The architecture of ROTC:

A historical overview and proposal for the next generation at ISU

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CHAPTER 1. INTRODUCTION

Many high school graduates compete for ROTC (Reserve Officers' Training Corps) scholarships in the United States. Highly capable students are awarded ROTC scholarships, and through the scholarships, these students are well educated in colleges and universities. The recipients serve for four years in the military after they graduate. The association between the military services and institutions of higher education has been represented on campuses by the ROTC program. Continuation of the program has relied on its usefulness to the nation and its acceptance by higher educational institutions (Report of the Special Committee on ROTC, 1969).

Institutions were required to offer military training as a part of their curriculum under the terms of the Morrill Act of 1862, which created Land Grant Universities (Malpass, 1985). Because Iowa State University (ISU) is a Land Grant University, military education has been a part of the curriculum here. The university has accepted the fact that when the country is at war, the college will devote its resources, including facilities, staff, and programs, to the war effort.

Although each ROTC host institution has adopted the ROTC program as an integral part of its curriculum in line with federal law, the program has been a peripheral entity in the academic programs of the institutions (Report of the Special Committee on ROTC, 1969). On many campuses, ROTC units are housed in shabby facilities and receive insufficient support service. Because of small enrollments, increasing costs, and limited resources, many institutions have difficulty offering adequate space and support services to the ROTC units.

The attitude toward having ROTC on campuses varies. Many institutions have been strongly supportive and have integrated the ROTC programs with other

aspects of college education (Smith, 1985). On the other hand, others have been skeptical of ROTC's function of soldiering college students in a free society (Smith, 1985).

In September of 1969, the "Report of the Special Committee on ROTC to the Secretary of Defense" was published. The Special Committee on ROTC considered ROTC in light of the rapidly changing American higher education scene. The Committee considered alternative ways of providing officer education and supplying officers to the military. They considered expansion of existing service academies, establishment of off-campus metropolitan centers, development of summer education and training camp programs, and commissioning by direct appointment.

The Special Committee concluded that it would be better to continue supplying officers to the military service through ROTC programs rather than by expanding existing service academies. Producing officers costs five times more through service academies than through ROTC or Officer Candidate School (OCS). Furthermore, the academies are not easily expanded or contracted to meet growing or decreasing military needs, as higher educational institutions are. The expansion of military academies also implies development of college and university programs. In contrast, a large number of qualified young people are available as officer cadets on campuses. ROTC has the additional advantage that it will maintain interaction between highly motivated military teaching staffs and civilian-oriented faculties.

The Committee also considered replacing the ROTC programs with Officer Candidate Schools (OCS). All of the military services maintain OCSs, which are useful for meeting rapidly expanding needs for officers. Their courses are brief and can be easily staffed. However, all three military services believe their long-term

chances of securing high quality officers are better with ROTC, because the extended contact between ROTC officer instructors and ROTC cadets on campus for two to four years provides real educational depth to the ROTC officers.

Furthermore, the Special Committee decided that off-campus centers are not as suitable for producing commissioned officers as ROTC is. In France, university students can be commissioned in the armed forces by attending off-campus centers for a number of weekends and by participating in a summer camp, a program that is similar to the U. S. ROTC summer camps and summer sea cruises. However, American colleges and universities are located in both metropolitan and rural areas. Students have difficulty finding transportation to attend the off-campus centers and camps of the three services. Moreover, the off-campus military institutions do not blend civilian and military aspects of education as ROTC does.

The Committee agreed that ROTC is better than summer education for commissioning officers. The U. S. Marine Corps has a summer program to train junior officers; college students attend two summer camps, and when they graduate, they can be commissioned in the Marine Corps. However, the program does not attract enough officer candidates. The program lacks the important officer-cadet contact on campus that the ROTC program provides.

The Special Committee chose ROTC rather than direct commissioning for officer procurement. Although each of the services commissions certain people with special qualifications, and direct commissioning is useful, it is not enough for general officer procurement because of an insufficient number of qualified people.

Another advantage the Special Committee identified of maintaining the ROTC program is that the program has a blend of civilian and military studies, so that there are continuous contacts between the military staffs and the students; not only do these contacts offer proper guidance of the students' military experiences,

but they also allow continuous observation of students' leadership potentials. Continuous contacts between students and military staffs maintain the students' interest in the military.

In conclusion, the Committee considered various officer procurement methods, and recommended that the ROTC program be continued as a major source of officers for the three services.

In addition to the Special Committee's recommendation that ROTC be maintained on campuses, there are other important reasons why ROTC should stay on campuses. The ROTC programs continue a unique American tradition of strong civilian participation in and influence on the military. The American people have supported the principle of organization that keeps the armed forces under civilian control (Report of the Special Committee on ROTC, 1969). If there were no ROTC programs on campuses, there would be a great danger of separating the services from the intellectual centers of the public. Colleges and universities are also responsible for playing an important role as part of the national defense (Report of the Special Committee on ROTC, 1969).

ROTC will continue to provide officers for the active and reserve forces. Its continuance on college and university campuses is important to the national interest.

Statement of objectives

This study is concerned with the design refinement applied to design of the ROTC facilities at Iowa State University (ISU). The intent is to research and evaluate the environmental requirements of the military science program, on campus and off-campus, including the national scene. The primary objective is therefore to consider ways of meeting the needs of the best possible military officer

production program at ISU. This research will address the direction that military education at ISU could take through its future facilities.

The thesis begins with an overview and historical survey of military education at ISU both on and off-campus. Existing military educational facilities at ISU and throughout the United States are then analyzed. The research will be accomplished by use of interviews, questionnaires, and acute observations of the military educational buildings.

Thus, the study determines what design factors constitute a successful facility. By analyzing existing military facilities on campuses throughout the U. S., an initial design methodology will be incorporated into the final design.

This research will include the Long-Term Plan of the Department of Defense for ROTC in the future. The study will then develop a final design for the military science building at ISU. The final result, in short, will be the design of the new ROTC facility.

CHAPTER II. MILITARY EDUCATION AT IOWA STATE UNIVERSITY: A CONCISE HISTORY

A brief chronological review of the Military Science program at ISU and on the national level will be given to provide a better understanding of the growth and changes of military training at Iowa State University in Ames, Iowa. This background will assist in understanding the University's current and future relationship with the Reserve Officers' Training Corps (ROTC). Most of the information about military training at ISU is taken from *the Iowa State Daily* and from James Leftwitch Lee Jr.'s dissertation, *A Century of Military Training at Iowa State University 1870 - 1970* (1972).

Overview

The American tradition of the citizen's army is rooted in the birth of the nation. The Land Grant Act of 1862 provided for military training at colleges and universities in response to the North's lack of trained leaders during the Civil War. Subsequently, one Land Grant University, Iowa State University, had a successful military education program through the efforts of an Army Professor of Military Science and Tactics and with the cooperation of school administrators. The college was later mobilized to support the services with wartime programs during World War I and World War II. After World War II, these programs developed into the Navy and Air Force ROTC programs. They faced difficulties at the time of anti-war sentiment during the Vietnam War and when the draft was abolished in 1972. The Department of Defense then increased ROTC scholarships, making the programs more competitive as well as essential to the defense of the United States as a peacekeeper.

This chapter will focus on the major events underlying the evolution of today's ROTC programs. The intent is not to explain the political and military events, but to present brief comments on important events that influenced ROTC's history and its metamorphosis that will influence the planning and design of ISU's military science building.

To understand ROTC's history and the evolution of the role of ROTC at ISU, we must consider the origin and history of Land Grant College and University military education. During World War I and II, an important role in the Allied Forces' victory was the mobilization, by the U.S. armed forces, of colleges and universities that included ROTC programs. Through the Korean War and the Vietnam War, the U.S. Armed Forces continued to develop with ROTC. Thus programs at ISU have been closely linked to the American armed forces throughout modern history.

The ROTC programs at ISU have been pioneers in successful military education through the efforts of early Professors of Military Science and Tactics and the support of the College and University administration. The Military Education program at ISU has been important to the nation's history as well as to the history of the college curriculum.

The national scene (the tradition of an American citizen army)

The idea of a citizen's army is in the American tradition and can be traced to the early political development of the United States. Captain Alden Partridge, a former superintendent of the United States Military Academy, first prescribed military studies in the curriculum of American education when he founded a military academy (now Norwich University at Northfield, Vermont) in 1819. Before the Civil War, it was rare for American colleges and universities to have military training. At the start of this war, the South had famous military schools such as the Virginia

Military Institute (1839) and the Citadel (1842). During the Civil War, the North, unlike the South, was short of trained military leadership. This directly influenced the inclusion of military instruction as a curriculum choice in the Land Grant Act of 1862. This act (the Morrill Act), sponsored by Justin Smith Morrill, provided for military instruction on colleges and universities by making a single reference to military instruction;

> The leading object shall be, without excluding other specific and classical studies, and including military tactics to teach such branches of learning as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life (Lee, 1972, P. 4).

The phrase "including military tactics" provided for federal support of military education. The federal government decided to promote military education at colleges and universities instead of establishing more military and naval academies.

The Morrill Act did not provide federal assistance for the military courses to be taught in the colleges, however. Each institution conducted its military training by its own concepts and in its own environment, without the federal government's decisions regarding whether military instruction was required or not. The duration of courses, class hours per week and content of instruction varied between institutions (Lee, 1972).

Although the Iowa Agricultural College (IAC) was founded on March 22, 1858, it did not begin instruction until 1869. On September 11, 1862, Iowa became the first state to ratify the Morrill Act when it accepted its provisions in the special session of the Ninth General Assembly of Iowa. Military training at IAC was

considered so important that a professor of Military Training was hired in early 1870. The college offered military education to its students one year later (Lee, 1972).

General Geddes and the early years 1870 - 1910

Military training was an accepted part of the curriculum at the Iowa Agricultural College because the college was a Land Grant institution. The academic atmosphere at the college was not appropriate for military training, which traditionally emphasized the discipline of mind and body. Therefore, the first Military Department at the Iowa Agricultural College was established in pursuit of meeting the provisions of the Morrill Act within U. S. Army regulations.

The first professor of Military Tactics and head of Military Training, James L. Geddes, is most noted in connection with the launching of military instruction at the Iowa Agricultural College from 1870 to 1882. Though there were no clearly defined objectives or syllabus, General Geddes began the military program with the intent of carrying out the principles of the Land Grant Act. He offered courses in military engineering, military tactics, and military law.

During the first term (1870) of military training, all able-bodied male students took part in college battalion drill once a week. A class of 45 students received instruction three times a week in the military science school. Nineteen sophomores received instruction in field artillery for three one-hour sessions per week.

In 1870, Congress authorized the War Department to issue small arms and artillery pieces to the Land Grant institutions and military colleges (Lyons and Masland, 1959). The arms were given to the IAC through the efforts of Professor of Military Tactics Geddes.

As college enrollment grew, the Military Tactics department also expanded. General Geddes reported that all male students had military training and one-fourth of them had taken advanced officer training as well. A new branch of military instruction (gunnery and ordinance) was added to the original three (military engineering, military tactics, and military law). Gunnery and ordinance covered the theory of projectiles, siege, artillery and mortar practice (Lee, 1972).

The IAC unit was as well-armed as any of the Iowa National Guard units, and the college militia company was listed along with the other 25 units of the Iowa State Militia. All these achievements were made possible by the efforts of General James L. Geddes (Lee, 1972).

The IAC was effective in providing military training compared to other Land Grant Institutions. The IAC hired a civilian, General Geddes, who had experience as a military officer, who was paid by the College for the first 45 years that military training was offered. Most other Land Grant Universities had active duty officers from the U.S. Army to fill the Professor of Military Science and Tactics position. Moreover, many institutions had rapid turnover of personnel, which caused a continuing problem of maintaining an efficient and effective program (Lee, 1972). For example, the University of Nebraska, which opened in 1871, did not have an instructor of military tactics until 1876. The University of Minnesota started its military training in 1869 under retired Major General Richard W. Johnson and dropped it when General Johnson resigned in 1871 (Lee, 1972). Failures such as this were mainly due to lack of adequate instruction. Unlike these universities, the IAC had a successful military training program under General Geddes.

After General Geddes, the second head of military training at the IAC was Colonel John Scott. He had little impact on the military training program, which he instructed from 1882 to 1884. The third Professor of the Military Department at IAC,

Captain James Rush Lincoln, came in 1884. The early 1890's were boom years for the Military Department under Captain (later General) Lincoln.

The military's training and discipline requirements were generally recognized as desirable factors in education at the IAC. In fact, women's interest in military drill increased so that a third company was formed. Studies and lectures in Military Science were extended to include infantry, artillery, and signal tactics. Military training was required of all male students at IAC during their first two years of study. Wednesday and Friday afternoons were traditionally reserved for military drill. A class in the evening was open to all who wanted to attend the voluntary portion of the military training (Lee, 1972).

The Military Department had special events in which students could participate, including annual inspection, drill competitions, guard duty at the Iowa State Fair, sham battles, and the officers' reception. A considerable part of the remarks during the officers' reception ceremony dealt with the necessity of military training in college. This attracted considerable attention to the Military Department on the IAC campus (Lee, 1972).

The national scene 1900 - 1916

The Government took a particular interest in military training on college campuses during the early 1900s. At the Land Grant Convention in 1903, Dean Edward Orton Jr. of Ohio State University presented a paper entitled "The Status of the Military Department in the Land Grant Colleges" (Pollard, 1964). In this presentation, Orton pointed out the advantages for colleges and individuals of proper military training but said that colleges did not carry out the intent of the Morrill Act. He then proposed a way to attain a viable Military Department within the academic framework of higher educational institutions. Orton concluded that if

war came to the U. S., a large number of officers should be trained at colleges. He proposed that legislative acts implement his plans.

Major General Leonard Wood, Chief of Staff, supported Orton's thesis. In his discussion, General Wood identified some of the problems of manning and operating military departments on college campuses but concluded that a large reserve of officers was vital to the defense of the country (Lee, 1972). A large number of officers could come from colleges and universities. More assistance of colleges and universities to the War Department was needed.

Orton said the National Association of State Universities, including Land Grant Universities and non-Land Grant Universities, desired the enthusiastic attention and support of its members in adopting a new act, the National Defense Act of 1916, which had a provision to expand ROTC by utilizing the existing military training in civilian colleges (Pollard, 1964). The support of universities was shown through their acceptance of credits in theoretical military subjects by offering to accept up to twelve credit hours as general electives for any degree or as substitutes for required work in any curriculum in which no elective course was offered. Not only did the National Association of State Universities support this boost for national defense, but the public's concern about this subject was also reflected in Congress. The public concern moved for a larger Army and Navy, because World War I had begun in Europe in 1914 (Pollard, 1964).

Orton's plans were incorporated in the National Defense Act of 1916. Congress finally created the Reserve Officers Training Corps, with a specific amendment to the National Defense Act, which passed in June of 1916.

General Lincoln 1900 -1916

The Military Department at the IAC continued its progress under General Lincoln, under whose direction the basic portion of military training consisted mostly of drills for the freshmen with an occasional lecture on military tactics. The sophomores attended non-commissioned officers' school and received a few additional lectures by the General on leadership and military tactics. They were the only group that could be excused from military drill by enrolling in physical training. The juniors studied drill regulations, guard duty, and army regulations. The seniors ran the cadet corps and did much of the cadet instruction (Lee, 1972).

The officers' school, which required three hours a week extra instruction in addition to drill, included a class in fencing with the broadsword as well as other subjects, which were taught under the names military engineering, military law, and military tactics (Lee, 1972).

In spite of all this, the college president concluded in 1907 that the college was not actually meeting the requirements of the federal government to any adequate degree. Many other schools were also concerned they were not complying with the original Land Grant Act (Lee, 1972). In December, 1915, the general faculty adopted a requirement of two years of military tactics. This was not to support a particular policy but to meet the requirement that all Land Grant Colleges must offer military tactics.

Iowa State before World War I: 1910 - 1916

As students continued to enroll in military training at Iowa State, the facilities became more obviously lacking to support military training. In December of 1914, the faculty of Iowa State College voted to give credit for military drill during the first two years of study for all students, and for juniors and seniors in officer school. One

credit was given for each hour of class work per week. One credit was also given for two hours of drill per week or attendance at special maneuvers and summer camp. In the past, drill had been given no credit. The system utilized, was similar to that used to assign credit for laboratory periods in other courses (Lee, 1972).

Offering credit for military drill had a significant impact on the college during the war in Europe. At this time, at the college president' s request, an active duty officer of the U.S. Army was assigned to Iowa State College to assist General Lincoln, the first time this had been done in the college's history (Lee, 1972).

Another significant change for military training at Iowa State came in 1915 - 1916 when summer camp became a requirement for cadets. Practical application of the theory they had learned in eight months of classroom work and drilling was done during summer camp. Cadets had drills of camp duties, military regulations, personal hygiene, maneuvers, etc. (Lee, 1972).

ISU saw its first official deployment of troops in 1916, when there was a border dispute with Mexico. Sixteen Iowa State cadets, eleven officers and five privates, were called to active duty to serve on the Mexican border (Lee, 1972).

Iowa State World War I to just before World War II

Prior to the involvement of the U.S. in World War I, Iowa State College continued to develop its military program. When Congress declared war on April 6, 1917, the campus was quickly mobilized. Women became active in Red Cross work, and many students enlisted for active duty. Iowa State College was assigned one of the 36 ambulance units that were trained and sent to France (Lee, 1972). This ambulance unit was a unique organization recruited from colleges.

Other departments also began to teach military related courses; the Civil Engineering Department taught military topography, mapping, bridges, roads and

railroads, and field fortifications; the Electrical Engineering Department taught about telegraphy and use of wireless telephone; and the Mechanical Engineering Department taught about vehicles (Lee, 1972).

In April of 1918, fifteen schools, including Iowa State College, were assigned the technical training of men, because the Army had a serious shortage of technically trained personnel. The solution to the Army's problem was put on the colleges. Thus came the Student Army Training Corps (SATC) program, which utilized Iowa State College for the training of students prior to their military service (Lee, 1972).

Beginning in March, 1918, five hundred military students took the eight-week vocational and technical program in the Mechanical Engineering Department at Iowa State College. Five hundred new soldiers replaced the finishing class every eight weeks (Lee, 1972). However, this Student Army Training Corps (SATC) was separated from the collegiate military program. Iowa State's ROTC had a very limited program that was operated by a civilian Professor of Military Science and Tactics, because all active duty officers had been called to war.

A letter from the Committee on Education and Special Training of the War Department, dated August 5, 1918, clarified the status of ROTC and SATC; SATC could stop its operation at the end of the war, and ROTC could continue or resume regardless of whether it had been dropped or maintained by the college during the war (Lee, 1972). When World War I ended in November of 1918, the SATC was terminated and the ROTC program was implemented at Iowa State in early 1919 (Lee, 1972).

The effective implementation of the ROTC program at Iowa State College was attributed to the Professor of Military Science and Tactics and the support of the faculty and administration. Initially, ROTC at Iowa State College had three

units: infantry, engineering, and artillery. A fourth unit, the veterinary corps, was added in 1921. Freshmen and sophomores learned basic military subjects, such as drill, military courtesy, and map reading. Each branch unit also taught its basic branch training. Advanced courses for juniors and seniors, in all three units, included command, leadership, tactics, military law and its history, and their specific branch programs (Lee, 1972). These military programs were carried out in spite of lack of a facility.

Despite problems, they made do. The stables of the Veterinary Department and the men's gymnasium were used for drill during inclement weather. Buildings used as barracks for the Student Army Training Corps during World War I were used as gun sheds (Lee, 1972). Finally, in 1917, General Lincoln in the Military Department and Iowa State President R. A. Pearson convinced the Iowa legislature to appropriate funds necessary to construct the Armory building, which was completed in late 1921. The Military Department had an adequate facility for the first time in its 51-year history (Lee, 1972).

However, the Armory was destroyed by fire in 1922, with the loss of all government equipment and military records. Military offices were then set up in the halls of Beardshear Hall.

