Presentation on the Chemical Sciences Building

to the Campus Planning Committee

(January 27, 1971)

The Chemical Sciences Building is to provide 80,612 NASF of space for the School of Chemical Sciences. It is to be constructed as an addition to the East Chemistry Building on the corner of California Street and Goodwin Avenue as shown in the site layout given in Appendix I. The project will provide new and expanded space for several of the School's programs and functions as outlined in Appendix II. There one sees the distribution of space in the building for the various operations involved. It should be noted that 24,000 NASF of space in the project is non-Chemistry space (library, classroom, and commons areas). Upon completion of the project, about 35,000 sq. ft. of space will be vacated in Noyes Laboratory for reassignment by the College of Liberal Arts and Sciences. Thus, the proposed building will provide a modest expansion (~20,000 NASF) in the space assigned to the Chemical Sciences and will also provide 35,000 NASF for other areas in LAS which are experiencing space deficiencies.

There are several factors which make it imperative that the proposed Chemical Sciences Building be funded and constructed as soon as possible. The basic reasons are that most of the functions planned for the project are currently housed in space that is inadequate in terms of quality and unsuitable in terms of location. These functions are located in Noyes Laboratory which is a structure whose parts date back seventy and fifty-five years, respectively. Although some areas in Noyes Lab have been remodeled (most recently for research in inorganic chemistry), the bulk of that building is simply outdated as far as modern-day instruction and research in the chemical sciences is concerned. In particular, the oldest part of the building (from 1902) is of wooden construction and a fire hazard;

the utilities system is grossly inadequate and ventillating and hood ducting is scarce and ineffective. In addition, many of the rooms are of the wrong size and shape and are improperly furnished to accommodate the highly instrumented set-ups that characterize current practice in physical chemistry. Some feeling for the nature of this problem can be gotten from the photograph in Appendix III. This shows room 125 Noyes Lab before it was vacated by organic chemistry several years ago.

The poor utilities systems in this room are evident by the old-fashioned lighting and the presence of drop cords and plastic tubing throughout the room. The design of the lab benches and their locations and the absence of air conditioning make it difficult to house instruments in this room. Also, the absence of a chemical hood further limits the use of the lab. In order to make space like this functional in terms of the needs of the 1970's, it would have to be completely stripped to the walls and new utilities, air conditioning, and lab furnishings would have to be installed. Although some work of this nature has been done, about 20,000 sq. ft. of laboratory space in Noyes Lab is still in a similar state. The poor quality of our Noyes space has limited both the instructional and research programs in the School and has been a source of difficulty as far as staff retention and recruitment go. In fact several of our best faculty in physical chemistry and chemical physics are still here because of our plans for new space for them.

Another aspect to consider is the need for future expansion. Although the school now has roughly the amount of space that it generates in the orange-book type of space calculations, more than 20,000 NASF are either completely useless or nearly so for our needs. Moreover a sizeable deficit can be expected in the future (a 60,000 NASF deficit by 1976, excluding library space, according to the orange book). We have kept our graduate

enrollments fairly constant at about 420 during the past seven years, seeking to improve quality rather than quantity. The last appreciable overall change was in 1963-5 when, in connection with the addition to East Chemistry, enrollments were increased from 370 to the present 420 figure, a 10 to 15% increase. However, undergraduate enrollments have continued to increase, especially in our advanced undergraduate courses, and although science in general appears to be having economic problems at the present time, we believe that the graduate programs in the Chemical Sciences at Illinois should grow by at least a modest 10 to 20% in the 70's.

Chemistry is central to much of what goes on in the life sciences, the medical sciences, and the environmental sciences. As these other areas grow in the future of this campus, the Chemical Sciences will need to grow also. As the economy of the country recovers, we expect that the chemical industry will again be in need of an expanding number of chemists. Indeed, a recently released study of manpower needs in 1980 by the U. S Department of Labor predicts a 56% increase in needs for chemists by 1980 and a significant shortage of trained chemists by that time. (The results of this study are summarized in Appendix IV.)

In addition to these general factors favoring the construction of the Chemical Sciences Building, additional specific justification can be presented for the various components of the project. The center of gravity of the School's activities has shifted towards the East Chemistry block, and it has become essential to bring the School's library, service facilities, offices and advanced instructional labs over from Noyes Lab to the block and re-establish the day-to-day interactions which contribute so greatly to the vitality and success of any endeavor. This is not only a matter of convenience and efficiency as far as the staff is concerned. This will also permit modest expansion and a tremendous increase in

quality in the space used by the service laboratories and shops. (These are such labs and shops as the machine shop, the electronics shop, the computer center, the glassblowing shop, and the mass spectrometer lab.)

