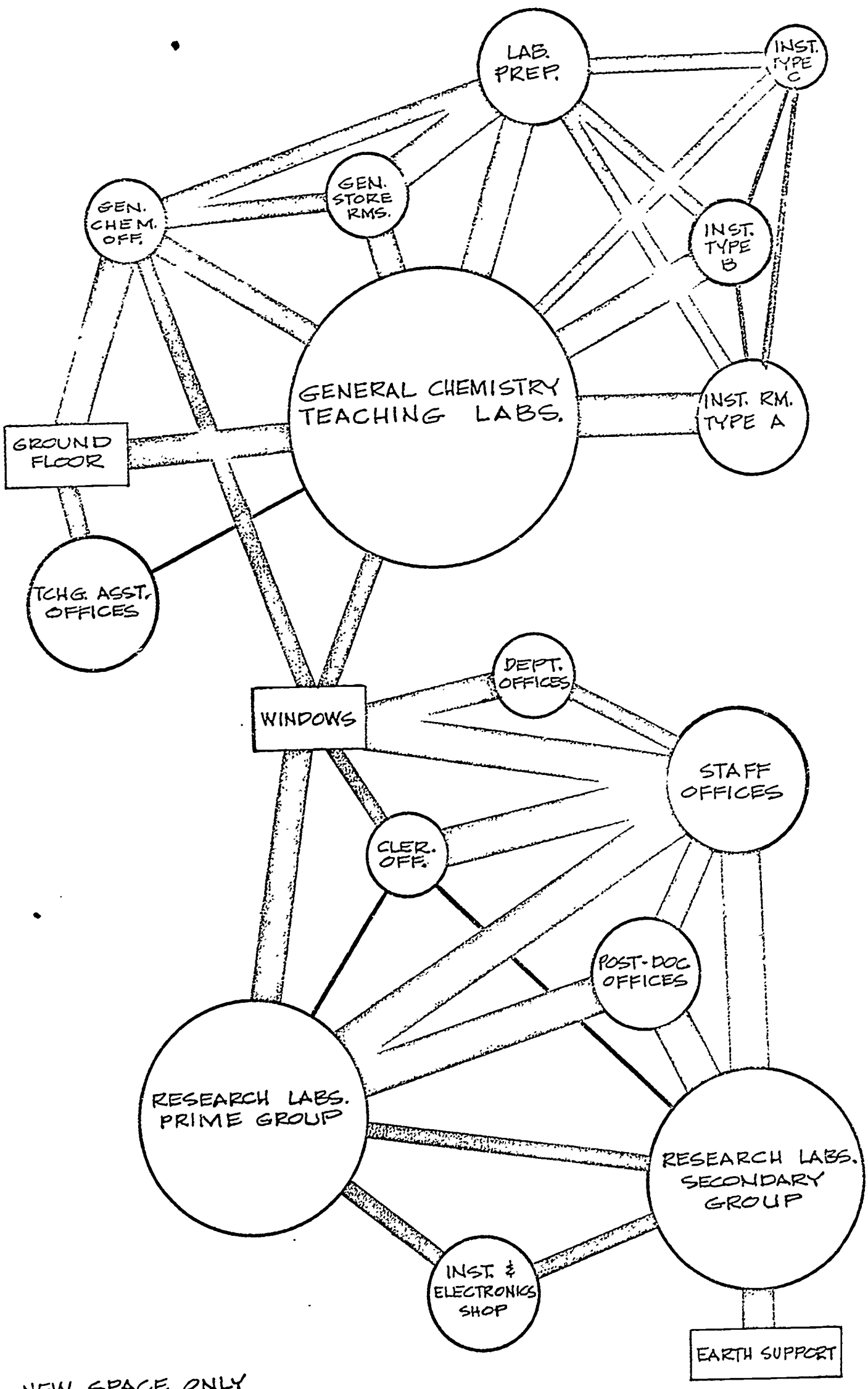
A room of about 240 sq. ft. should be provided to house departmental and clinic records. This room should be located close to the clinic areas as well as the main office.

F. Library Space

A departmental library of about 300 square feet or more, as specified by the design electives, should be constructed as close to the present main office area as possible. However, if reductions must be made because of design considerations, this should be the first area to delete.