With the State legislature's help and Iowa State College's financial support for the Military Department, along with faculty and administrative cooperation, funds ($125,000.00) were obtained to replace the destroyed Armory (Lee, 1972). It was rebuilt in 1923, as a fireproof building with the south addition that is the same structure as exists on the Iowa State University campus today. Two-thirds of the funds were provided by the federal Works Progress Administration (WPA) and one-third from the college. It was one of the finest facilities in the nation.

Although Iowa State's ROTC had a good facility again, the Military Department's enrollments were dropping because of decreased college enrollments and the exemption from military training for those with previous war service. There were only eight cadets in the first-year advanced course during 1920 - 1921 (Lee, 1972).

The first group of six cadets graduated and was commissioned from ROTC in June of 1922. It was the start of Iowa State College providing reserve officers. Military Department enrollments gradually increased and the faculty and school administration continued to provide financial and moral support for the Military Department.

At this time, Iowa State administrators imposed an additional special qualification requirement for military officers. Graduates of the Military Academy or standard college who had experience in managing young men were accepted into the Military Department (Lee, 1972). This policy was not implemented nationwide until after World War II. In addition, the president of Iowa State, R. M. Hughes, made an announcement regarding military education at Iowa State in the *Military Education Survey Section I Statements of Presidents of Universities And Colleges Upon the Value of the ROTC as an Educational Component* (Military Education Survey, 1931).

> The ROTC is a part of the Educational Work of Iowa State College at Ames, Iowa. The work is required for freshmen and sophomore and is elective for juniors and seniors. We have a fine group of officers here and the work has been handled in a very efficient way. I believe the educational value is about on a par with other courses. We are graduating each year a considerable number of officers and I have reason to believe they are quite well trained in comparison with graduates of other college units (Military Education Survey, 18).

The Military Department continued to be well accepted on campus. Increased growth and stabilization of the Army ROTC program occurred even during the Great Depression.

In December of 1916, the faculty at Iowa State College voted unanimously to petition the War Department for immediate establishment of an Officers' Corps, in accordance with the National Defense Act of 1916. It also voted to constitute the Military Department as a major department of study in the Industrial Science Division (Lee, 1972).

As an additional program, the U.S. Army implemented the Air Training ROTC on an experimental base at seven schools in 1939 (Lee, 1972). Iowa State was one of these seven schools. Army personnel came to Iowa State to conduct physical examinations of students who were interested in Army Flying Training (Lee, 1972). This program later developed into an Air Force ROTC.

Consequently, ROTC enrollments at Iowa State steadily increased and the number of commissioned officers rose from six in 1922 to 95 in 1929. Numbers stabilized at 100 officers a year until World War II. The total production of reserve officers from ROTC programs in the U.S. from 1920 to 1941 was 109,847, during which period Iowa State graduated 1,445 officers. It can be seen that Iowa State produced more than its share of reserve officers (Lee 1972).

Despite the national agitation to drop military education, caused by the peace movement after World War I, all Land-Grant Colleges and Universities maintained military training on a compulsory basis for male students.

Two different studies on military training were done at this time. During 1925 - 35, the Committee on Militarism in Education published a 1925 pamphlet by Winthrop Lane that warned that ROTC was militarizing the youth of the country. In

response to this, Congress drafted some bills that proposed removing the compulsory feature of ROTC, but none of these bills passed (Lee, 1972).

In contrast to the pamphlet, the "Educational Value of Military Instruction in Colleges and Universities" by Ralph C. Bishop in 1932 contained high praise for ROTC and for the two years of required training. Bishop sent this survey questionnaire to 16,416 ROTC graduates of the 1920-to-1930 time period. From answers in 10,000 returned questionnaires, Bishop concluded that military training had definite educational value as well as improving the ability of trainees to supervise and cooperate with others (Lee, 1972).

Similarly, the American sentiment was that ROTC was a part of the necessary preparation for war (Pollard, 1964). This was especially evident when German invaded Austria in 1938. President Roosevelt announced that a special sum of three hundred million dollars would be devoted to armaments, and in October of 1938 he declared that the idea of neutrality should be given up. With the nation widely favoring military preparation, the military services again relied on colleges and universities to supply officers.

World War II and Iowa State College

In the 1940s, World War II swept across in Europe and Asia. The previously decreased Armed Forces of the U.S. started to expand before World War II. The Association of Land Grant Colleges and Universities was active in expanding the ROTC program and meeting the country's needs for officers.

On December 7, 1941, Pearl Harbor was bombed by Japan, at which point, the U.S. became directly involved in the war in Asia. Undoubtedly, there were unprecedented demands for military officers from colleges and universities. In fact, Iowa State College was immediately mobilized for active military service.

Separately from the Military Department, Iowa State Administrators and students formed a "War Council" in which students did their part in winning the war through their academic work. The War Council formed an education committee to educate the general public about the background, progress, and students' responsibility throughout the war (Lee, 1972). Generally, patriotic spirit was prevalent on the Iowa State campus.

In early 1943, the advanced ROTC students were called to active duty to begin at the end of Spring quarter. By this time, enrollments in Military Training were 2,218 with 246 in the advanced corps. In the Fall of 1942, the signal corps ROTC unit was added to the existing field artillery and engineer branches (Lee, 1972).

By late 1942, the need for officers in the war was so great that the "new modified war-time program" (sometimes called "branch immaterial") was included in the ROTC program during 1943 - 46 (Lee, 1972). This branch immaterial program was one year long and consisted of three quarters' work of five hours per week. This was made possible by compacting the old two year basic mandatory program into a one-year program. The one-year modified ROTC program resulted in lowering enrollments from 2,218 in 1942 to 218 in 1944 at Iowa State (Lee, 1972).

Additionally, the summer camp of the advanced course for juniors and seniors was canceled because of the war. The summer camp was replaced with three months of Officer Candidate School courses before active duty. Thereafter, all seniors who graduated from Iowa State ROTC went to the OCS course.

In the Fall of 1946, within slightly more than a year after World War II ended, the Army advanced program was reactivated and the other ROTC staffs were reassigned to the postwar Army ROTC.

In addition to ROTC, after the war was over, Iowa State had a non-collegiate naval training program to train personnel in three disciplines: electricians, diesel firemen, and cooks and bakers. Later, amphibious firemen were added. More than 12,000 had been trained in various skills by December of 1944 and were housed in Friley Hall. The college also trained 84 women for the Curtiss-Wright Airplane Corporation. Two other groups, including 22 aircraft mechanics and 220 veterinary students, were also trained at Iowa State (Lee, 1972).

Another naval program trained Navy aviators at the newly constructed Ames airport between January of 1943 and July of 1944. The Navy collegiate V - 12 instruction, which was a regular collegiate engineering curriculum but was not under military discipline, started with 800 would-be Navy officers on July 1943 (Lee, 1972). After the war, this V - 12 program developed into the Naval Military Training Program (Navy ROTC) at Iowa State in the Fall of 1945.

In November 15, 1945, President Charles E. Friley of Iowa State gave a speech on "Higher Education and University Military Training" at the meeting of the Association of Governing Boards of State Institutions in recognition of the ROTC graduates and the other wartime efforts of the nation's colleges and universities. This speech seemed quite appropriate in view of the postwar expansion of the ROTC program from one Army ROTC unit before World War II to three units of the armed services following the war (Lee, 1972).

Army ROTC at Iowa State 1946 - 1959

In the 1946 - 47 school year, the Iowa State Army ROTC program was changed back to the normal two-year required basic courses and the optional advanced course (Pollard, 1964). This advanced course included branch oriented training in engineer, artillery, signal, and a new branch of air. This air unit was the

origin of the Air Force ROTC unit, which developed into a four year program (Lee, 1972).

After World War II, there was a resumption and rapid rise of the ROTC program. National Planning Conferences were held in 1944 and 1945 to determine the future of ROTC. The joint session of representatives of the Army, Air Force, and Navy concluded that the service academies could not provide the required number of officers for the armed forces (Lee, 1972).

The Army suggested a combination of ROTC and Universal Military Training (UMT) that would require all male citizens to have one year of military training after high school or at the age of eighteen. Universal Military Training replaced the previous first two years of the required basic ROTC program. However, the only advanced course was taught on campus. Because of budget limitations for such a large number of ROTC graduates to have positions in the Army reserve forces, this was not enacted by Congress. The Army did not have a firm alternative plan for the original UMT program (Lee, 1972).

In the postwar Army ROTC at Iowa State, the most important changes were reinstatement of the signal corps, which operated for one year during World War II; a new air unit, added in 1946; and addition of the veterinary unit in 1948 (Lee, 1972). The veterinary unit continued until veterinarians were allowed to enter the Army through a different program in 1955. The air unit was a part of the Army ROTC program until 1949, when it became the Air Force ROTC program at Iowa State.

The Army ROTC program was reinstated and stabilized at Iowa State College. The school's enrollment steadily increased after World War II. The Military Science Department became a separate department with specific programs and activities. The Army ROTC program at Iowa State remained branch-

oriented even as many other schools went to a general military science curriculum (Lee, 1972).

The sudden onset in June of 1950 of the Korean War, which ended in 1953, brought renewed interest in ROTC, because World War III was expected (Lee, 1972). In the same context, the Universal Military Training and Service Act of 1951 was passed, requiring a compulsory military training program during peacetime. The Act stated that every able-bodied young man was responsible for eight years of service in the armed forces, including two years of active duty.

Expansion of the Army ROTC program at Iowa State started in 1952. As a result, a large number of second lieutenants were available in 1955 and 1956 and the Army lacked active duty positions for all these new officers. Consequently, starting in 1954, the Army adopted a new six-month active duty program and a seven-and-a-half-year reserve program to alleviate the effects of over-production of officers (Lee, 1972).

ROTC students were also affected. At the end of their sophomore year, the ROTC cadets had to agree to serve on active duty for at least two years. Most students were highly motivated to enter the advanced ROTC program because of the impact of the Korean War, and the Army ROTC enrollment rose in spite of declining college male enrollments. With the nation-wide increase in enrollment, the U.S. Army developed a plan to convert the ROTC curriculum to the general curriculum. This curriculum had been updated with the latest infantry tactics, including those described in the American Military History and the Role of the Army in World Affairs (Lee, 1972).

However, Iowa State did not want to change to the branch general, because Iowa State graduates could benefit more from technical training in engineering and artillery. The Army ROTC at Iowa State College continued the branch-oriented

curriculum, although ninety percent of all senior ROTC units switched to the branch general curriculum until 1957. The size of the Army ROTC unit reached a postwar high of over 1,500 cadets (Lee, 1972).

The Iowa State Daily had several articles in the Fall of 1958 and early 1959 that cited results of polls taken at other colleges. More than seventy percent of students disapproved of compulsory military training (Lee, 1972). In response, the faculty of Iowa State started a dialogue that later resulted in a voluntary Basic Military Program in the Military Department in 1962. Thus, the Department of Military Science and Tactics continued to function within the school to such a degree that no one questioned the teaching of military science.

Navy ROTC at Iowa State 1946 - 1959

The present Navy ROTC at Iowa State dates back to the V - 12 naval officer program during World War II and the naval training school in 1942. The Navy was able to make a smooth transition from the V - 12 officer program to the postwar NROTC program.

The origin of the Navy ROTC is Public Law 611, which Congress passed in March 4, 1925, and provided for sundry matters affecting the naval service. Under the authority of this act, the Navy Department established NROTC, in 1926, at six universities. The Navy Department set up the Holloway Board to study the system and methodology of naval officer education to meet the needs of an expanded U.S. Navy (Pollard, 1964). The recommended plan from the Holloway Board, which dealt with the undergraduate phase of officer procurement including the Naval Academy, NROTC, and the Naval Aviation College program, was passed by Congress in August, 1946, and included two NROTC programs, regular and contract (Lee, 1972).

The difference between the regular and the contract program was that the regular (scholarship) program selected students through a national examination. These students were required to participate in six- to eight-week summer cruises for four years. After graduation, the candidates were commissioned and served on active duty in the U.S. Navy or U.S. Marine Corps for two years (Lee, 1972).

The contract (non-scholarship) students were selected by the professor of Navy ROTC at each college. These students had the same coursework as those in the regular program, but were required to take only one summer cruise and were commissioned in the U.S. Navy or Marine Corps Reserve. During their junior and senior years, the students in both programs selected the related subjects necessary to be commissioned as a Navy or Marine Corps officer (Lee, 1972).

Approximately 1,000 Navy ROTC scholarships were offered for regular midshipmen through a national competition each year (Lee, 1972). At this time, the Army and the Air Force ROTC did not offer such scholarships. Not only the scholarships, but also the opportunity to see the world during required naval cruises, made the NROTC program very popular. Thus, acceptance into the small NROTC program at Iowa State was highly competitive.

Iowa State College established a four-year naval training program in July, 1945. Iowa State was very cooperative with the Navy, because the Navy invested a large amount of money in facilities for the wartime programs at Iowa State College. Friley Hall and the U.S. Navy Diesel Laboratory (on the current Black Engineering Building site) were built with federal funds (Day, 1980). The Naval Science building was able to accommodate 300 midshipmen (Lee, 1972).

In 1946, the NROTC unit received much of the equipment necessary to teach technical courses. The NROTC curriculum was designed to provide the professional and technical training as well as the concept of an "immediately

employable ensign" (Lee, 1972). It was similar to the Army ROTC curriculum in terms of being a service-oriented program.

When the need arose for more officers during the Korean War, the Navy obtained a majority of officers from their Officer Candidate School (OCS). At the same time, the Navy, expecting the Korean War to become World War III, increased officer production. When World War III did not occur, the Navy had to cut back on its number of officers. After the Korean War, the Navy expanded its size to compete with the Soviet Union and again confronted the need for more active duty officers.

Consequently, regular midshipmen were required to go on active duty for three years rather than the previously required two years, and the contract midshipmen had to serve on active duty for two years rather than provide inactive support as before (Lee, 1972).

Conclusively, the Navy ROTC program at Iowa State was voluntary and the U.S. Navy allowed maximum enrollment of contract students in its program. The enrollments varied from 148 in 1946 to 291 in 1955 and stabilized in late 1950 with about 220 midshipmen. The Navy ROTC at Iowa State commissioned an average of 38 Navy or Marine Corps officers per year over a ten-year period with the first graduates of the four-year program (Lee, 1972).

Air Force ROTC at Iowa State 1946 - 1959

The first Air Force ROTC units at Iowa State were established during the 1946 - 47 school year as part of the Army ROTC program in the Military Science Department. Air Force ROTC cadets completed the same two-year program as the Army ROTC cadets and then had specialized course content for the last two years. This specialized content was aimed at producing the reserve officers for the

reserve forces without further training. The specialized courses of AFROTC at Iowa State were administration, military management, and communications.

The Army Air Corps became the U.S. Air Force in 1949 through the Armed Forces Unification Act of July 26, 1947. Separation of the Air Force ROTC from the Army ROTC occurred in 1949 (Lee, 1972). The Air Force cadets took one year of basic military training through the Army ROTC and three years under the Air Force. During the 1950 - 51 school year, the Air Force initiated a full four-year curriculum (Lee, 1972). The Air Force ROTC unit at Iowa State relied for its support on the Army ROTC unit during the first two years, because of the delays in obtaining supplies and equipment.

In the Fall of 1951, enrollments of male freshmen in the AFROTC program at Iowa State increased because of the Korean War. The AFROTC had a shortage of classrooms. Though the Army ROTC unit was reluctant to give up classrooms in the Armory (Lee, 1972), the college modified assignments and gave three additional rooms to the Air Force ROTC unit. The AFROTC also suffered from a shortage of textbooks and equipment.

The AFROTC staff was active in developing the generalized curriculum instead of specialized options. After a national conference in October, 1952, Iowa State AFROTC Professor of Air Science and Tactics Colonel Evanoff and Iowa State President Friley announced a generalized curriculum for AFROTC, which would be implemented for freshmen, sophomores, and juniors (Lee, 1972). The seniors (class of 1953 - 54) also had specialized options. In the Fall of 1954, the four-year generalized curriculum was implemented. It was to produce well-rounded officers versed in leadership and world affairs, as well as the fundamentals of flight.

During the 1953 - 54 school year, the AFROTC had the largest enrollment ever at Iowa State (1952 cadets). Due to the slowdown following the Korean War and the budget limitations imposed on the Air Force by Congress, the number of officers needed for active duty service was severely reduced. In response, AFROTC headquarters introduced a quota system to control the production of Air Force officers. The quota system was lifted in 1959 because of an increased Air Force Service obligation and the growing U.S. economy. As that time, all AFROTC recruitment and motivation programs were put into effect (Lee, 1972).

ROTC at Iowa State University 1960 - 1970

The controversy over compulsory versus voluntary and basic ROTC ended with the adoption of voluntary ROTC in the 1960s. The voluntary ROTC program disagreement came to a climax following a campus protest during the Vietnam conflict. At this time, ROTC enrollments were rapidly dropping. The ROTC Vitalization Act of 1964 helped revitalize the program. Iowa State University also supported the ROTC programs and kept them viable in the face of voluntary ROTC and anti-war sentiments.

In 1960, compulsory ROTC became a big issue on many colleges and universities, including Michigan State, Wisconsin, and California (Lee, 1972). Students argued that they should have the freedom to decide whether or not to take ROTC.

The voluntary military training program at Iowa State was gradually becoming better known. The provost of Iowa State University, James H. Jensen, attended the Mershon National Security Program at the Ohio State University in June, 1960, and discussed the " Role of Colleges and Universities in the ROTC programs." Then, on March 7, 1961, the provost of Iowa State University appointed

an ad hoc faculty committee to evaluate the future role of the three ROTC programs at Iowa State University.

The ad hoc ROTC committee interviewed officers and students in all three Military Departments and collected information about the voluntary ROTC program. The committee report, submitted on February, 16, 1962, stated that "the compulsory basic ROTC program is not needed to provide an adequate number of commissioned officers" (the Iowa State Daily, February 17, 1962). The committee's recommendations were accepted by Iowa State after lengthy discussions. The university administration and students conceived a voluntary ROTC program as a "sign of the times;" however, the voluntary basic ROTC program greatly reduced the selection base for the advanced ROTC programs.

All three ROTC units at Iowa State offered the voluntary basic program. Enrollments for the four-year AFROTC program dropped from 1,443 in 1961 to 492 in 1962. The Army ROTC had a similar enrollment decline, from 1,632 in 1961 to 646 in 1962. In contrast, the Navy ROTC had slightly increased enrollments, from 217 in 1961 to 228 in 1962, and the Navy ROTC's freshmen regular (scholarship) midshipmen increased from 31 in 1961 to 43 in 1962 (Lee, 1972). Following this growth of the Navy ROTC, all three ROTC units' enrollments dropped steadily until 1965.

The Military Department and the University took special steps to introduce their ROTC programs to new students. In fact, the University prepared a booklet extolling the ROTC programs, including a letter from the University President. The booklet had information on military obligations, opportunities for active and reserve service, selective service, and the benefits of taking ROTC (Lee, 1972). President Hilton's letter stating that the administration's support of the ROTC programs constituted an outright endorsement. During the summer of 1962, this information

was sent to all incoming freshmen. The Military Department also participated in freshmen orientation programs, and the University established a ROTC Committee to assist with solving the problem of declining.

In March of 1964, Dr. Robert Parks, Vice President of ISU, formed the ROTC Advisory Committee (Officer Education Committee). Its mission was to serve as a liaison, not to promote, but rather to motivate the University administration to support the ROTC programs.

The ROTC Advisory Committee completed a study of the three ROTC programs at Iowa State and determined that the three units did not train officers for the reserves, but rather provided pre-professional officer education. The Officer Education Committee was then called upon to update the three Military Departments' course descriptions for the 1965 - 67 University General Catalog. In the end, Iowa State University had six credits of basic ROTC as electives in all colleges (Lee, 1972).

ROTC Vitalization Act of 1964

The change from compulsory to voluntary ROTC was a nationwide movement that required complete updating of all ROTC programs. The Air Force started a long range planning project with the objective of developing a proposal for the modification of the AFROTC program during the next two decades. All three services submitted similar legislative packages to Congress. All services offered four year scholarships to revitalize the ROTC programs. Under this program, a new two-year program was offered along with the four-year program.