The instructional labs that are involved are used for the main sequence of laboratory courses taken by science majors of several persuasions following the freshman year. These "core" labs are now located on different floors at opposite ends of Noyes Lab and also in the East Chemistry addition. A more centralized location in somewhat larger quarters is needed. The courses involved have been recently inaugurated and they represent a new approach to teaching chemistry at the undergraduate level, which is more in tune with what chemistry is today and will be tomorrow. The courses are heavily instrumented and require a wide variety of facilities. The economics of the situation require a large amount of equipment sharing between these courses which can be done efficiently only if they are located near one another. Again, much of the existing space in Noyes Lab is of poor quality and lends itself only marginally for use in this new and important instructional program.

The assignment of space in the new building to the graduate research program in physical chemistry (and chemical physics) recognizes that this area of the School is the most hardpressed in terms of existing facilities. The program in physical chemistry is restricted more than any other part of the School by the inadequacies of Noyes Lab. It has also become cramped for space due to a continued growth over the past several years (from 65 in 1965-66 to 100 in 1970-71). In addition the central role of this area in chemistry makes it highly desirable that it be located on the East Chemistry block in order to strengthen interactions between the physical chemists and those in other areas, particularly organic and biochemistry. It is through such interactions that much of the frontier work in the chemical sciences evolves.

The space assigned to the School library will make it possible to remove the scandalous condition of our current library which is located in Noyes Lab. The library currently occupies 4,726 NASF of space. An Office of Space Utilization calculation shows that about 15,000 NASF is needed now, a need which will expand further. Probably the worst features of our current library are that it is located a block from its most avid users and that the reading room facilities are totally inadequate, both in terms of size and in the lack of carrels. Appendix V shows a picture of the main reading area in the Chemistry Library which is about half of the reading area now available. When one considers that over 400 graduate students, 65 faculty, 60 postdoctorates, and several thousand undergraduates should have access to the Chemistry Library, the lack of facilities is quite evident. Our "solution" to this lack has been to restrict the use of the library to those using the journals, a "solution" that is highly undesirable.

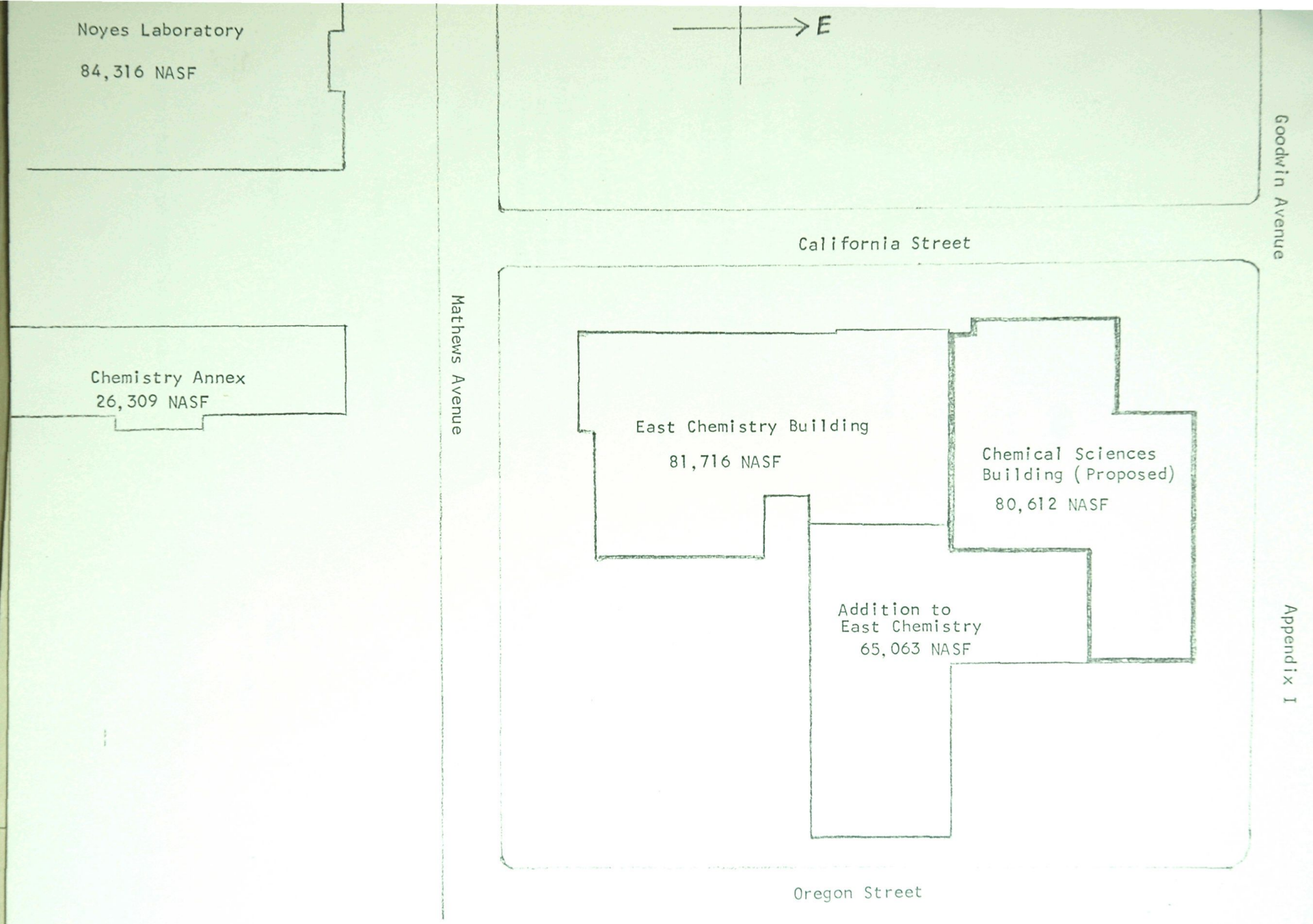
The inclusion of commons space and a large seminar room in the program recognizes the current lack of these facilities in chemistry.