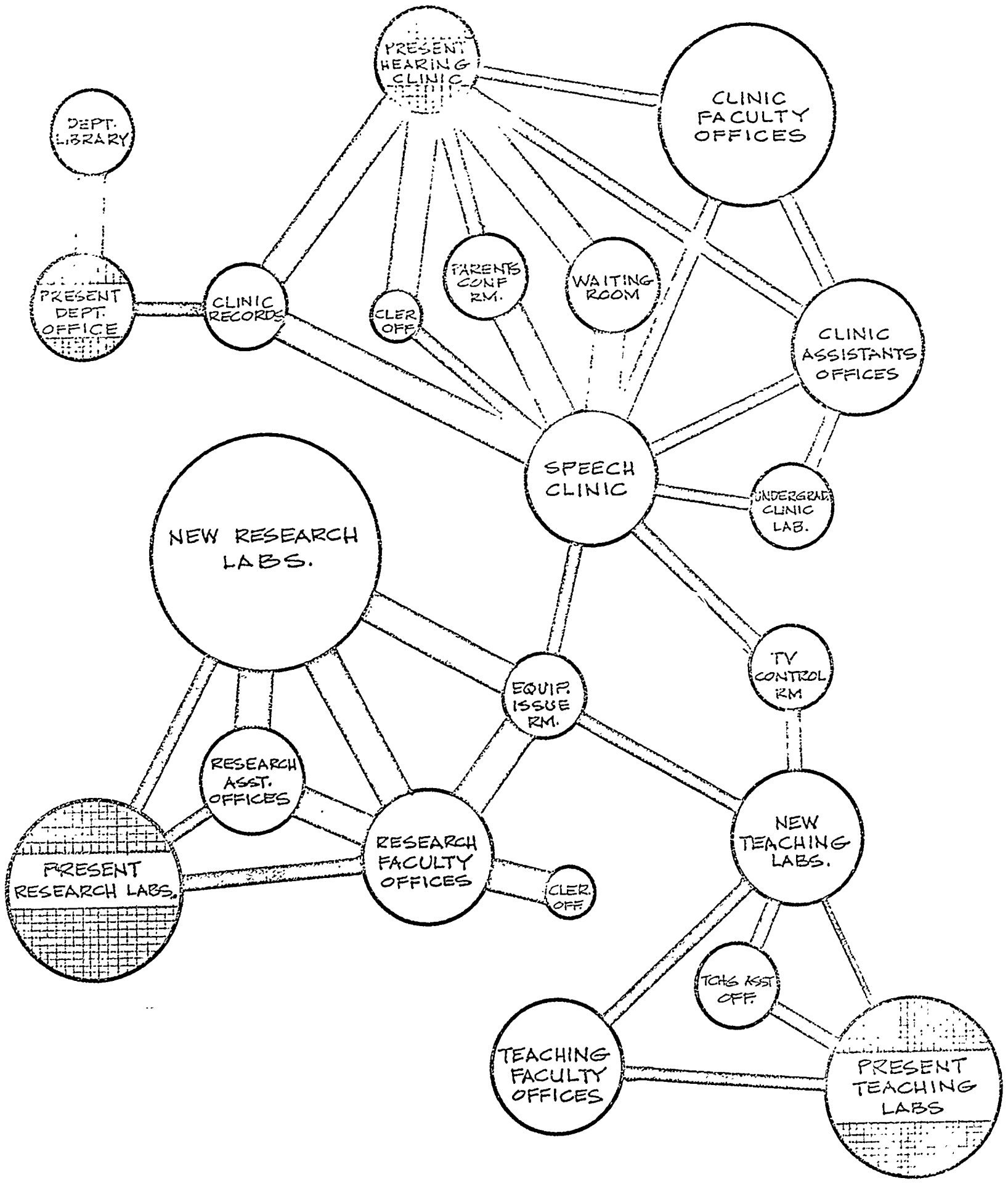
V. FUNCTIONAL RELATIONSHIP DIAGRAMS

FUNCTIONAL RELATIONSHIP DIAGRAM
CHEMISTRY DEPT. - PLAN C



NEW SPACE ONLY

FUNCTIONAL RELATIONSHIP DIAGRAM
AUDIOLOGY AND SPEECH SCIENCE DEPT. - PLAN C



PRESENT AND NEW SPACE