In October of 1964, President Lyndon B. Johnson signed the ROTC Vitalization Act of 1964 (Lee, 1972). With this act, which required all three military

services to operate under the same law, many schools switched to the two-year program and later offered a four-year ROTC program.

The two-year program was initially intended for junior college transfer students, but the graduate students who had two years of college could also enroll in the two-year program and take the advanced ROTC program with the undergraduate students. A student who did not take the ROTC program during his first two years of college could substitute a six-week summer camp for these first two years. They could then enter the advanced portion of the ROTC program (Lee, 1972).

The two-year program had little effect nationwide as well as or on Iowa State during its first year of operation, because it lacked national publicity and received little response from junior college students.

The two-year program was most successful for the Army ROTC at Iowa State. The Air Force ROTC had success that was moderate but not up to its expectations. Each ROTC program changed its Officer Education program according to the University's academic environment. Therefore, each of the three units functioned as an effective unit at Iowa State University.

At Iowa State, only the Navy ROTC unit failed to offer the two-year program. The Navy thought the first two years of the Navy curriculum could not be taught during a six-week summer camp. The Navy ROTC unit at Iowa State offered the two-year program in 1966 but dropped it by the 1969 - 70 school year. The Navy had adequate numbers of midshipmen through the four-year program and saw no need to offer the two-year option (Lee, 1972).

Army ROTC at Iowa State University 1960 - 1970

The Iowa State Army ROTC unit moved toward the branch general curriculum in the early 1960s. The unit removed some of its specific military training subjects and allowed substitution of college-taught courses as electives during the sophomore and senior years. In the fall of 1964, the Army Officer Education program at Iowa State switched completely to the general military science (Lee, 1972).

The first graduates under the new general military science curriculum at Iowa State were produced in 1966. The Army published the Army ROTC graduates' performance in the branch school. The Iowa State graduates' averages were in the upper one-third of ROTC graduates (Lee, 1972). Thus, the Army Officer Education program at Iowa State produced highly qualified students as officers in the U.S. Reserve and the regular Army.

Navy ROTC at Iowa State University 1960 - 1970

The NROTC Officer Education Program at Iowa State changed only slightly in the 1960s. The changes in the curriculum consisted only of the move of the weapons course from the sophomore year to the senior year. The sophomore year now included a sea power seminar. Likewise, seniors had a more theoretical weaponry course than before. The overall number of Naval Science course credits were reduced from 36 to 31, through deletion of such courses as: navigation, naval engineering, and naval operations (Lee, 1972). Many training activities were scheduled during summer camp. Additionally, the naval curriculum now required several prerequisites in other university courses, such as computer science, mathematics, physics, etc.

Another change made by the Navy was that scholarship cadets would no longer be required to remain unmarried during their NROTC program. With the changed rules and curriculum, the Iowa State NROTC produced immediately serviceable officers for the Navy. About 65 percent of graduates were commissioned as regular Navy or Marine Corps officers (Lee, 1972).

Air Force ROTC at Iowa State 1960 - 1970

After a drastic drop in enrollment, the three Military Departments coordinated to keep ROTC programs viable at Iowa State. In response to the Air Force requirement, the AFROTC concentrated on commissioning career officers through a college program. As part of this, a new Air Force ROTC curriculum was introduced, which included a substantial number of courses in aerospace development. The new curriculum implemented the professional officer course.

The AFROTC program was aimed at career officers. The active duty commitment for non-flying Air Force officers was changed to four years and flying officers had to serve for five years.

The Iowa State AFROTC unit gained a new organization when the Angel Flight was formed in 1962. This was a national organization whose objective was to promote interest in the Air Force and in military service. The Angel Flight, which consists of women, was an official hostess for the Arnold Air Society and served as hostesses for the AFROTC at Iowa State University (Lee, 1972). Then, the Iowa State AFROTC offered a two-year coeducational AFROTC program in 1969. At this time, only four institutions in the nation offered a two-year AFROTC program for women.

The Air Force authorized entry of women into the Air Force ROTC program at any school in May, 1970. Although women enrolled, they were not allowed to take

the flight instruction program, or flight training for active duty, because of a law excluding women from positions requiring such training. Women were required to serve for four years on active duty, the same as for other non-rated officers (Lee, 1972).

The Vietnam War and ROTC at Iowa State University

The effect of the Vietnam War worked both ways on enrollments of the ROTC programs at Iowa state. There was increased enrollment in ROTC initially, but then enrollment decreased when students protested against the Vietnam War in 1966. Total Army ROTC enrollments increased from 213 in 1965 to 311 in 1966 and then stabilized above 280 for three years (Lee, 1972). The Navy ROTC unit had stable enrollments throughout the entire Vietnam War era.

The number of commissioned officers was comparatively consistent during the Vietnam War, because admission to the advanced courses of the three services was more competitive then ever before. Students wanted to stay in school with the ROTC program instead of being drafted.

The Vietnam War had marked effects on campuses. There were many protests, anti-military publicity, and destruction of ROTC facilities across the country in 1970. However, Iowa State University was relatively quiet. Only two incidents were aimed at the Military Departments. On May 5, 1970, about fifty people staged a sit-in protest in the Armory. A door of the Armory was broken and the Army and Air Force staffs were harassed. On the following day, some students at a rally on central campus demonstrated to interrupt a ROTC drill session. The interruption was peaceful and the drill session was called off immediately after the students arrived at the field (Lee, 1972).

The protest at Iowa State was an expression of the dissatisfaction with the Vietnam War. However, no request for removal of the ROTC programs at Iowa State University was made. The University administration continued to support the ROTC programs. Dr. W. Robert Parks, President of Iowa State, expressed his disappointment with the interruption of the military drill session as "the destruction of the academic freedom of the ROTC students." The State Board of Regents voted unanimously to keep the ROTC program as a part of the University (the Iowa State Daily, September 8, 1970).

The national scene 1971 - 1980

President Nixon ordered troops to be sent into Cambodia in 1970. There were protests in all parts of the country for the end of the Vietnam War and the abolishment of ROTC on campuses. Four students died at Kent State University during one such protest. The dissatisfaction of students and faculty members with the war, rather than with ROTC, led to anti-military sentiments. The existence of ROTC on many campuses was questioned, and widespread anti-ROTC sentiment on campuses resulted in decreased enrollments. In addition, the end of the draft in 1972 was one of the main reasons for low enrollments (the Iowa State Daily, December 15, 1972).

The Defense Department in 1972 suggested three major changes in ROTC, on a national level, to raise ROTC enrollments. First, scholarships for ROTC increased from 16,500 to 30,000, divided among the three ROTC programs (the Army, Air Force, and Navy). Second, the subsistence payment for all junior and senior ROTC cadets increased from $50 to $100 per month. Finally, the Defense Department proposed to pay schools five hundred dollars for each officer

commissioned, as a form of assistance with administrative costs (the Iowa State Daily, December 15, 1972).

With the end of the draft in 1972, the most attractive reason for joining the ROTC programs was lost. The number of college seniors completing the programs dropped from 18,033 to 4,892 between 1970 and 1975. The trend of officer production continued at 4,567 in 1976. Since then, gradually increased officer production has continued (Shelton, 1985).

The national trend of increasing ROTC enrollments has also included more women enrolled than ever before. In 1976, enrollment at Iowa State showed 35 women cadets, compared with 15 in 1971. The Army and the Air Force ROTC each had 16 of the 35 ROTC cadet women, and three were in the Navy ROTC unit. The military was attractive to women, because they could receive military benefits during peacetime and an increased number of military officer positions were available to women. At the same time, the military could attain high quality forces by recruiting qualified women to fill the positions. Women were not discriminated against in promotions, salaries, benefits, or positions; however, Congress would not allow females to engage in combat or operate combat equipment.

In 1976, the armed service representatives said that the ROTC Programs were well received on campus. At a conference of 54 Navy ROTC units in August, 1976, the Ivy league schools, which were first to ban the ROTC programs, filed applications to get them back (the Iowa State Daily, October 25, 1976). The Armed Service Representatives said that the Armed Forces had restricted the number of ROTC cadets because of the smaller size of the military.

According to the *Iowa State Daily* on October 25, 1976, the Navy decreased the number of ROTC units on colleges and restricted the academic background of ROTC cadets so as to include mainly individuals mainly from engineering,

chemistry, physics, and math. Because of the increasing use of nuclear power, more technical backgrounds were required for operation of the ships and submarines. After the Enterprise, the first nuclear powered ship, was launched in 1961, Congress passed a law requiring that fifty per cent of all ships be nuclear powered by 1980. In response to this, the Navy required that eighty per cent of its ROTC cadets to have a technical background.

Army ROTC at ISU 1971 - 1980

The Vietnam War contributed to a decrease in the Army and Air Force ROTC programs. The enrollments in the Army ROTC had dropped by 1971, which the Army ROTC program at Iowa State had 136 cadets, more than seventy per cent juniors and seniors. Enrollment in the 1976 - 77 school year was 110, 29 per cent lower than in the 1969 - 70 school year. Reduced pressure from the draft system was considered the main reason behind this (the Iowa State Daily, October 25, 1976).

Another reason for decreased enrollment was the number of ROTC scholarships for Army ROTC cadets. Each branch of the services had 5,500 ROTC scholarships, which were distributed to the schools in the nation (the Iowa State Daily, December 15, 1972). There were more Army ROTC units than AFROTC or NROTC units on campuses. As a result, the Army ROTC unit at Iowa State had fewer scholarships compared with the other two ROTC units.

With the low enrollments in the Army ROTC at Iowa State, the University in 1977 investigated the Army ROTC unit with regard to its purpose and use of a loyalty oath, enrollment of students without their consent, and the turning over of a 'dropout' list to military recruiters. This investigation was requested by James Olberding, a former Captain in the AROTC detachment at Iowa State. The

University ad hoc committee's report in 1977 substantiated most of Olberding's claims (the Iowa State Daily, September 7, 1978).

The investigating committee recommended to President W. Robert Parks that secondary opinions be requested from the judge advocate general of the Army and from the U.S. Attorney General. The specific issue was whether supplying recruiters with lists of students who had withdrawn from the university violated the Privacy Act of 1974 (the Iowa State Daily, September 7, 1978).

In May of 1978, investigation of the AROTC at Iowa State was requested by Representative Tom Harkin and Senator John Culver, Democrats from Iowa. They asked the Army to investigate problems that had been raised by an earlier university investigation (the Iowa State Daily, October 27, 1978). An Army investigating committee revealed that some students were enrolled in the AROTC without their knowledge or consent, loyalty oaths were misused, students enrolled in non-ROTC courses were counted as cadets, and the lists of Iowa State University dropouts had been given to Army recruiters by an Army ROTC instructor. According to the *Iowa State Daily*, February 2, 1979, this practice violated the Buckley Amendment to the Privacy Act.

At this time, the Army investigated more than twelve universities by use of a questionnaire survey of the 2,514 AROTC detachments in the nation. The group's report said that the misconducts at ISU were not found elsewhere. As the result of the problems at ISU, the Army instructed the ROTC regional commanders that participating students who do not want to become cadets not be required to sign an oath and that no student be enrolled as a cadet without executing the loyalty oath.

The University took action to amend ROTC membership records. George Christensen, Vice-President of Academic Affairs, said " there was no good purpose" in recommending elimination of the Military Science Department at ISU.

Air Force ROTC at ISU 1971 - 80

Anti-Vietnam War sentiments were expressed on the local level to draft boards and ROTC as a means of protesting the war in 1970. Because of anti-military sentiment and the abolishment of the draft, a drop in AFROTC enrollments occurred. Furthermore, after the Vietnam War, the reduced need for officers in the Air Force brought a drop in enrollment in the AFROTC pilot and navigation fields. The AFROTC enrollment at ISU dropped from 154 during the 1971 - 72 school year to 105 in the 1976 - 77 school year, which was twenty-nine percent lower than in the 1969 - 70 school year (the Iowa State Daily, October 26, 1976).

Like the Navy, the Air Force sought engineering and computer science majors. The *Iowa State Daily* on October 25, 1976, reported that federal law placed restrictions on some Air Force ROTC cadets, particularly those who wanted to be pilots, navigators, missile personnel, development engineers, or electronics specialists.

However, AFROTC at ISU was not affected by the decreased need for officers, not only because of the strong engineering and science departments at ISU, but also because of the closing of many of the 162 units across the nation.

Navy ROTC at ISU 1971 - 1980

The Navy ROTC greatly restricted its ROTC students' academic backgrounds. Because of the technical requirements of the Navy, the Navy placed emphasis on science majors. Navy ROTC enrollments at ISU were steady and increased from 127 in the 1971 - 72 school year to 140 in the 1976 - 77 school year despite a national enrollment drop (the Iowa State Daily, October 26, 1976). This stability continued in the 1970s because of the strong engineering and science departments at ISU.

The national scene 1981 - 1990

There was a change in public sentiment toward the military, patriotism, and the tight national economic conditions in the post Vietnam War era. Many students altered their attitudes toward ROTC programs as a means of financing their educations or as a career alternative (the Iowa State Daily, January 23, 1982). In 1985, Congress passed a bill to fund up to 12,000 four-year scholarships, nearly double the number in previous years. Additionally, the simultaneous membership program offered people in the National Guard and Reserves the opportunity to stay in their units and participate in ROTC, receiving pay from both programs. More schools began to offer the ROTC programs and allowed their students to take ROTC credits at other institutions and to transfer credit (Shelton, 1985).

The military services' ROTC programs functioned under the same laws, and all services were basically given the same number of scholarships. Accordingly, a curriculum revision was implemented nationwide to standardize the basic requirements for officers closely related to the university's academic credibility and acceptance of the military science program (Malpass, 1985).

With these nationwide general conditions, Army enrollments doubled between 1974 and 1983, rising from 33,220 to 72,463, and female enrollments rose 800 percent, from 2,211 in 1973 to 16,493 in 1982. The Army ROTC had the highest proportion of females (26 percent) and minorities (19 percent). There should be no reason that female and minorities' enrollments would drop in the future (Shelton, 1985). In the 1980s, the U.S. Army's image was changed to emphasize the many opportunities for women in the Army, and 771 out of 3,871 new officers on active duty in 1986 were women (the Iowa State Daily, November, 3, 1986).

The increased numbers of females and minorities sought ROTC commissions. Service branches needed larger numbers of majors of the academic disciplines in engineering, mathematics, physics, computer science, business, and science (Shelton, 1985).

According to the *Iowa State Daily* of September 31, 1984, the Navy's increasing complexity and reliance on sophisticated technology requires more competitive individuals. A national directive raised the academic standards of Navy ROTC units. The grade point average (GPA) requirement stipulated a 2.5 GPA (up from a 2.0 GPA) for a four year scholarship student. In addition, students were required to rank in the upper half of their college graduating class. In 1990, the Navy National Scholarship Board selected 1700 individuals out of 35,000 applicants for four-year scholarships. Most of these recipients were in the top ten percent of their high school classes (the Iowa State Daily, November 22, 1990).

Upon completing the ROTC programs, Navy midshipmen and Air Force cadets are obliged to serve on active duty for four years. Army cadets have a choice of serving on active duty for four years or in the Army National Guard or Army Reserve for eight years. Since the 1980s, the military subject has been vocational in nature, along with the improved academic credibility and acceptance of the military science program (Malpass, 1985).

The *Iowa State Daily* reported on January 27, 1984, that the Army ROTC Program had met its recruiting goals for active and reserve assignments. Brigadier General Robert Wagner, Commander of the U.S. Army Fourth ROTC Region, said that the Army had turned down offers from some schools to host ROTC programs because of lack of funds and personnel for further expansion. Wagner said that the ROTC Program is important to the Army, because it provides 75 percent of the active duty officers in the Army.

Military education on campuses has demonstrated conclusively that the uses and purposes of military power protect national interests and are designed to preserve peace and freedom, rather than war (Smith, 1985). Both the Pentagon and the Congress are satisfied with the ability of ROTC programs to produce military officers for the active and reserve armed services. Additionally, there is no concerted effort to increase the size of the U.S. Military Academies (Malpass, 1985).

ROTC at Iowa State University 1981 - 1990

As mentioned in the National Scene during the period of 1981 - 1990, public sentiment toward the military had changed and students became more aware of the variety of opportunities in the military, such as project management, engineering, and communications. The ROTC program had changed to accommodate a changing world. The Army ROTC at ISU included courses focused on various aspects of management and leadership, to be credited as electives (the Iowa State Daily, January 23, 1981).

Increased patriotism among students, concern about the national economy, and a new awareness of the ROTC program resulted in increased enrollments in Iowa State ROTC during 1980s (the Iowa State Daily, January 23, 1981). The increased enrollments can be attributed primarily to the financial incentives for the ROTC program. The ROTC program offered four-year scholarships that paid a students' tuition, fees, and the costs of books and supplies as well as providing a monthly stipend of $100 during the last two years of the program. Without the scholarship, a $100 monthly stipend had been given for the last two years.

The enrollments of the three ROTC units stabilized in the 1980s. In the 1984 - 85 school year, the enrollments were: army; 204, navy; 187, and air force; 211

(the Iowa State Daily, December 30, 1984). Better advertising and a positive national climate for the military were factors in favor of ROTC for the first time since the Vietnam War (the Iowa State Daily, September 15, 1982), and ROTC units at Iowa state were among the best in the nation. Despite congressional slashes of the Defense Department budget and a nationwide closure of AFROTC detachments was completed in May of 1989 (the Iowa State Daily, January 28, 1988), the Navy and Air Force ROTC units remained especially strong at ISU because of the availability of many individuals from engineering and advanced science majors (the Iowa State Daily, January 27, 1984).

Increasing numbers of women have joined the ROTC program. The *Iowa State Daily* reported on October 22, 1980, that 47 out of 135 cadets in the two-year basic Army ROTC training program during the 1980 - 81 school year were women. The AFROTC unit had 23 women cadets during the 1980 - 81 school year, 15 of whom were in the first two years of the General Military Curriculum program; the remaining eight were completing their last two years of Professional Officer Curriculum.

The favorable mood toward the military has continued into the 1990s. On September 18, 1990, the AFROTC organized numerous events for American soldiers classified as prisoners of war and missing in action. These events focused on the need for the U.S. to establish communication with the Hanoi government about these issues (the Iowa State Daily, September 18, 1990). The Army ROTC also conducted a campaign to write letters to American troops stationed in the Persian Gulf to boost morale during the Gulf War (the Iowa State Daily, October 25, 1990). It appears the ROTC programs will remain a well regarded part of the ISU curriculum in the 1990s.

CHAPTER III. THE FUTURE DIRECTION OF ROTC IN NATIONAL STRATEGY

This chapter outlines general parameters of the future of the U.S. armed forces to provide direction for the transition of the ROTC program. The ROTC program will be formulated according to the requirements of the armed forces under US national strategy.

In the United States, national strategy stems from the national security policy of political parties. It directly reflects public opinion, because the public is involved in the pressing issues of the times. After all, public opinion modifies the effects of American policy on national strategy. Therefore, a national strategic environment that dominates the nature of the armed forces will affect decision-making on ROTC programs.

National strategy

National strategy has been defined as "the art and science of developing and using the political, economic, and psychological powers of a nation, together with its armed forces, during peace and war, to secure national objectives (Meinhold, 1992)." National security objectives are all practical purposes. For example, after the Cold War, the global economy created conflicts in the world, so US national strategy was designed to protect US economic security in the future.

Additionally, development of national strategy is a means for the armed forces to develop high quality forces, important to the ability to meet the needs of national strategy and the future of the nation.

A new era

The end of the Cold War was a new challenge for the U.S. military. The collapse of the U.S.S.R has changed the strategy of the U.S. national security. The

changed U.S. strategy focuses on national interests and role of the U.S. in the world.

The shift from containing the spread of Communism and deterring Soviet aggression to a more diverse and flexible strategy is regionally oriented and capable of meeting the challenges of this decade. A new international order is taking shape in the U.S. national security policy and military strategy (Powell, 1992).