In summary, the construction of the Chemical Sciences Building will permit the School to remedy many of its worst current space deficiencies and provide for some modest expansion. And, finally, a significant part of the expansion will involve programs related to the chemical aspects of environmental problems. The School is already involved in this area as evidenced by a recently held national symposium on this campus on analytical aspects of environmental work and by the recent nationally televised appearance of Professor Wood concerning mercury polution. Two new seminar courses on the environment are being given this spring and, hopefully, will evolve into at least one new regular course offering. Also, a major effort is being made to revise one of the advanced undergraduate laboratory courses to gear it towards environmental problems. The central nature of chemical phenomena in our interactions with the environment makes it certain

that the School of Chemical Sciences will become even more involved in this important area in the future.

Chemical Sciences Building

Appendix I - V


Noyes Laboratory
84,316 NASF
E
Goodwin Avenue
California Street
Mathews Avenue
Chemistry Annex
26,309 NASF
East Chemistry Building
81,716 NASF
Chemical Sciences
Building (Proposed)
80,612 NASF
Addition to
East Chemistry
65,063 NASF
Oregon Street

Appendix I

Chemical Sciences Building

Distribution of Space by Function

School Administrative and Business Offices	4,490	NASF
Seminar Room	1,500	
Commons Area	3,472	
School Service Labs and Shops	14,000	
Department of Chemistry Undergraduate Instructional Labs	8,950	
Physical Chemistry Offices and Research Space	27,710	
School Library	18,690	
Replacement Space (to replace losses in existing structures due to joining with the new building)	1,800	
TOTAL	80,612	NASF

Distribution of Space by Assignment

School of Chemical Sciences Space	56,950	
General University Space (Seminar Room and Commons)	4,972	
Library Space	18,690	
TOTAL	80,612	NASF

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Space to be vacated in Noyes Lab ~ 35,000 NASF

Appendix III

View of room 125 Noyes Laboratory before it was vacated by organic chemistry.

Summary of a recently released U. S. Department of Labor study on employment prospects in major professions in 1980. (From U. S. News and World Report, page 26, January 25, 1971.)

Profession	Employed in 1968	Anticipated Demand in 1980	Per Cent Increase	Estimated Supply in 1980
Physicists	45,000	75,000	64%	
Chemists	130,000	200,000	56%	
Physicians	295,000	450,000	53%	"Significantly below requirements"
Dentists	100,000	130,000	32%	
Dieticians	30,000	42,100	40%	
Counselors (school, lab)	71,000	107,000	50%	
Engineers	1,100,000	1,500,000	40%	"Slightly short of requirements"
Geologists, geophysicists	30,000	36,000	21%	
Optometrists	17,000	21,000	24%	
Architects	34,000	50,000	47%	"In balance with requirements"
Lawyers	270,000	335,000	23%	
Pharmacists	121,000	130,000	7%	"Slightly above requirements"
Mathematicians	70,000	110,000	61%	
Life scientists	168,000	238,000	41%	"Significantly above requirements"
Teachers, elementary and secondary	2,170,000	2,340,000	8%	

Note: Employment figures rounded; percentage increases based on unrounded figures.

Appendix V

Reading room in the Chemistry Library.