Pursuing international security is America's best interests. Thus U.S. international policy is focused on specific national objectives that are important to American security and interests, for example, the protection of international markets and of certain regions that have valuable natural resources (Asmus, 1993).

After the Cold War, with the U.S. sole superpower, preservation of America's strategic independence is necessary to defend American sovereignty and maintain its strategic advantage (Asmus, 1993). On changing American strategy in the future, there are two major, opposite opinions, that of the unilateralists and that of the multilateralists.

Unilateralists are skeptical of collective security and the ability of international institutions such as the United Nations (UN) to play an important role in international security. They are less sensitive to domestic problems and to complaints that the United States bears too much international burden (Asmus, 1993). They believe the United States needs to retain its strategic flexibility and strong interventional capability, which are vital to US interests. Moreover, many are concerned about the potential power of Japan or Germany and support an ongoing U.S. role to contain Japanese or German power (Asmus, 1993).

In contrast, multilateralists prefer interdependence. Their strategy is to expand Western regional alliances to deal with new problems. The United States

would be encouraged to play a larger role as partner with other nations rather than fearing a strong Japan or Europe (Asmus, 1993).

With the proposals of a new form of power sharing with Western allies, the Bush administration attempted to maintain the proper balance between unilateralism and mutilateralism, focusing on the need for the United States to retain the right and the capability to act unilaterally. Simultaneously, the United States engaged in expanding American commitments in multilateral context (Asmus, 1993).

After the Bush administration, the Clinton administration, based on promotion of democratic values and multilateralism, was committed to maintaining a strong and ready defense accompanied by clear purpose (Asmus, 1993).

In the new era, the United States is a catalyzing collective system to protect the U.S. security, political, and economic values. The collective engagement is American leadership. It avoids the danger of extremes of either fallacious omnipotence or misplaced multilateralism. The collective system draws on common values and common interests shared by the community of nations (Asmus, 1993).

U.S. public opinion on the armed forces

To set post-Cold War national securities, public opinion is important in providing political supports. A majority of Americans believe that the United States has lost its role as the world's leading power and that the critical future threats to the nation are likely to be economic (Asmus, 1993). Attitudes toward the defense budget in 1990 were the same as they were at the end of the Vietnam War in 1974. A majority of Americans wanted to increase spending on education, social security, and drug programs by cutting the defense budget (Asmus, 1993).

The American public's desire to see greater attention paid to American economic security is matched by a desire to see a "new world order," in which the United States would do its part with other allies rather than play the role of a "world policeman (Asmus, 1993)." According to former president Bush, the "new world order," in conjunction with the Persian Gulf War, was a sober, reality-oriented order based on the balance of power and the willingness of key states to provide the leadership (Asmus, 1993). This is a shift in the direction of expanded multilateralism and collective security. This shift is rooted in a desire of Americans to reduce U.S. international burdens through increased multilateralism. It means the United States needs to remain involved in world affairs.

Along with active international participation of the United States, Americans want to pay more attention to domestic issues. Thus, both an economic strategy that favors American interests and a military strategy to respond to crises are vital to U.S. interests.

In sum, the American public wants the United states to remain engaged in international affairs. At the same time, they want more attention to domestic issues and American economic security.

New direction for the armed forces

In the era following the Cold War, though the United States is enjoying an unprecedented degree of security and no major strategic challenges are seen for the foreseeable future, the challenge for multilateralism is in the realm of military strategy (Asmus, 1993). Military strategy emphasizes the central role of uncertainty in planning to shape international security by preserving alliances and maintaining an ongoing regional stability.

America has an unenviable role as the world's policeman, and military conflict makes it harder for the U.S. to have alternatives that lighten the American burden. Without U.S. participation, attempts to forge new multilateral or collective security are unlikely to succeed. For example, collective leadership failed against Fascism in the 1930s, because no strong power provided the leadership to rally the less powerful countries. However, collective leadership worked in the Gulf War, because the United States was willing to lead less powerful countries as a superpower (Asmus, 1993). Thus, the United States has a strong interest in sustaining and leading regional alliances with its new military strategy.

The new military strategy is important in preserving a core capability to deter aggression and respond to regional crises. The core capability is a necessary Base Force that can adapt to changing circumstances. It is 25 percent smaller than the force that existed before the collapse of the Berlin Wall in the 1980s (Asmus, 1993). It is a future force that anticipates continued progress and improvement in dealing with an uncertain future and that can be reshaped in response to further changes in the strategic environment.

Important challenges face the armed forces now that the Cold War has ended. Most of the challenges also provide opportunities for new national security objectives and for the United States' to assume global leadership with downsized armed forces.

Implications

The Base Force will provide the framework for planning the ROTC program under the new national strategy. With the American tradition of civilian control of the military, the Base Force is centered on the ROTC program as a source of officers.

As the Base Force supports the strategy, the future ROTC program will be more effective and predictable as a result of a new national strategy.

The ROTC program must find its future direction through close ties with the armed forces and national strategy. The US national strategy plays an important role in the armed forces and influences on the future makeup and direction of the ROTC program.

The ROTC programs will serve as important sources of armed forces personnel in carrying out U.S. national strategy. The achievement of national strategy needs more supportive armed forces. The US armed forces must concentrate their resources and engage in activities designed to achieve national strategy. Thus, ROTC officers will be a greater proportion of personnel on national strategic duty.

The ROTC program is fundamental to the armed forces' conduct in the national interests. In a word, the ROTC program contributes to the U.S. strategy.

Additionally, the new national strategy addresses the need for strong armed forces in a new era. The armed forces need ROTC programs as a major source of officers. According to a June, 1994, letter from the Public Affairs Office of the Department of the Army about the future direction of ROTC, the ROTC program has not been asked to commission as many officers as were required before the end of the Cold War. Although the programs are smaller than they were, they will remain the largest source of commissioned officers for the armed forces in the future (personal correspondence).

In conclusion, national strategy is destined to become a central focus of the ROTC program in a new era. The opportunity exists for the ROTC program to make significant progress in armed forces.

The United States will maintain a military with ROTC-produced officers to deal with an uncertain future. This provides direction for ROTC in a new era. It is a final architecture as well as the foundation that provides for ROTC to progress in the future.

CHAPTER IV. THE HISTORY OF THE ARMORY HALL

This chapter looks back on the history of the Armory Hall focusing on the history of the construction of the building. The Armory Hall was a pressing need of Iowa State College (ISC) for military tactics and drills in inclement weather. World War I spurred the college to build the Armory Hall for use in training male students at ISC.

One year after the completion of the first Armory Hall, it, along with all army equipment, entirely burned down. An exact copy of the first Armory Hall was soon built, using fire-resistant materials. Extension and remodeling of the Armory Hall was accomplished to meet the school's needs. The character of the Armory Hall continued to change and was not focused entirely on the Military Department.

Based on the original purpose of the Armory Hall, this chapter shows how its character changed over 70 years. Because the building was newly designed for military education at ISU, the present building's history may offer information on a new building's future direction. Thus, a study of the Armory Hall's history is necessary.

The Armory Hall

The beginning of military instruction at Iowa State College in 1870 led to the respect for construction of an armory. An armory became a pressing need of the college, according to the 12th Biennial Report of 1886 - 87, which report said the use and the nature of the building was to allow for the most effective military tactics and drills even in severe and stormy weather, which greatly interfered with the work during many parts of the year in spring and fall. "An armory, to be used as a gymnasium, and on commencements, junior exhibitions and similar occasions as

an assembly room..... This building can be utilized as above indicated for other valuable purposes (12th Biennial Report 1886 - 87)."

The Iowa State Student (the predecessor of today's ISU Daily) reported on March 10, 1917, that the need for other buildings on campus was deemed more urgent than the need for an armory. At this time, all men were required to drill two periods per week during the first year; the subject was optional with physical training or athletics during their second year. In 1917, military training for all male students was required from 11:00 to 12:15, five days a week, made in response to an additional government requirement resulting from the First World War. Thus, the department seriously needed an adequate facility for drilling in inclement weather (the Third Biannual Report 1912 -14).

On March 8, 1917, General Lincoln of Iowa State and Captain Mumma of the University of Iowa were called before the military committee at the State Capitol in Des Moines. The committee appropriated $125,000 to each of the State Universities for the erection of armories at Ames and Iowa City.

On October 9, 1919, members of the Board of Education Building Committee conferred on the location of the building with Iowa State President Pearson and Lieutenant Colonel J. K. Boles. The following suggestions were made as to the possible armory site:

a. With long axis north and south and coincident with the axis of Engineering Drive, front lines of building between the front and back lines of the Chemistry Building.
b. With long axis east and west, north of the street car track and opposite the Gymnasium and bearing approximately the same relation to the library as the Gymnasium bears to Central Building.
c. With long axis north and south, east of the Gymnasium and south of Engineering Shops.
d. With long axis north and south, east of Chemistry building and Central Avenue. (Iowa Board of Education, Minutes, December 2, 1919).

The first location (a) was accepted with the understanding that the south front line of the building would be selected by the architect and the college authorities.

The construction followed a rough concept characterized by a building with an trussed and arched roof. The appropriation of $125,000 was not to be exceeded. The portion of the structure completed within this sum was based on what was necessary for the Department of Military Science to function properly (Iowa Board of Education, Minutes, April 13, 1920).

At the meeting of the State Board of Education on August 18, 1920, the Building and Business Committee for the armories at the State University of Iowa and Iowa State College was authorized to make decisions on the armory.

Superintendent Sloss estimated that an extension, two stories high, nine bays wide, and with 25 foot joists, for the storage of vehicles on the north end of the Armory Hall, and another extension, two stories high the full length of the east side of the Armory Hall and with 22 foot joists, would be possible within the appropriation of $125,000 (Iowa Board of Education, Minutes, November 3 - 4, 1920). Construction of the Armory Hall was completed in the fall of 1921.

The Armory Hall was used by about 1,300 men for the military instructional hours during the day. Additionally, the building was the headquarters of the State Corn Show, the greatest annual corn show in the United States. Moreover, the building was used for a small International Livestock Show (Iowa Board of Education, Minutes, December 18, 1922).

On December 16, 1922, the Armory Hall entirely burned down along with army equipment valued at more than $150,000. The steel frame was twisted because of expansion by the heat of the fire, and the walls of the Armory Hall bulged and cracked from the heat (Fig. 1).

The loss of the Armory Hall was critical to ISC. President Pearson recommended that the secretary of the Board prepare a bill for an appropriation to construct an Armory Hall with non-combustible material. Through the efforts of the Secretary of the Board, a special committee was organized to ask, the General Assembly for reconstruction of an Armory Hall as an emergency measure (Iowa Board of Education, Minutes, January 30, 1923).

The decision to rebuild the Armory Hall was made soon. The exact copy of the Armory Hall was done in the spring of 1924 on the same site with fireproof materials.

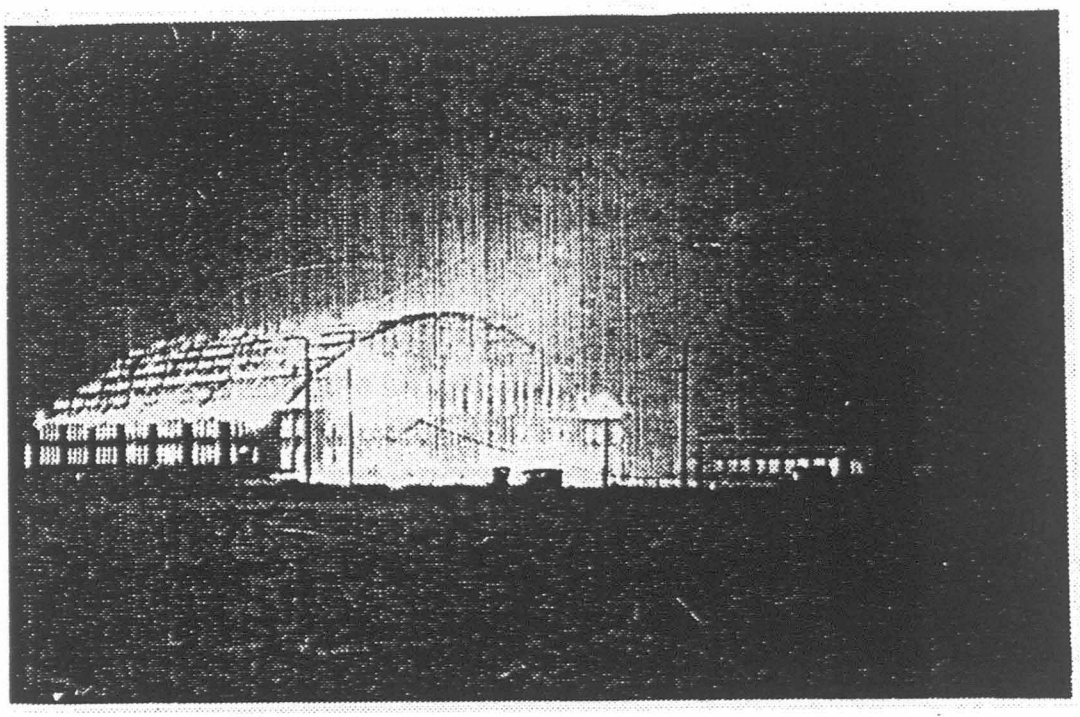


Figure 1. The Armory Hall caught fire and burned on December 16, 1922

Extension and Remodeling of Armory Hall

Extension of the south and west sides of the building was planned to be symmetrical with the east and north extensions of the building in 1920. The extension plan was not executed until 1941 because of the limitations of the appropriation.

With funds from the Works Progress Administration, an addition was constructed along the entire west side of the building in 1941. The addition provided more classrooms (Day, 1980).

A new hardwood floor was installed in the fall of 1948, because the Armory Hall held home basketball games starting with the 1946 - 47 season; games had been held at the State Gymnasium before that time (Day, 1980).

The remodeling in 1956 added a new concrete floor, larger dressing rooms, and the north-south steel bleacher system to provide improved facilities for accommodating large crowds, as at commencements, convocations, concerts, farm group meetings, basketball, etc.

In addition to increasing the seating capacity to 8,500, the renovation improved the main and subsidiary exits and the ventilation system. The remodeling included roof repairs; general construction (of six classrooms and one office); plumbing, heating, and electrical work; and addition of folding bleachers (Iowa Board of Education, Minutes, May 12 - 13, 1955).

The remodeling in 1956 provided heating and ventilating of the main portion for auditorium purposes and basketball, but not for classrooms, because of insufficient funds. Ventilation was a problem in the main area when large crowds assembled for commencements, concerts, and basketballs. For these reasons, a second remodeling of the Armory Hall, including features such as heating,

ventilating, and painting, was done in 1959 (Iowa Board of Education, Minutes, September 11, 1959).

The Armory Hall in the 1960s - 1980s

Most commencements were held in the Armory Hall in the 1960s and 1970s, until the Iowa State Center was constructed. After the Iowa State Center was built in the early 1970s, the needs of the school changed as that the Armory Hall, which had served as a place for sports, commencements, and exhibits, as well as mainly for military tactics and drills, was converted into a general recreation area to accommodate tennis, basketball, badminton, volleyball, and related recreational activities for students by the time of the completion of the Hilton Coliseum in 1971.

Because it was a recreation center, the Armory Hall was used until 1990 for special events such as carnivals and activities of groups that could not rent the Coliseum.

The Armory Hall in the 1990s

On July 1, 1990, the main floor of the Armory Hall was remodeled to create design studios and jury rooms for the College of Design (Fig. 2). On October 2, 1990, design students moved into the building. At the same time, the ROTC moved to the State Gymnasium for their training.

As of late 1990, ROTC people had cramped space for their military education. ROTC offices and storage are in the Armory Hall, but training is done at the State Gymnasium. Military drills are no longer held at the Armory Hall, which resulted from neglect of military instruction by the school administration; ROTC now uses the State Gymnasium facilities for drill practice.

The Armory Hall is no longer reserved for use by the Military Department. Temporary design studios, ISU traffic and security offices, and a small number of ROTC offices are housed in the Armory Hall. The original philosophy of the Armory Hall has completely deteriorated and the Military Department has lost its place. ISU Facilities Planning and Management Department has no alternative plan for housing the ROTC program at ISU.

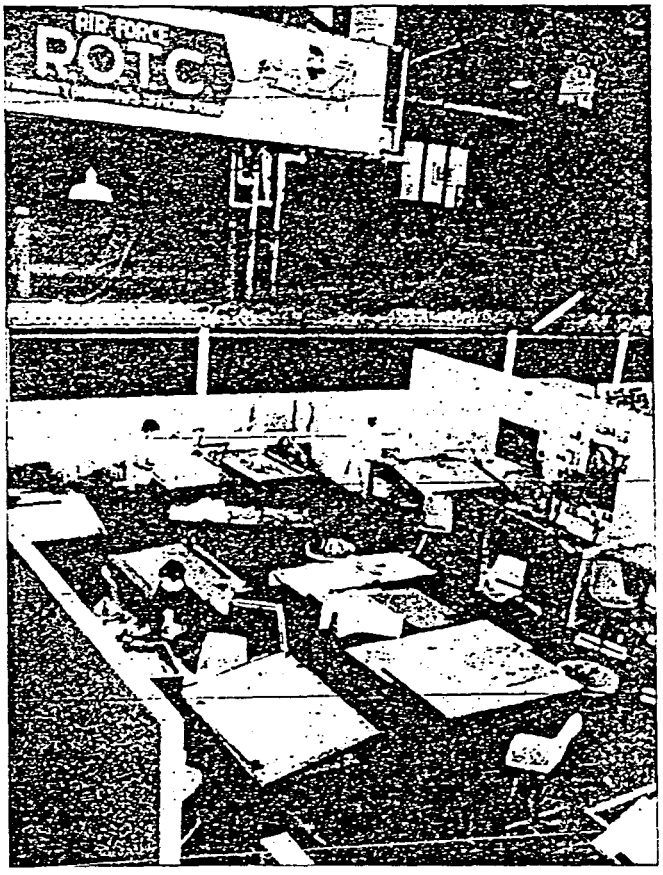


Figure 2. Space in the Armory Hall previously used by ROTC people is now occupied by studios for the College of Design (the Iowa State Daily, February 22, 1991).

Implications

The ROTC programs were weakened after their drill practice moved to the State Gymnasium. Lieutenant Colonel C. Kent Long, Chairperson of the Military Science Department, is reported to have said, in the ISU Daily of July 10, 1990, that "though the State Gymnasium is fulfilling the ROTC's need and the relocation to the State Gymnasium does not affect training procedure, there has been some disgruntlement and a loss of pride."

The Armory Hall (Fig. 3) was never designed to house design studios. The best long-term solution of the problem of use of Armory Hall for the future ROTC program is to review the Armory Hall's uses of design studios, public safety offices, recreation center office, ROTC offices, etc., and then relocate each of these to another building.

Figure 3. The Armory Hall 1994

With the construction of recreational and athletic facilities such as the Recreation Center, Beyer Hall, State Gymnasium, Physical Education Building, and some individual off-campus facilities, alternative buildings or sites are available to house the recreational activities now housed in the Armory Hall. There would be acceptable alternatives for most of the activities that are in the Armory Hall.

To accommodate and maintain the *"esprit de corps"* in the ROTC program, and to promote development of their program, the main classroom and academic functions should be in the same building (the Iowa State Daily, July 10,1990).

CHAPTER V. ARCHITECTURAL ANALYSIS OF THE ARMORY HALL

The purpose of this chapter is to review and analyze the current condition of the Armory Hall at ISU in view of ISU's Master Plan. This analysis evaluated the Armory Hall's architectural value and its economy as a campus building for the ROTC program. The analysis addresses various topics, such as location, structure, lighting, heating and cooling, noise, material and color, composition, circulation, and users. Lastly, the new Campus Master Plan is discussed in relation to the future of the Armory Hall.

Location

The existing facility is located west of the Chemistry Building and south of the WOI-TV and radio station building. President Pearson and the Board of Deans decided at the meeting of the Building and Business Committee on April 28, 1917 to locate the Armory Hall directly west of the Chemistry Building with its long axis north and south (Iowa Board of Education, Minutes May 11 - 12, 1917).

When the Armory Hall was first built, it was on the north west corner of the campus. It was purposely placed on the edge of the ISC campus, far from the core academic buildings that housed the major academic activities of the school. The nature of military tactics and drills was different from other normal classes at the school.

When the Town Engineering Building and the Design Center were built west of the Armory Hall during the westward expansion of the campus, the location of Armory Hall was no longer on the northwest corner of the campus.

Structures

After considerable discussion, the Board Architect and the McClintic-Marshall Co. of Pittsburgh, contractor for the structural steel, determined to furnish steel trusses that were longer and heavier but fewer in number as 160 feet wide and 210 feet in length. The 4" x 1/2" x 21' - 6" plate was riveted to upper and lower flanges of 15" channels (Iowa Board of Education, Minutes, October 8, 1919).

The most peculiar feature of the Armory hall is the structure of its arched roof. It is supported by an array of self-supporting steel trusses that avoid all posts in between, which span the entire drilling space and give an entirely open space on the floor for drilling (Fig. 4).

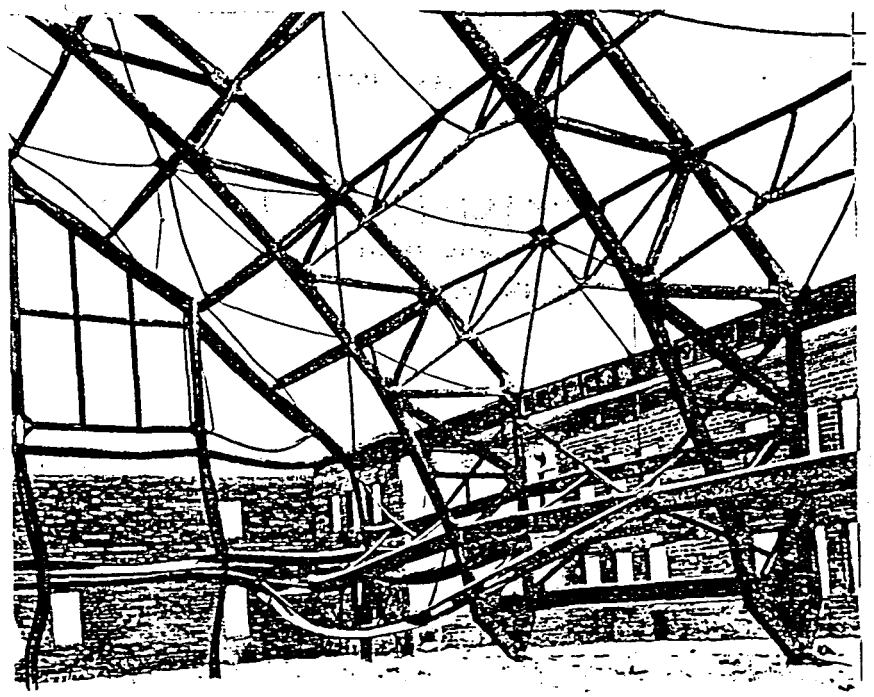


Figure 4. Steel trusses after fire of 1922

The steel trusses are of the hinge type and are placed on concrete bases on both sides. The depth of the trusses varies from three-and-a-half feet on the top to twelve feet on the bottom. Eight trusses were placed every thirty feet.

The clarity of structural expression is buried by the two side additions. The lower part of the trusses, below the arched roof, is clearly exposed. However, the bottom of the trusses is immersed in layers of additional construction, which based on the two-floor additions on both the east and the west side of the building. The most important structural elements of the interior space is the use of steel trusses to support the wide open interior space.

Daylighting

Daylight comes into the drilling area through two openings at the two ends of the arched roof. The two huge openings of the arched gable are formed by the arched roof and the walls on which the arched roof sits. Little daylight comes through the other punched openings on the wall to illuminate the inside. Thus, the two arched openings brings light that allows people to easily perceive the huge interior space, which is also defined by the roof.

The balconies and bleachers on the south and north ends of the drilling space built in 1956 block much of the arched openings (Fig. 5), greatly reducing the amount of the daylight entering the drilling space. Daylight entering through the huge openings is also greatly diminished by the frames of the grid mullion as well as the translucent glasses on them. Therefore, the level of illumination necessary for the activities in the hall must be maintained by artificial lighting.

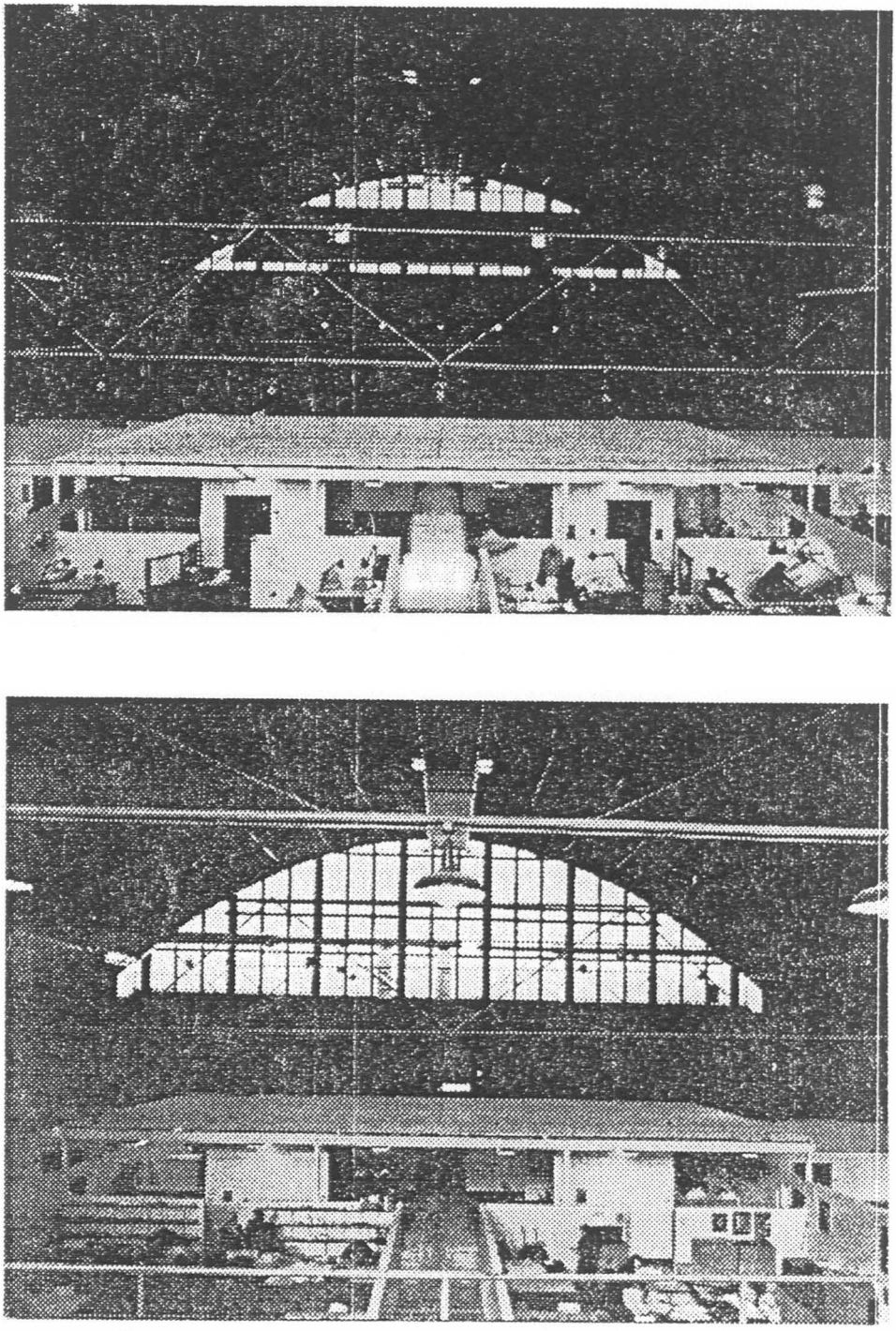


Figure 5. Daylight in the drilling hall: much light is blocked by bleachers. South opening (top) and north of it (bottom) (Feng, 1994).

Artificial lighting

The geometrical nature of the space defined by the Armory Hall's arched roof creates a more intimate space within the drilling space illuminated by the artificial lighting from the ceiling. The drilling space is defined by the arched roof of the regularly arrayed trusses. Four sodium lights on the ceiling illuminate the drilling hall, making tremendous noise. The over-hanging incandescent lamps also make the space above the incandescent lamps invisible. The invisible space offers the sense of huge scale to the Armory Hall.

Thus, people cannot easily be distracted from their activities within the spacious drilling hall. Though the incandescent lamps help to make an intimate space in the hall, they produce a great deal of glare in the drilling hall.

Since the architectural studios have been moved in on the drilling hall, partitions in the studio have been painted white to maximize reflection of light in the studio. However, the level of light on drafting tables is not enough to allow for drawing. Students find it necessary to set up their own lamps for their studio work.

Heating and cooling

The huge drilling space needs a great deal of energy to heat or cool its air. Two huge arched windows at the south and north lose a great deal of heat in cold weather. The old grid mullion structure easily loses heat from inside to outside, the thermal resistance of the arched windows is not enough to block heat movement efficiently.

Conversely, when the building is air-conditioned in hot weather, the two arched windows cannot stop the heat movement from outside to inside.

The vaulted roof presents a problem of heat gain and loss. The roof is made of Imperial tile and concrete on the arched trusses. The concrete is easily heated

by the sun on hot days and absorbs a great deal of heat, and heats the air inside over a long time. On the same principle, the concrete roof cannot stop heat movement from inside to outside through the roof in cold weather.

Noise

Sounds at the edge of the drilling hall are reflected to its central floor by the arched roof, which greatly enlarges sound as a sophisticated sound impact in the central floor. The steel bleachers at the south and north also reflect all the sounds off them. When the space is full of activities, the drilling space is heavily loaded by oppressive noises together with vibration (Feng, 1994).

The sound from the four high-voltage sodium lamps on the ceiling, which were installed in 1980, added to the noise inside the Armory Hall. Thus, the noise level is much higher than ambient noise level.

Material and color

The exterior walls of both wings are made of brick and the arched roof is covered with red imperial tile. The brick walls and the tile roof are both red, with little difference in color. Doors and window frames are made of steel and are painted white. The trims and horizontal bands are made of concrete and are light gray, nearly white.

Though the red color dominates the east and west elevations, the white shimmering in between the red brick produces a rich pattern. The whole harmony between white and red makes a strong unified mass. When the arched roof is partly covered with snow in winter, the color effect, between the red brick of the wall and the red tile of the roof, along with snow on the roof and ground, shows a wonderful match of color.

The color effect of the south facade is coarse and weak compared to that of the east and west elevations. Within the red brick on the wall, there is some unorganized white color from the white painted frames of the arched window on the top of the brick wall. While the intensity of the white seems strong enough, the darkness of the opening from inside mitigates the whole mass of color. The frames of arched gable windows painted white make a white block. Thus, the white block simply sits on the top of the red block with a weird match to each other. The color elements of the south facade are not in good harmony with other facades, which confuses the building's unity.

The interior space has a factory-like appearance because of such very strong features as trusses, barely open materials and their dark colors, old construction methods, reflected and vibrated noises, etc. The walls, made of large light yellow bricks, look old and depressing in color. The surface of the arched cement ceiling is rusted and dappled by leaks during rainstorms over many years. Beneath the arched cement ceiling are suspended electric circuits for incandescent lamps. The gray painted trusses add to the deterioration of the space and make the inside space ugly.

Steel trusses suspend the lamps and support the arched roof, columns and beams, railing, and the huge ventilation pipes that go through the trusses and along the arched windows of south and north. These structures are revealed and their dark colors contribute to the poor inside space of the drilling hall.

Composition

The exterior of the Armory Hall is composed of two masses: the rectangular large box and the vault on the top of the box (Fig. 6). This produces different elevations, which can have a visual beauty or ugliness.

A viewer at the south or north of the building is disappointed by the visual failure between the rectangular box and the vault (Feng, 1994). At the north, the building looks like the back side of an engineering building. At the south, the vault and the low rectangular box do not match well and conflict in terms of shape, materials, colors, function, and structure.

The white vault on the brick wall does not dominate the rectangular brick mass. The vault is neither higher and nor more detailed than the brick box. In contrast, the low brick box is more detailed. The two elements are equal to each other. Thus, the front facade has failed to achieve a visual harmony with the rest of the building. Its failure is soothed by trees that block the facade.

The reason of the visual failure at the south is that the original plan of 1920 was not accomplished because of budget constraints. The original plan had an extension to the interior space on the south side, which could serve as a transition between outside and the drilling hall. The extension was a symmetrical and consistent, and reinforced the symmetrical composition of the whole building. The extension had its horizontality by serving as the base for the vault on it.

A view of the building from west or east has a good composition and produces satisfaction. Additionally, there is a formal unity between the vault and the brick box. Though the brick walls are sufficiently detailed, the vault dominates the brick mass with a good composition.

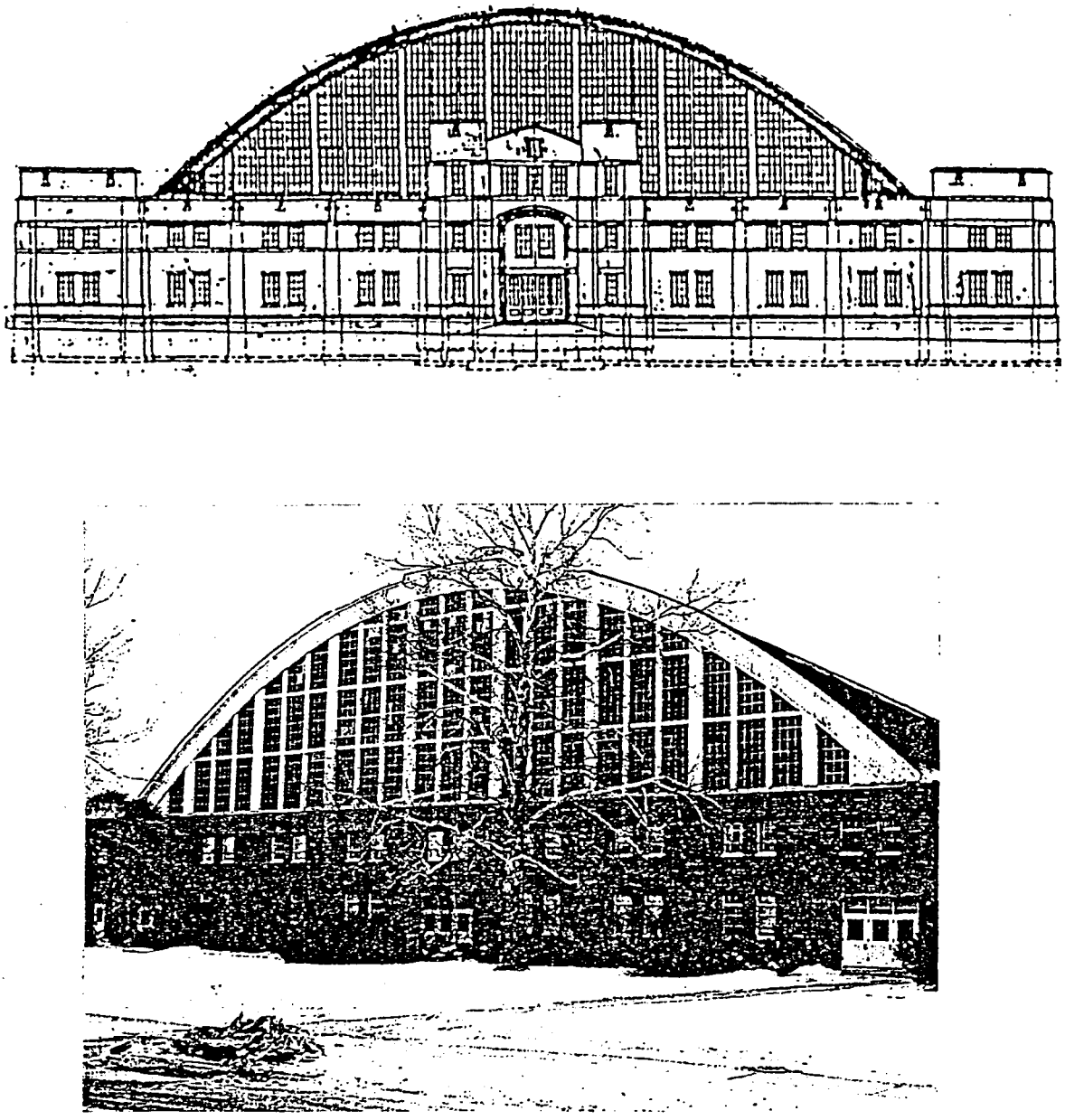


Figure 6. The original south elevation of the Armory Hall in 1921 (top) and south facade in 1995 (bottom)

Circulation

The circulation of the Armory Hall is simple. The huge drilling space is connected to two south entrances. An additional balcony at the south forms a short passageway between the main entrance and the drilling space. The transition through the passageway to the drilling space offers efficient recognizable psychological preparation for the entrance into the drilling space.

The pathways on both sides of the drilling space reach the two exits at the northeast and the northwest corners. The two pathways are not directly connected to the exits, which gives a new informal sequence. This informal circulation gives the building's formal composition a more intimate transition.

Users

The Armory Hall serves many departments. The major drilling hall is used for design studios of the College of Design. The Department of Public Safety is at the north side of the building, and its Parking System Office is at the southwest side of the building. The ISU Recreation Service Outdoor Recreation Center and Program has a small office and mainly its warehouse for equipment such as boats and outdoor life equipment.

The Military Department has a small part of the Armory Hall. The east and south addition and the second floor of the west addition are given to the Military Department. Since the design studios moved in during the Fall of 1990, drills have been done at the State Gymnasium and at the edge of the golf course, which is north of the Armory and west of the WOI-TV and radio station.

The new campus master plan

The ISU Master Plan, which was done by Sasaki Associates Inc., of Pittsburgh in February of 1990, is a plan to guide the physical growth of the ISU campus during the next thirty years. The Master Plan has a building demolition plan for the Armory Hall and some other buildings that are expected to be demolished to make space for new construction according to a project priority.

The phasing program for some buildings is on the University's Ten-Year Capital Request List. Before demolition of the Armory Hall, the school authorities has a "relocation of uses" plan. The plan calls for moving out the design studios on the drilling hall when the Design Center addition is built. The ROTC programs will move to the State Gymnasium, which recently offered its space for drilling of the ROTC. The other departments will be relocated to other facilities according to the nature of their programs.

The Armory hall will be no longer for use by the military science programs, and the Military Department are scheduled to lose their home soon. The Military Departments, which have been with ISU from the beginning, are in need of their own building for its program development.

CHAPTER VI. EVALUATIONS OF ARMORY (ROTC) BUILDINGS AT THREE UNIVERSITIES

The purpose of these evaluations is to identify and determine positive and negative design features that Armory buildings at different universities may share in common. The armories analyzed were at the Ohio State University (OSU), the University of Iowa (UI), and the University of Nebraska at Lincoln (UNL). These are all land grant universities in addition to having a long history of ROTC programs. However, each school significantly differs in the status it gives its ROTC programs through the ROTC building.

Historically, the OSU, the so-called "Ohio group," successfully carried out plans to get Congress to adopt "the Ohio plan" for utilizing existing military training in civilian colleges by expanding it to include the ROTC program. The ROTC plan was presented to the Congress by the War Department and incorporated in the National Defense Act of 1916, which established the ROTC program (Pollard, 1964). So far, the OSU ROTC program has been one of the biggest programs in the nation and has three ROTC programs (Air Force, Army, and Navy).

Like the OSU, the University of Nebraska at Lincoln (UNL) has three ROTC programs. The ROTC program at the UNL not only has a similar historical background to ISU, but also is well recognized and has a meaningful existence, unlike the other universities. Moreover, the ROTC program at the UNL was one of the testing bed schools designated by the Department of Defense and Congress. The test was to research how to efficiently carry out training of three ROTC programs at civilian schools; the test stopped because of the difficulty of evaluating different armed forces' ROTC programs and their curricula as a unique value in

1994. Each of the three testing bed schools, such as ISU, UNL, and University of Washington, has three ROTC programs.

Lastly, the University of Iowa had an excellent ROTC facility, but currently the ROTC facilities are too poor to fulfill ROTC's educational mission. The University of Iowa currently has two ROTC programs (Air Force and Army) and they have been continued to move to smaller buildings than before by the school. Additionally, the liberal campus does not easily incorporate the ROTC program into its academic courses and objects to having the relatively conservative ROTC program on its campus. The evaluation of University of Iowa reveals one of the bad example of a ROTC building to offer ROTC programs in it.

The three school facilities were evaluated through physical tours of the facilities; extensive study of their sites on their campuses, floor plans and elevations, relations between the ROTC building and other gymnastic facilities, and building history; and personal interviews with ROTC staff, students, and other civilians related to the ROTC building.

These evaluations primarily dealt with the history of the original armory buildings and other ROTC buildings and included architectural analysis. Though the armories at the three universities differ in time of construction, image, style, etc., they have in common the fact that they represent three different ROTC architectures in the colleges and universities in the nation.

Information obtained from each University Archives as well as interviews with related people in this chapter, leads to establishment of a set of design rules and guidelines. These offer design concepts directly and indirectly related to the architecture of ROTC.

The facilities were analyzed not by a particular format or sequence, but by free approaching exploration and observation by this researcher. As a result, the

following three evaluations vary in history and content. However, the observations and recordings of design features from these facilities remained consistent to determine what the architecture of ROTC is.

The Ohio State University

The Ohio State University Armory, a French Feudal style building, was built for the Military and Physical Education Department at a cost of $115,000 in 1897 (Fig. 7). It was designed by architects Packard and Yost of Columbus, Ohio. The building was destroyed by fire in 1958 and razed in 1959. The materials were brick, terra cotta and limestone. The main drilling part was a one-story building with a two-story front tower. The basement had two swimming pools. The building had been used for commencement ceremonies and a variety of social functions.

The Armory was built as a multipurpose facility for ROTC, physical education, athletics, large social events and commencement ceremonies. Its mezzanine floor was added to provide for an indoor track. The main floor had a drilling hall that was 80 by 150 feet in area (postcard collected by Richard E. Barrett, 1912). The building served as a gymnasium and basketball court; two swimming pools in the basement were not used for interscholastic competition because of the small size. The Armory was turned over to the government for its exclusive use on May 21, 1917, for preliminary training of men for the Signal Corps. It was taken over by the Naval ROTC in 1945. In the 1930s, the Armory was in such full swing that it additionally served as a dance hall as well as for commencement, until graduating classes grew too large.

All the offices for military personnel were in the Armory until 1942, when the Military Science Building (Converse Hall) was built. The field artillery training

program moved out of the Armory. The executive offices and the Signal and Engineering Corps units stayed in the building.

The new Military Science Building (Converse Hall) was built by the Works Progress Administration (WPA) in 1941 (Fig. 7). At first, military vehicles were serviced at this building. The current second and third floors were added in 1943.

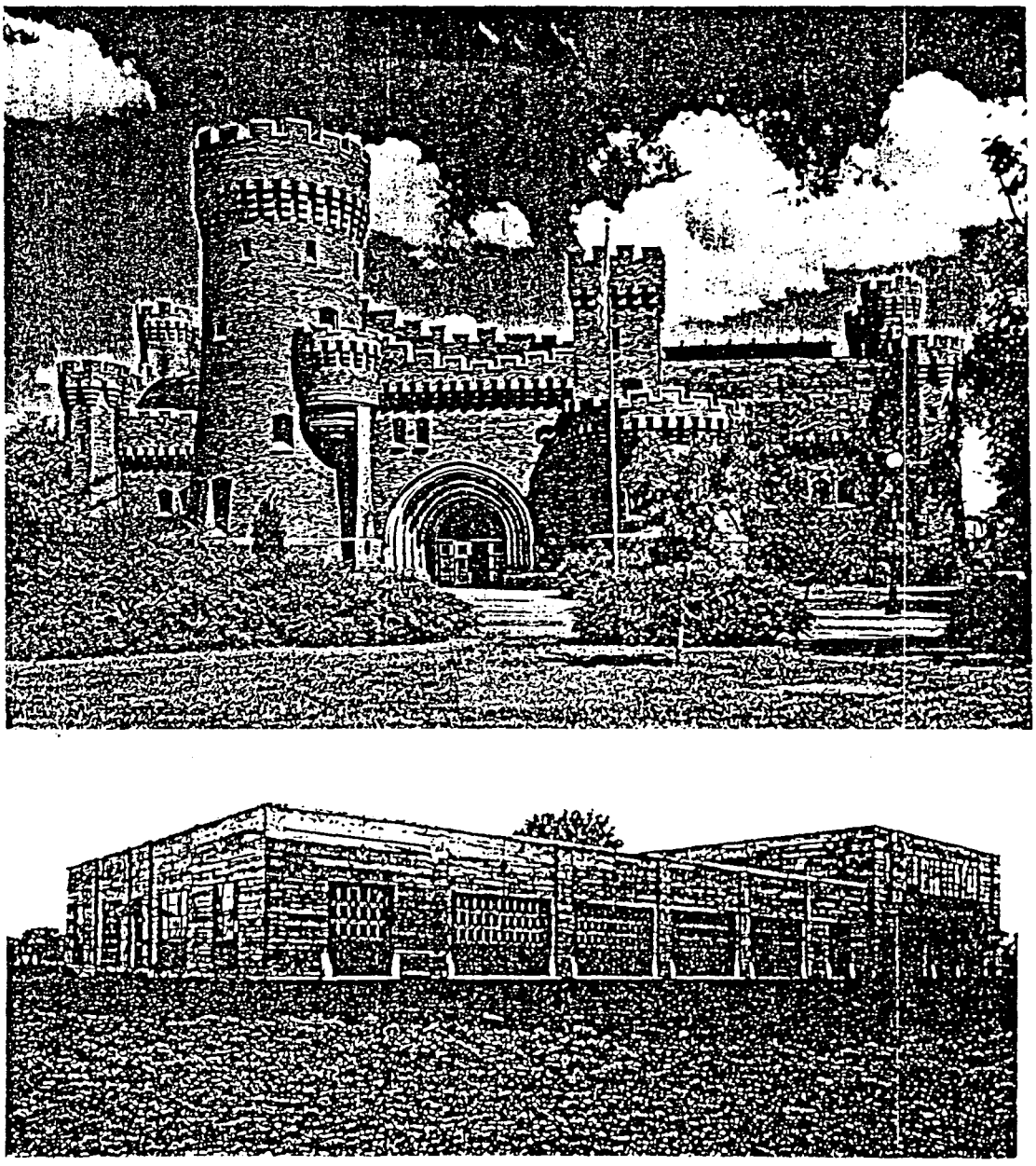


Figure 7. The Armory of 1897 (top) and the Converse Hall of 1941 (bottom)

It was known that as the Military Science Shop and Storage Building and ROTC building. Converse Hall has housed three ROTC units (Air Force, Army, and Navy), the University Archives, and the Wylie Rifle Range since 1942.

In 1958, the Armory burned, and it was torn down the following year. Though the Armory had lost its old glory, the Armory still remains a cherished memory for many old OSU alumni. It became a fitting reminder of the grandeur of a time gone by.

Long after its demolition, the Armory repeated itself as a likeness of the OSU landmark was incorporated into the new Wexner Center for the Visual Arts on the Armory site in 1985. The Wexner was designed by Trott and Bean of Columbus, Ohio and Eisenman/Robertson Architects of New York City. The oval of the Wexner Center is only a replica of the Armory.

The University of Nebraska at Lincoln

The Armory Building at University of Nebraska-Lincoln (UNL) was planned to house all Lincoln Reserve units as well as housing the University's ROTC program during the daytime. Construction of the Military and Naval Science Building was completed at a cost of $300,000 in 1947 (Fig. 8). It was located east of the school Coliseum. The Military and Naval Science Building has been used jointly by the Army and Navy ROTC departments from the beginning and Lincoln Reserve Units never did not move in the building. All three ROTC programs (Air Force, Army, and Navy) are now housed in it.

The Military and Naval Science Building was built of brick and structural steel. Inside the building has exposed electric outlets; and circuits that were replaced long after its completion. The building has a capacity of 400 persons with extension area for 400 more, an indoor rifle range, warehouses, three classrooms,

ROTC offices, cadet lounges for each of three units, one volleyball court on the ground floor, one basketball court on the third floor, etc.

In 1970, the building had difficulties as the result of students' anti-military demonstrations stemming from dissatisfaction over the Vietnam War. The Military and Naval Science Building, the nearest symbol of the U.S. military forces on campus, was occupied by students, who were frustrated and angered by the death of anti-Vietnam War demonstrations in Ohio. Four students had been killed by shots fired by Ohio National Guard troops brought in to quell a demonstration at Kent State University, Ohio, on May 4, 1970 (Wayman, 1990). Finally, the students walked out peacefully before ROTC students arrived the next day.

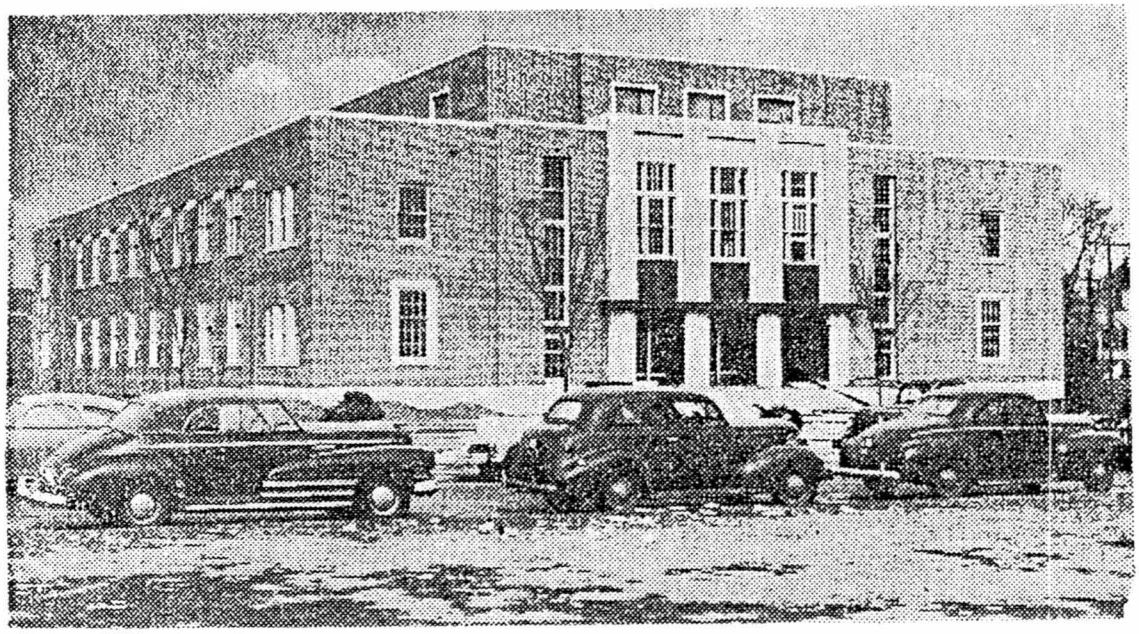


Figure 8. The Armory at UNL of 1947

Since its construction, the Military and Naval Science Building has served ROTC programs of the University of Nebraska at Lincoln (UNL). Moreover, the building is located close to core academic facilities and has as its close neighbors, sports complexes to the north and west. The Military and Naval Science Building is so visible on campus that people are aware of where the building is and are fully aware that the ROTC programs are located in it.

Additionally, the classrooms in the Military and Naval Science Building are used for academic courses in the evening. The indoor basketball and volleyball courts are open for the recreation program after six p.m.. After ROTC schedules necessary functions in it, some recreational activities, including medieval knight games, are held in the building. Thus, the Military and Naval Science Building at UNL is well recognized on campus. With the openness of the Military and Naval Science Building to the public, ROTC programs work very well within the building.

ROTC programs (Air Force, Army, and Navy) are housed in the same building so that they can easily make joint efforts in scheduling their classes as well as joint ceremonies at the building. Furthermore, two different ROTC departments, Army and Marine Corps, help each other in their military tactic classes by playing enemy to each other.

Besides the Military and Naval Science Building, ROTC students have access to any University sports complex for their training. They use the indoor football arena for their physical fitness training in the morning, the swimming pool for their water survival training, the weight lifting room for body building, and so on.

The Military and Naval Science Building at UNL has a strong academic environment, not strictly military institution environment. Civilian and ROTC students mingle in the Military and Naval Science Building as in any other buildings on campus.

ROTC programs and their facility at UNL are an excellent example of how the ROTC program and its facility work together with other academic courses and facilities. Not only are other academic courses held at the Military and Naval Science Building, but also the building is located close to excellent athletic facilities, which are always open for ROTC programs and their training. These factors result in a good status of the ROTC program within the academic environment on the campus.

The University of Iowa

Three buildings have been used for the ROTC program at the University of Iowa. The three buildings (the Old Armory-Men's Gymnasium, New Armory, and Quadrangle) were successively built and used for the Military Department. They will be described in order.

Old Armory-Men's Gymnasium

Men's gymnasium was built after Building Committee of University of Iowa recommended construction in 1904 "for an athletic pavilion and armory, same to be so constructed that when no longer required for these purposes, it will be available for other University needs" (Bates, 1949). The Old Armory, made of brick with limestone, was built at a cost of slightly over $30,000 for use as a men's gymnasium as well as for use as the armory in 1904 (Fig. 9).

The original building contained a rectangular gymnasium that was a three-story structure in front and otherwise two stories high. The gymnasium's dimensions were 86 by 170 feet, and it occupied three-fourths of the building. It was equipped with a canvas-lined running track, a drill floor, baths, lockers, and all other necessary apparatus. The military department had offices on the second

floor and conducted drills on the dirt floor of the basement. It also had a parade ground in front of the building.

Its prime years were 1904 - 1920, when athletics and military drills were so much a part of the students' curriculum. Moreover, all intercollegiate athletic events during this period, such as football, track, and baseball, were held either in the Old Armory or on the adjacent Iowa Field.

During the World War I years, the Old Armory served as a barracks for the Student Army Training Corps (SATC). The SATC conducted military maneuvers in the mess hall in the basement of the Old Armory. The Military Department wanted and prepared another new armory to provide more efficient training and services for a larger regiment.

By 1928, the athletic and military departments had outgrown the Old Armory, despite a 1915 addition. With construction of the New Armory as a part of the Field House for athletics by 1920, the athletic and military departments moved to the New Armory in 1928. The Old Armory was converted to a Library Annex, containing reserved books, periodicals, and government documents until the early 1950s.

The Old Armory underwent more changes in the mid 1950s. Several plans were made to convert the Old Armory into a proscenium theater and concert hall during the 1950s. The Department of Speech and Dramatic Arts had classrooms there, starting in the Spring semester of 1950. With the completion of the new main library at the school, the north addition of the Old Armory was converted to a film and TV broadcasting studio in 1952. In 1953, the Old Armory was taken over by the Broadcasting and Dramatic Arts Departments. New TV studios for teaching as well as the Studio Theater were provided (Sellen, 1985).

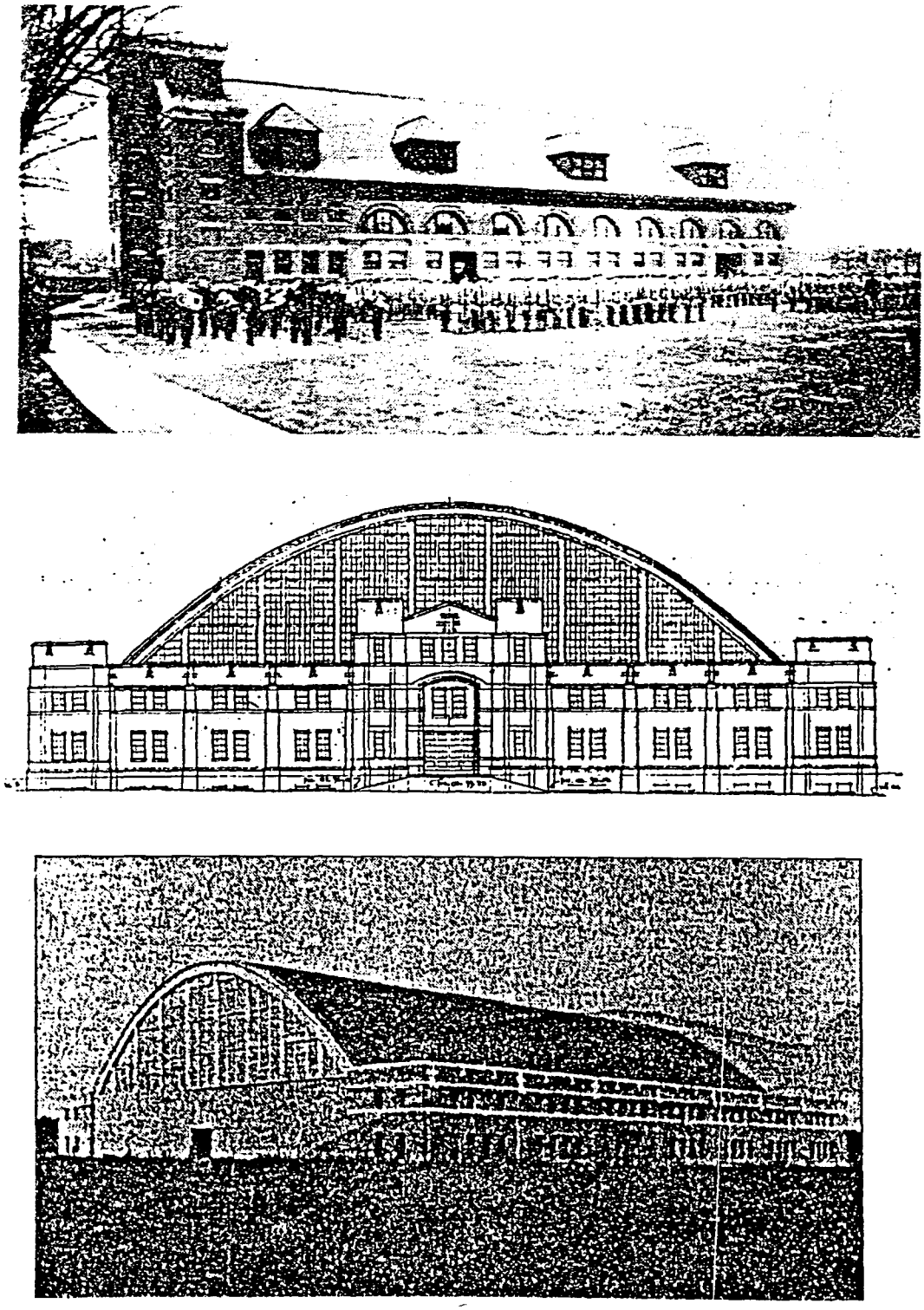


Figure 9. The old Armory (top), the New Armory's original front plan (middle), and the Armory of 1920 (bottom) at the University of Iowa.

The Old Armory underwent inevitable decay throughout years of changes. All of the rooms in the Old Armory were considered temporary spaces to be used until new facilities could be constructed for the Broadcasting and Dramatic Arts Departments. With the completion of the Theater Building in 1985, the Old Armory building was demolished at the University of Iowa.

The New Armory

A large new Armory was constructed at University of Iowa to relieve the congestion of the Old Armory in 1920 (Fig. 9). The building served for as an armory and later became a part of the Field House as a gymnastic facility. The 37th General Assembly approved the $125,000 appropriation to build armories both at the State University of Iowa in Iowa City and at Iowa State College in Ames.

The design of the New Armory at University of Iowa was exactly the same as Iowa State College's armory in Ames. They were designed by the same architect (Mr. Proudfoot). Its area was 160 by 210 feet, and it had a huge drilling hall, which was formed by the steel frame in the central part. A wood frame was incorporated into both sides of the drilling hall on top of the huge brick structure with stone trimming. The front had two stories, which made a distinctive main entrance, and provisions offered administrative offices and classrooms. Additionally, the front part had a large room for band practice, exhibition of military trophies, and club meetings, etc. (The Iowa Alumnus, 1920).

Two-story additions flanked both sides of the trusses. One wing was devoted to shooting galleries as well as with storage space. The upper story of the opposite wing also contained rooms for equipment storage, and its lower floor was used as a garage for the storage of army trucks. These two wings were open to the interior. Provision was also made for machine shops, testing demonstrations,

arrangements for instruction in repair, maintenance, and operation of all classes of army vehicles. After completion of the New Armory in 1920, much additional work was done on it, including fireproofing, fire protection, and renewal of the side roofs.

Although the building was erected in 1920, it was not used until a year later because of lack of funds for finishing its interior, heating, lighting, etc. The Military Department moved into the New Armory in February, 1922; graduation commencements started to be held at the building as well. The completion of the Armory made battalion drills possible throughout the winter of Iowa as well as providing enough classrooms, storage spaces, and shops for the Military Department. The floor was dirt to facilitate holding military drills on it during inclement weather. Forty acres adjoining the New Armory was acquired and set aside for drill grounds.

The New Armory was planned primarily to serve the Military Department. By permission of the Military Department, it housed Iowa inter-collegiate basketball games as well as other indoor games which could not be accommodated in the Old Armory.

The New Armory also served not only as a basketball court, with its much increased capacity for spectators on the east part of drilling hall, but also as a field for football games on the dirt floor (Weber, 1987).

The New Armory continued to serve the Military Department and provide a place for inter-collegiate sports until 1927. By this time, the New Armory was incorporated into the Field House, which was constructed to serve as gymnastic facilities for inter-collegiate sports games as well as for Iowa athletics and physical education.

The University of Iowa Planning and Administrative Services decided in 1988 to raze the New Armory to allow University Hospitals and Clinics to have

room for a new psychiatry pavilion, which was built in 1989. The New Armory was demolished to build a three story, 72 bed psychiatric hospital, which is connected with Colloton Pavilion of University Hospitals (Bartenhagen, 1988).

The South Quadrangle (ROTC Building)

The South Quadrangle (the present ROTC Building at the University of Iowa) was built in 1918, before the New Armory of 1920. The South Quadrangle was built to serve as Army barracks for the Student Army Training Corps (SATC) during World War I (Weber, 1987). The war ended before completion of the South Quadrangle, which became a men's dormitory until the Military Department moved into it in 1988.

Before the Military Department moved in, the South Quadrangle residence hall offered classrooms for common sections of three or more core courses. The courses were taught in the residence hall itself as a pilot program called "living-learning," viewed as one possible answer to the impersonality of a large University in the mid-1960s. Pre-dentistry, pre-medicine, pre-pharmacy, and pre-engineering students had been tapped for the South Quadrangle pilot program (McDonald, 1967). Then, the dormitory was converted into the ROTC building for Army and Air Force ROTC programs when the new Armory was demolished in 1988.

Conclusions

Because of its physically oriented nature, ROTC programs were placed with the physical education and athletics departments. Through the compulsory military training and intercollegiate sports games at the ROTC facility at each school, the ROTC building had been a central place of social life on colleges and universities until the Vietnam War.

The Military Department of most colleges and universities started to shrink nationwide by accepting military drilling as a voluntary activity instead of continuing to make enrollment compulsory. Moreover, the dissatisfaction resulting from the Vietnam War spurred universities to place the ROTC programs outside the academic courses at colleges and universities.

The ROTC program has been a peripheral existence in the academic programs of the schools. In a few schools, such as the University of Nebraska at Lincoln, the ROTC program is well recognized as a part of academic courses within core academic facilities of the University. At most universities, for example the Ohio State University and University of Iowa, the ROTC program and its facilities are kept outside of academic courses and are low-key compared with other academic courses. When other courses expand, the ROTC program and its facilities are the most vulnerable program on campus.

The ROTC programs at Land Grant Universities are over 100 years old. This is a very long time span in terms of academic age at Land Grant Universities. The age of Armories at each school also has been more than the age of any other buildings. It is better to conclude that the design of a new building that has its highest evolutionary level to date back in spirit to the original Armory buildings. How the military program is going to chart its overall objectives at Land Grant Universities is a problem to be solved within the logistical framework of an institution. This incorporates into the facility, ROTC people's respective contributions and missions, and finally goes to their level of patriotism.

CHAPTER VII. THE ARCHITECTURE OF ROTC

In this study, the author sought to provide information on the ROTC building, both general architectural and historical. A few retrospective conclusions suggest themselves. Through the ROTC building, a wonderful combination of typical Land Grant Universities' characteristics and unique features of military education will foster a sense of pride in their institution and country.

This conclusion is related to issues of a new type of ROTC building, and these issues are addressed next. In writing this thesis, generalizing and applying the previous research in history and architecture to physical building design requires a complex combination of theory, analysis, synthesis and practice. The combination explains the architecture of ROTC in terms of the idea of Land Grant Universities, the *esprit de corps* of the ROTC program, current status of the ROTC program on campus, and the Architecture of ROTC.

The idea of Land Grant Universities

The nature of Land Grant Universities has a special background related to their birth. The Land Grant Universities have had a special relationship with the nation, which needs military training at Land Grant Universities for national defense. Under the Morrill Act of 1862, Congress required military training at the Colleges and Universities in order for them to share federal benefits. Most American colleges and Universities are responsible for sharing in the national defense as a part of a free society.

Esprit de Corps in the ROTC program

Because there are always physical challenges involved in the field, physical training is essential in training future officers of the armed forces. Therefore, to train potential leaders, the ROTC program is largely based on leadership through drills, which are designed to increase the cadets' participation and motivation toward their performance in the ROTC program as well as their future military careers.

The drilling of the ROTC program is based on selfless and often enthusiastic and jealous devotion of the members of ROTC with the *esprit de corps*, which is not only obedience to orders, but also acceptance of responsibility (Webster's third new international dictionary, 1986).

At the same time, the *esprit de corps* improves their attitude and their pride in their performance in the activities of the ROTC program. In a word, *esprit de corps* is a vital goal of the ROTC program.

Current ROTC program

Each ROTC host institution has adopted the ROTC program as an integral part of its curriculum in accordance with federal law. The ROTC program has been the only instructional program on campus whose curriculum is evaluated and determined by an external organization and where staff have been provided and financially supported by the same body.

However, the ROTC program and its educational facilities are paid less attention than other academic courses. The ROTC program has been regarded as having a peripheral existence among the academic courses of the institution. Each host institution has basically been not interested in ROTC programs and has conducted them with a minimum of input. Most Land Grant Universities have relocated the ROTC facility from the original ROTC or Armory building at their

school because of their changed academic needs. In a word, the ROTC program had been changed nationwide as outside of academic courses, which is represented by the ROTC building.

The current ROTC buildings at most Land Grant Universities were not originally designed for the ROTC program. As a result, the buildings do not have proper architectural features for the ROTC education in it. For example, the indoor drilling hall is separated from offices and classrooms, and this results inefficiencies and troubles for ROTC education.

ROTC courses are both academic and professional in nature. The aim of the Department of Military Science and Tactics is to coordinate discipline of mind and body and develope character, initiative, and all other vital elements of executive leadership. The ROTC courses heavily rely on personal and collective interaction between teacher and ROTC students. Thus, their architectural environment is very important to their education.

The ideal architecture of ROTC facilities

The underlying concept of ROTC architecture is the design of buildings, for the ROTC program on campus. To fulfill ROTC's academic as well as professional nature, a building should be specifically designed for the program. In real terms, the hosting institutions have difficulty justifying an entire large gymnasium building for the ROTC program alone because of facility shortages for other academic courses. Thus, the ideal ROTC building is one that would 1) house all ROTC units (Air Force, Army, and Navy) in one building, 2) be located within core academic facilities on the main campus, 3) be large enough, and lastly 4) share the huge indoor drilling facility with other academic programs such as the recreation and athletic departments.

Three ROTC units at one building

The ROTC building should provide a comfortable and functional space in which three ROTC units can communicate together within one building. The inter-communication between the different armed forces is very important to learn about the organization and military principles of other armed forces. In the real world, it is impossible to carry out a military mission without cooperation of different armed forces. Therefore, three ROTC units necessarily need to get together to learn about each other while they are in school.

When the three armed forces' ROTC units are together in one building, ROTC students can easily have opportunities to learn about other armed forces' military tactics and strategy. Moreover, they can cooperate in their education and training, because much of these is in common, so that the three ROTC units have similarities of character and program. Not only ROTC training, but also efficient use of drilling space and classrooms for their education, is possible with economical use of the building through cooperation.

Location

Most ROTC students' academic requirements are based on their major courses. In terms of credits required for graduation, military science credits are a small percentage of the total. Therefore, their major academic activities take place within core academic facilities. The location of the ROTC building should thus be within core academic facilities so as to be near their academic activities.

Moreover, within core academic areas on campus, intercommunication between ROTC students and other civilian students is very important in sharing opinions on issues related to national security. Basically, national defense should not be separated from a free academic society. At the same time, through such

frequent interactions on campus, other students can become familiar with the ROTC program on campus. This interaction thus allows civilian students to easily join the ROTC program available to them within core academic courses and facilities.

Not only the academic activities of the ROTC program, but the other gymnasium facilities as well, should be located conveniently near the academic buildings and student housing, because the athletic facilities of the ROTC building also should be easily usable by all the students.

Size

The building should be large enough to house three ROTC units within one building. Mainly, the indoor drilling hall should measure 120 by 90 feet, with a minimum ceiling height of 23 feet. This height allows a 22 foot clearance for the rope climb and is ideal for hanging mechanical systems used in gymnastics.

The size of a 120 by 90 foot indoor drilling hall is enough for 300 ROTC students to drill at one time. Currently, one Military Department, which has three ROTC units (Air Force, Army, and Navy), at most large big universities have around 300 cadet students. Enrollment has been nearly the same during the last two decades. Considering possible future expansion of the ROTC program at colleges and universities in the nation, enrollment of each ROTC program at an institution may reach a maximum of 300 students.

With the indoor drilling hall for 300 students, auxiliary spaces such as classrooms, warehouses, locker rooms, rifle range, etc., are needed to allow sufficient military education in it for that number of people.

Sharing of facilities

Along with providing opportunities for interaction with other students on campus, the ROTC building should also provide a place for interaction between other civilian students in recreational or athletic programs and ROTC students.

Practically, the host institution has problem in allowing an entire building for the ROTC program, because of other academic facility needs. It is very expensive to keep a large indoor drilling space warm or cool enough for its use in addition to constantly maintaining the building.

Thus, a large inside space for the ROTC program alone is too expensive for a host institution. Therefore, the indoor drilling space and other possible space of the ROTC building should be shared for other academic purposes, with priority given to ROTC classes. At the same time, all athletic facilities of the university should be close to the ROTC building and open for ROTC training.

A drill field close to the building is necessary for ROTC training. The drill field would be used for training , marching, physical exercise, etc. The soccer playground with a running track outside it is sufficient for an ROTC program. This playground also can be shared for other academic purposes.

Additionally, the swimming pool should be close to the ROTC building for water-related training such as physical fitness through swimming and water survival training.

CHAPTER VIII. DESIGN PROPOSAL

A conceptual analysis of the ROTC program at ISU concluded in the early stages that the ROTC facility at ISU is definitely in need of redesign of its building rather than remodeling of the Armory Hall. The redesign began with analysis of the ROTC facilities at four large Land Grant universities in the U.S., mainly through interviews with ROTC people at these institutions.

Through analysis of the ROTC facilities at four universities Chapter V and VI, unique characteristics of the facilities in regard to the program, building, location, size, usage, etc. were identified as the architecture of ROTC in Chapter VII. The common design features of the architecture of ROTC were applied to recommend a successful design of the building at ISU. Information on the common design features was used in the early concept stages and helped identify design patterns for the ROTC building. The proposal is developed into written formats.

As was stated in Chapter VII, the results suggested that the most desirable design requirements are 1) to house all of the ROTC programs under one roof, thereby promoting the interaction between different ROTC programs, 2) to place the ROTC building within core academic facilities so that it is close to other academic activities, 3) to be large enough to house three ROTC programs within one building, considering the possibility of future expansion of ROTC program at ISU, 4) to share the ROTC building, including classrooms, indoor drilling hall, etc., with other academic programs.

These design requirements of the architecture of ROTC outline the design strategy pertaining to this design proposal. The following literature provides the logic behind the design proposal of a new ROTC building at ISU. (For figures related to the design proposal, see Appendix, Figures 10 - 16.)

Site

The ISU campus has maintained the principle of maintaining the historic central lawn as a park-like open space that links historical buildings on it to surrounding campus areas by both pedestrian corridors and major streets.

The ISU campus master plan, done by Sasaki Associates of Watertown, Massachusetts, in 1992, recommends that the college of Liberal Arts and Science in the center of the campus, the college of Agriculture to the east and northeast, and the college of Engineering to the west, be retained to keep the historic pattern of land uses. The plan recommends the proposed expansion be located at the perimeter of the central core area.

The master plan has as a priority to maintain the function of all the buildings that focus on instruction within the central part of the campus, within a ten minute walking distance from Beardshear Hall.

This priority of the master plan of the ISU campus has been kept consistent in choosing the site for the ROTC building with the following considerations; 1) the campus master plan, 2) the relation to other academic activities, 3) maximum exposure of the ROTC program and its interaction with other programs, and 4) the best visual identity on campus.

The concept that buildings should be within a ten minute walking distance from Beardshear Hall, made it necessary to place new buildings within the context of the current campus master plan. The arrangement between the master plan and the campus core concept also goes to the relationship between the ROTC program and other academic activities on the central campus.

With the campus master plan based on academic activities on the central campus, the ROTC program needs more physically oriented activities than other

programs. It needs a drill field and swimming pool close to its building for training. These necessary components of the building should also match the master plan.

The ROTC building on the well balanced campus, based on a main campus circulation, acts as an identical landmark. Therefore, a site refined by pedestrian corridors and streets, would allow a sense of clarity and orientation with respect to the identity of existing neighboring buildings.

The considerations related to the campus master plan and main academic activities, including athletic activities on the central campus, reinforce the well balanced and organized campus master plan. This process helped in the choice of a new site for the ROTC building. As a result, it was decided that the best site for the building at ISU is at the north edge of Clyde Williams Field, on the current State Gymnasium Site.

Design concepts and layout

All neighboring facilities, Beyer Hall and dormitories (Friley Hall and Helser Hall), are within close proximity to each other on the central campus through use of multi-story design. These facilities share structural similarity with each other and this makes it necessary that the new design share their structural similarities.

The most desirable architectural design feature, based on interviews of ROTC faculty and students, was the multi-story, single building complex. The incorporation of multi-story design is preferable for interaction between students and faculty, ROTC departmental interactions, circulation inside and outside the building, etc.

The multi-story design is extremely functional by allowing offices, classrooms, and commons to be placed on the main floor and drill complexes on the ground floor. The design prepares for future expansion by laying out enough

area for drilling hall and related rooms such as warehouses, rifle ranges, locker rooms, and shower rooms. The design layout is thus centered around the incorporation of the drilling hall and the augmentation of natural lighting in the building.

The maximum window-lit lighting is incorporated as a visual identity maker and a way to make space bright and comfortable. Natural lighting is therefore a central focal point of reference throughout this design process.

The hallways need an ample natural light all around lounge and cafeteria areas to enhance the major circulation pattern of the building. So the hallway acts not only as a bonding element between ROTC departments and students, but also as a guiding device to aid orientation in the building. Generally, the circulation should be simple and should be shared with all ROTC departments.

Furthermore, the hallway vertically connects different ROTC departments and their students, housing them in sectionalized masses so that each sectionally separated rectilinear volume accommodates different ROTC departments together. Considering the vertical connection of sectionalized masses at the commons, good placement of them prevents the separation of faculty and students.

This layout contributes to the incorporation of a simple circulation emphasizing a strong conjunction at the central core area. A good layout and circulation in the public realm allow for short walking distances to the offices, classrooms, and drilling hall, etc. A layout that is neither crowded nor cramped with incorporation of subdivided office areas also provides better ventilation and lighting.

Structural concepts

The nature of the site of the State Gymnasium favors placing a building on it not only to have easy accessibility to it, but also to receive the most highly visible exposure to students at the north edge of Clyde Williams Field. At the same time, this makes it possible to retain Clyde Williams Field as a good drill field.

The fact that the biggest dormitory complexes at ISU neighbored the site, would help the ROTC program to be easily exposed to students. The ROTC program is not a secret profession or special institution only for special people, and its architecture should reflect this.

The ROTC program at ISU has been considered one of ISU's esteemed and proud scientific professions with science and technology fields, and this should be monumentally stated and memorialized through the architecture of the ROTC facility. A new multi-story building in front of Beyer Hall will provide a high degree of visibility of the school and its program.

A high structure with a clear visibility also helps define the physical identity and accessibility of the ROTC building. The building's main entrance, drilling hall, and entryways, are clearly visible and identifiable. The distinctive visual identity of the building shares the main campus traffic flow at Union Drive and Sheldon Avenue. A multi-story design makes it visually prominent and more functional. It allows placement of each ROTC department's offices and students' offices on the main floor. Then, the physical movement is minimized, allowing easy to intercommunication and interaction between people in different armed forces' ROTC departments. The short distance makes it convenient not only for the military staffs to work closely with other military departments, but also for ROTC students and instructors to frequently travel during their classes.

A multi-story design is the best solution for a new design on the compact ISU campus. It allows not only retention of the drill field (Clyde Williams Field) without disruption, but also creation of prominent visibility of the ROTC building. In terms of function, the multi-story building offers shorter physical movement for its users.

Circulation

How the circulation patterns succeed is incorporated in a successful ROTC building design through four design elements in terms of 1) the nature of site, 2) multi-story design in respect to pedestrian and vehicular circulation, 3) short trip within the building, 4) inter-communication between ROTC departments.

First, the site offers ease of pedestrian and vehicular navigation and orientation. The major four directions of the existing roads make finding the site easy.

Second, placement of a new multi-story building at the north edge of Clyde Williams Field also provides favorable circulation in respect to both vehicular and pedestrian traffic on campus, because the circulation does not require a new roadway to connect the new large building. The circulation at the west side of the building on Sheldon Avenue is a short distance and simple to navigate and identify in both vehicular and pedestrian accessibility.

Third, the walking distance in the building is shortened by placing the main stair directly between ROTC offices on the main floors. Around the atrium on the ground floor has the museum and directly connects its circulation to the second floor. The circulation on the second floor also directly connects to the commons, such as cafeteria, lounge, and other rooms, to the top floor. The wide window-sided hallway and balcony around the atrium define the circulation of the building and provide more spatial experience to remain there.

Fourth, although these facilities are separated by floors, the vertical distance between them is minimized by sectionally massing them to interact and intercommunicate among different ROTC departments in the building. The circulation of the building considered the interactions by keeping a minimal vertical and horizontal travel distance. This is an extremely important architectural environment at a learning institution.

Natural lighting

One of the positive features of this building is a conceptual use of natural light that comes from the use of high ceilings and tall windows. The windows of each room bring in natural light to brighten the entire length of the drilling hall, lounge, hallways etc.

The conceptual use of natural light is accomplished by both direct and indirect lighting concepts. Direct lighting is done by skylight slot, skylight dome, fenestration, end walls etc. Indirect lighting is done by combinations of direct lighting to maximize the natural lighting, using the reflection of the ceiling and reflector walls.

Series of individual skylight slots are placed directly along the main entrance and drilling hall. This allows natural light to penetrate into the building and acts to light their wide open areas, enhancing each room's nature and identity.

Besides the direct sunlight from the top, direct lighting is also accomplished by use of extensive fenestration along the outer walls and end window walls in hallways. This gives a picturesque elevation at the edge of the west side of campus, which not only lets more daylight into the building but also gives pedestrians and passengers in vehicles an arrival and ending landmark of the ISU main campus.

Direct daylighting through the sky slots and side windows will not be strong enough to overwhelm the entire inside space. So, extended walls in between windows also offer reflected daylight without glare on the east and north side of them. The tall windows of the building bring indirect daylight into the deep part of the room with the combination of the light reflected by the angled and extended walls.

Direct and indirect natural light through sky slots, and fenestration allow the light in the building to help in circulation and orientation. Additionally, the impression of daylight effect in the building will be greatly improved. This combination of direct and indirect daylighting is the ideal utilization of natural light in this building.

Atrium

In the final design, the atrium forms a core area to connect different spaces in the building. It acts as a nucleus connecting the lounge and classrooms to the offices and drilling hall.

The atrium receives full visibility from traffic on campus, both on Bissell Road and Union Drive. This gives the atrium as a central marker of the building.

The atrium is enclosed with glass to offer wide open interiors to bring natural light from the east and south facade, and is open-end at top. This entryway atrium provides wide-open south views of the Clyde Williams Field to Lincoln Way.

Cafeteria

The cafeteria is designed to accommodate the activities of ROTC students , faculty, and visitors by blending and connecting different characters of each. It has a wide-open south view with natural light that offers a favorable place for taking a

break with foods or drinks, reading, or relaxing with the scenic views of Clyde Williams Field.

Lounge

The lounge is designed to be functional and comfortable as a waiting room and reception room with plenty of south and north exposure by windows. It is neither small nor cramped but enough to blend each ROTC department on it. At the same time, the entry of the lounge leads and divides it into separated departmental areas. It serves both the military departments' offices and their drilling hall for ROTC students as well as other athletic and recreational users by connecting neighboring athletic facilities within a short walking distance to the lounge.

Volume identity and exterior image

The integration of the volume on the site along the main roads, such as Union Drive and Beyer Court loop road, is accommodated into a serious of shifts. The shifts offer interesting possibilities for walking, journey, jogging, and driving around the building. These intimate shifts make individual ROTC departments easily identified and located.

A successful design identifying buildings on the main roads is contributed by a clearly identified main entrance. By placing it at the east and south of the building with a large and bold opening, difficulty in identifying the building is avoided.

A clear identity even at night matches well the context of the building to show its own identity, because the volumetric sectioning and the clearly identifiable

entrance incorporate the visual identity and its image into an educational image in military science.

Not only the building's identity, but also its exterior image is expressed as positive design features. For example, the multi-story design eliminates long walking distances in the building, and the plentiful use of windows brings natural light into both the large drilling hall and small offices.

This design tries to present a conservative image at a land grant university so that the exterior image blends and matches with neighboring structures in terms of the use of forms and materials on campus.

Major materials of the ROTC building are red brick, concrete, glass, and metal frame, which give it collegiate color against the dark material of both of the old dormitories (Friley Hall and Helser Hall) and Beyer Hall. This allows a new conservative collegiate style of the building to be expressed.

As a result, the building matches well with the campus plan in the use of material and in fitting into the well landscaped campus. Though the ROTC building has an easily identifiable mass all under one roof, it does not have obtrusive volume. The best use of the restricted site specified in the campus master plan, is achieved through a great deal of ROTC architecture as a large monolithic mass, although it is not overbearing at the well balanced campus.

Commons

The commons serves as architectural components in interior and exterior design. It functions multi-purposedly in terms of structure and visuality. The commons blend and connect classrooms, offices, and drilling hall and provide necessary visual identities to them. Wide open fenestration at the commons bring higher level of natural lighting into them.

Museum

Around the commons and the atrium, exhibition museums are placed at the center and the outer perimeter. The pedestrian traffic will circularly move around the exhibition areas.

The exhibition serves as a shrine to the ROTC program at ISU as well as the military history of the United states. Because the profession of the ROTC program has been dedicated to the country in pursuit of national strategy, showing patriotic nature of the program through the exhibition is very important to ROTC people and other people.

Exhibition areas at the atrium are enclosed by a domed glass roof and open fenestration, which provide a higher level of illumination to show the exhibit. The domed roof strengthens the symbolic importance of the exhibition by focusedly illuminating the area from above. The bright natural light from above strongly captures the focus of the exhibited objects.

The museum will present the long tradition of the U.S. armed forces as well as their sophisticated systems in science and technology. It will exhibit past U.S. armed forces' glories and their current features through pictures, uniforms, ceremonial tools, flags, past equipment, and pictures of the sophisticated weaponry, with small-scale models. This museum will also serve as a study aid for the ROTC program at ISU and show the *esprit de corps* of the program, with their dedication and glory to the country.

The museum can be visited mainly by students who are interested in the ROTC program, visitors for athletics and recreational purposes at the building, and others. It attracts a great deal of attention to the ROTC program and offers an excellent place to lounge and socialize, not only to ROTC people, but also to people with athletic and recreational purposes on the drilling hall.

Activities around drilling hall

Since the drilling hall is the most important and frequented facility in the building, it makes sense to place the drilling hall behind the ROTC offices and other rooms, such as locker rooms, and shower rooms, to be in close proximity to all ROTC departments and other athletic and recreational departments. The rooms around the drilling hall are placed as close as possible to each other to shorten travel distances.

Each locker room and shower room is placed close to their related activities around the drilling hall. For example, the locker room and shower room will be used right before and after physical drilling or exercise on the drilling hall.

Besides the locking service for the users, the locker room functions as an easy and frankly naked communication point among the entire facilities, when ROTC students get together at the place right before and after their drill.

The entrance from the drilling hall to the locker room acts as the gateway between private and public space in the building with an easy access from the drilling hall. The drilling hall is tied directly to the locker room at the edge of it and flanked by the locker room and shower room. Therefore, most frequent interactions take place around the drilling hall when they exercise, drill, change clothes, and shower.

The locker rooms and shower rooms are placed with the considerations of alleviating congestion and keeping a higher level of orderly separated circulation for the comfort and simply easy circulation around the drilling hall. After drills or exercises at the drilling hall, the teaching staffs of ROTC and recreational program move out to their offices. At the same time, students in the ROTC or recreational program move to the locker rooms. This allows separation of circulation between the higher rank of teaching personnel and the learning students.

For further alleviation of congestion at the drilling hall, warehouses and exits are placed across the locker rooms, resulting in a short distance from the drilling hall to the warehouses. After drilling at the drilling hall, ROTC students move to the warehouse. Then, the travel around the drilling hall doesn't occur at the same moment, so that circulation around the hall is easily done without conflict.

Fluent movements and activities around the drilling hall are accomplished by the ample natural light through tall and long band of windows along the drilling hall, which easily orients each entrance and exit.

The entrances close to Beyer Hall directly connect the athletic and recreational traffic from Beyer Hall. Most daily and nightly athletic and recreational activities are not related to the ROTC program, so there is no confusion and congestion with ROTC program in circulation. Though athletic and recreational offices and warehouses are far away from ROTC offices, locker rooms and shower rooms are shared and used by everyone in the building.

Rifle range and warehouse

Besides regular ROTC classes at the drilling hall, the rifle range is the busiest place in the ROTC building. Therefore, the room should be spacious enough to support their rifle practice in lighting, noise control, ventilation, and safety. Though the rifle range should be close to the drilling hall to shorten walking distance, it should be spatially separated from the drilling hall and other areas of the building because of safety problems.

Because of the safety problems around the rifle range, the designer tries to have minimum traffic around it. A minimum pedestrian traffic in the building and minimized service traffic at the west side of the building are separated from the traffic at the entrance of the rifle range. By placing the warehouse for outdoor life

equipment, such as boats, ropes for rock climbing, hanggliders, etc., close to the service area, people checking out equipment from the warehouse can use a vehicle without interference from heavy pedestrian traffic on campus.

Conclusions

This design project is concerned primarily with the study of ROTC architecture. The final design proposal provides a proposed solution for a possible future ROTC facility at ISU.

For the topic of the site, design concept, structure, circulation, volume, drilling hall, etc., this designer repeatedly considered the new campus master plan to retain the well organized park-like campus system. Consequently, multi-story design utilizing natural light is accommodated into the new design. A strong and balanced volumetric entity of the ROTC building matches other neighboring campus facilities.

Not only is the concept of ROTC identity at ISU applied throughout the research and design, but recreational and athletic programs are also incorporated into the program of the ROTC building as a large part of the facility. Though the design proposal is based on the urgent need for an ROTC facility, a more fundamental solution for a new ROTC building at ISU is administrative support.

According to the new master plan for the next three decades, the current ROTC building (Armory Hall) is to be razed soon. Nobody takes into account the problem of its demolition and the emergent need for the ROTC building at ISU because of budget constraints.

However, the pressing financial and spatial restrictions at ISU always have been critical reasons to build any building. This means these restrictions are second obstacles to building the ROTC building. It will be built simply when the

school administration pays enough attention to the military department to house its program in its own facility so as to instruct the ROTC program as other departments do at ISU.

BIBLIOGRAPHY

Army Budget Fiscal Year 1994: An Analysis, Association of the United States Army, Arlington, Virginia, 1993.

Asmus, Ronald D., The New US Strategic Debate, Arroyo Center, Rand, Santa Monica, California, 1993.

Barrett, Richard E., Engineer and Post Card Collector, 1912, University Archives, the Ohio State University, Columbus, Ohio, 1994.

Bartenhagen, John, "UI Armory Demolition Delayed," The Daily Iowan, August 31, 1988.

Bates, Katherine V., History of State University of Iowa: Aspects of the Physical Structure, M. A Thesis, University of Iowa, Iowa City, Iowa, 1949.

Day, H. Summer Fields, The Iowa State University Campus and Its Buildings, Iowa State University, Ames, Iowa, 1980.

Feng, Zhi, Memory and Place: A Renovation Proposal for the Armory Hall, Master of Architecture Thesis, Iowa State University, Ames, Iowa, 1994.

Iowa Alumnus, The New Armory, Vol.17, no. 4, January, 1920.

Iowa Board of Education, Minutes, 1865 - 1908, Located in H. Summerfield Day paper, 1909 - 1959, University Archives, Iowa state University, Ames, Iowa.

Iowa State Daily, January 1960 through December 1991.

Lee Jr., James Leftwitch, A Century of Military Training at Iowa State University 1870 - 1970, Ph.D. Dissertation, Iowa State University, Ames, Iowa, 1972.

Lyons, Gene and Masland, John, Education and Military Leadership: A Study of the ROTC, Princeton University Press, Princeton, New Jersey, 1959.

Malpass, Leslie F., "The Benefits of ROTC on Campus: A President's Perspective," Educational Record, Vol. 66, no. 1, pp. 14 - 18, 1985.

McDonald, Joyce Woolley, "Another Alternative Living-Learning," The Iowa Alumnus Review, Vol. 20, no. 5, p. 10, the University of Iowa, Iowa City, Iowa, August, 1967.

Meinhold, Richard J., Beyond the Sound of Cannon, Military Strategy in the 1990s, McFarland & Company Inc., Jefferson, North Carolina, 1992.

Military Education Survey, Washington D.C., 1931.

Pollard, James Edward, Military Training in the Land Grant College and University with Special Reference to the ROTC Program, The Ohio State University, Columbus, Ohio, 1964.

Powell, Colin L., The National Military Strategy of the United States, Washington D.C., Joint Chiefs of Staff, 1992.

Report of the Special Committee on ROTC to the Secretary of Defense, Washington D.C., September 22, 1969.

Ross, Earle D., A History of the Iowa State College of Agriculture and Mechanic Arts, Iowa State College Press, Ames, Iowa, 1942.

Sasaki Associates, Iowa State University of Science and Technology-Campus Master Plan, Ames, Iowa, 1992

Sellen, Eric, "Old Armory: 1905 - 1985," Play Bill, Vol. 63, no. 3, Iowa City, Iowa, University of Iowa, pp. 14 - 15.

Shelton, James E., "The ROTC wants You: Why Military Training Programs Need Campus Support in the 1980s," Educational Record, Vol. 66, no. 1, pp. 22 - 24, 1985.

Smith Jr., Dewitt C., "To Protect a free Society: Maintaining Excellence in the Military," Educational Record, Vol. 66, no. 1, pp. 10 - 13, 1985.

Wayman, Mary Kay, "Protesters at UNL took over ROTC building 20 years ago," Lincoln-Neb. Sunday Journal-Star, the University of Nebraska-Lincoln, May, 6, 1990, p. 50.

Weber, Irving, "Memories of the Armory," Iowa City Press-Citizen, Iowa City, Iowa, University of Iowa, October 3, 1987, pp. 1B - 7B.

Websters' Third New International Dictionary, A Merriam-Webster Inc., Springfield, Massachusetts, 1986.

APPENDIX: DESIGN DRAWINGS

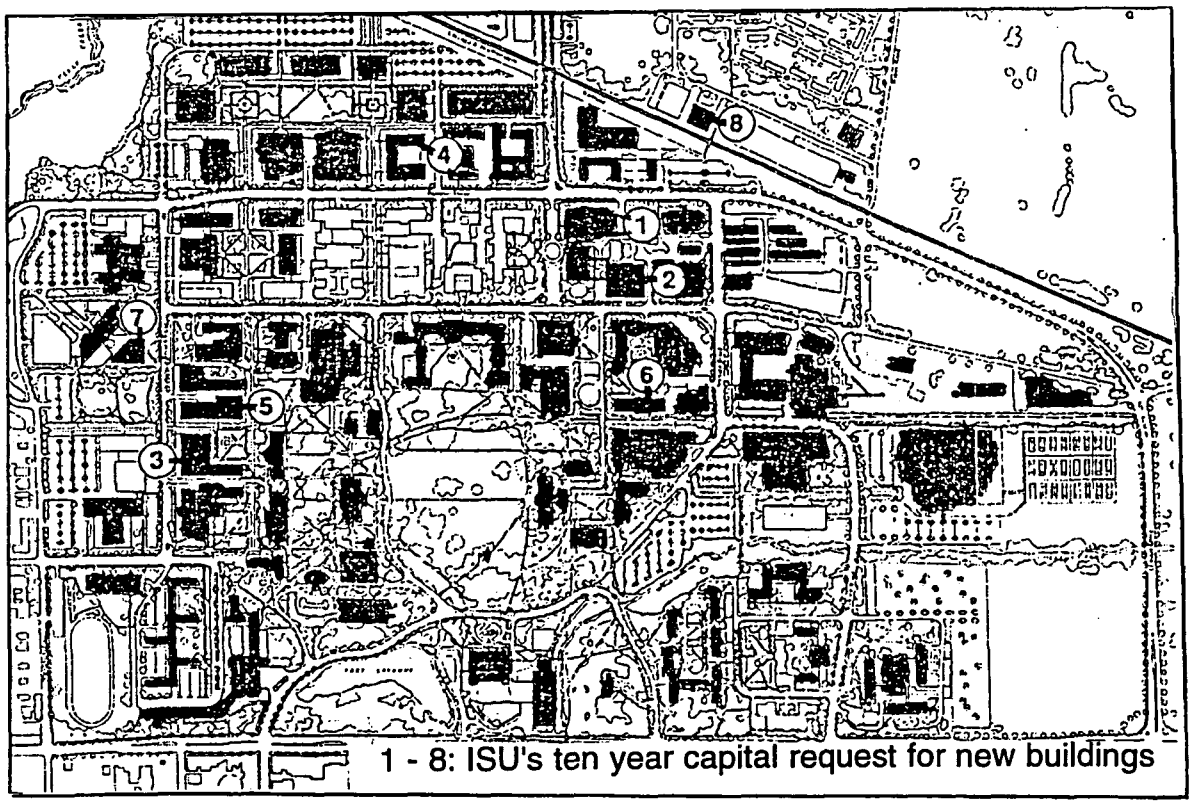


Figure 10. The Campus Master Plan (Sasaki Associates, 1992)

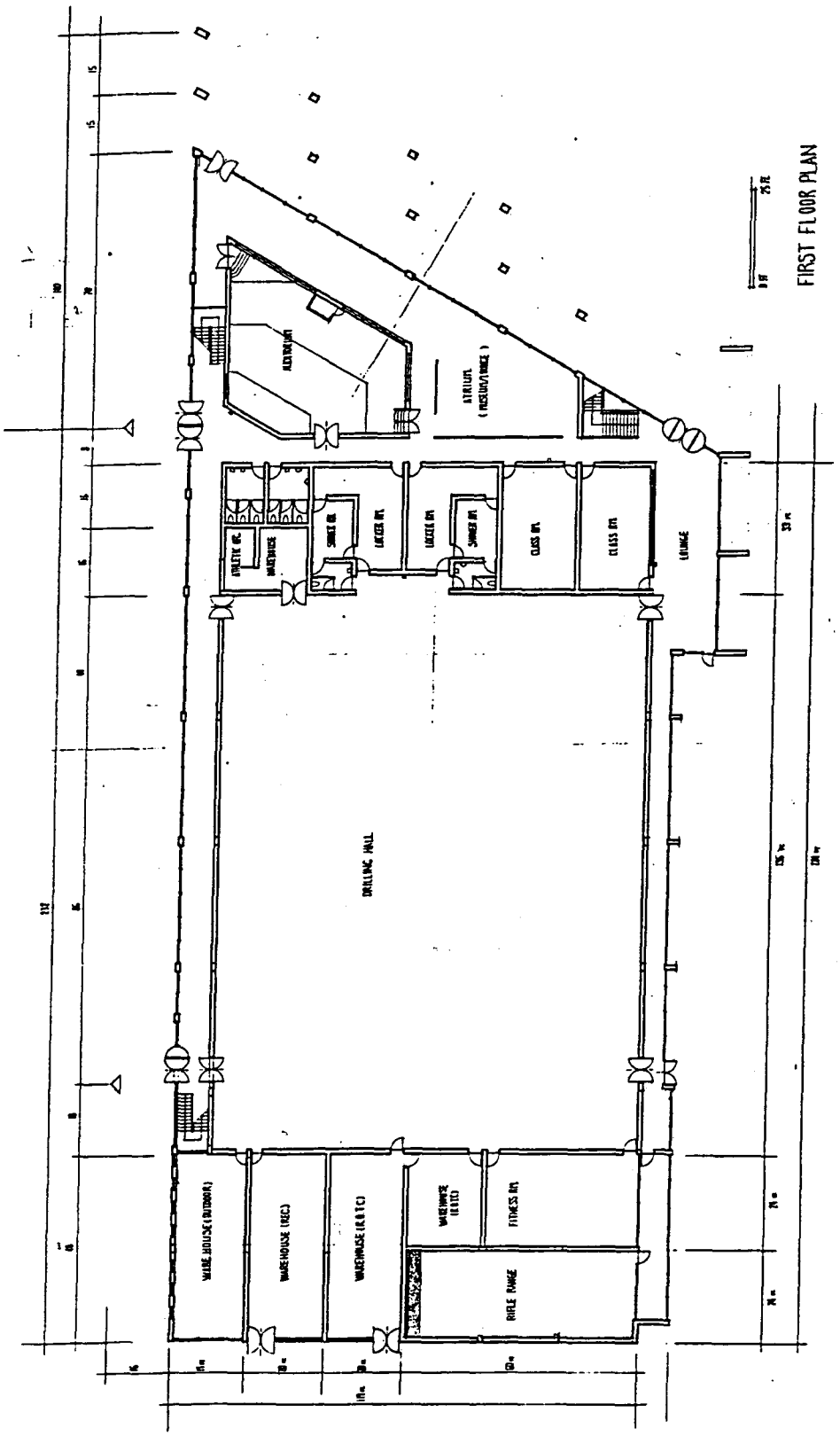


Figure 11. First floor plan

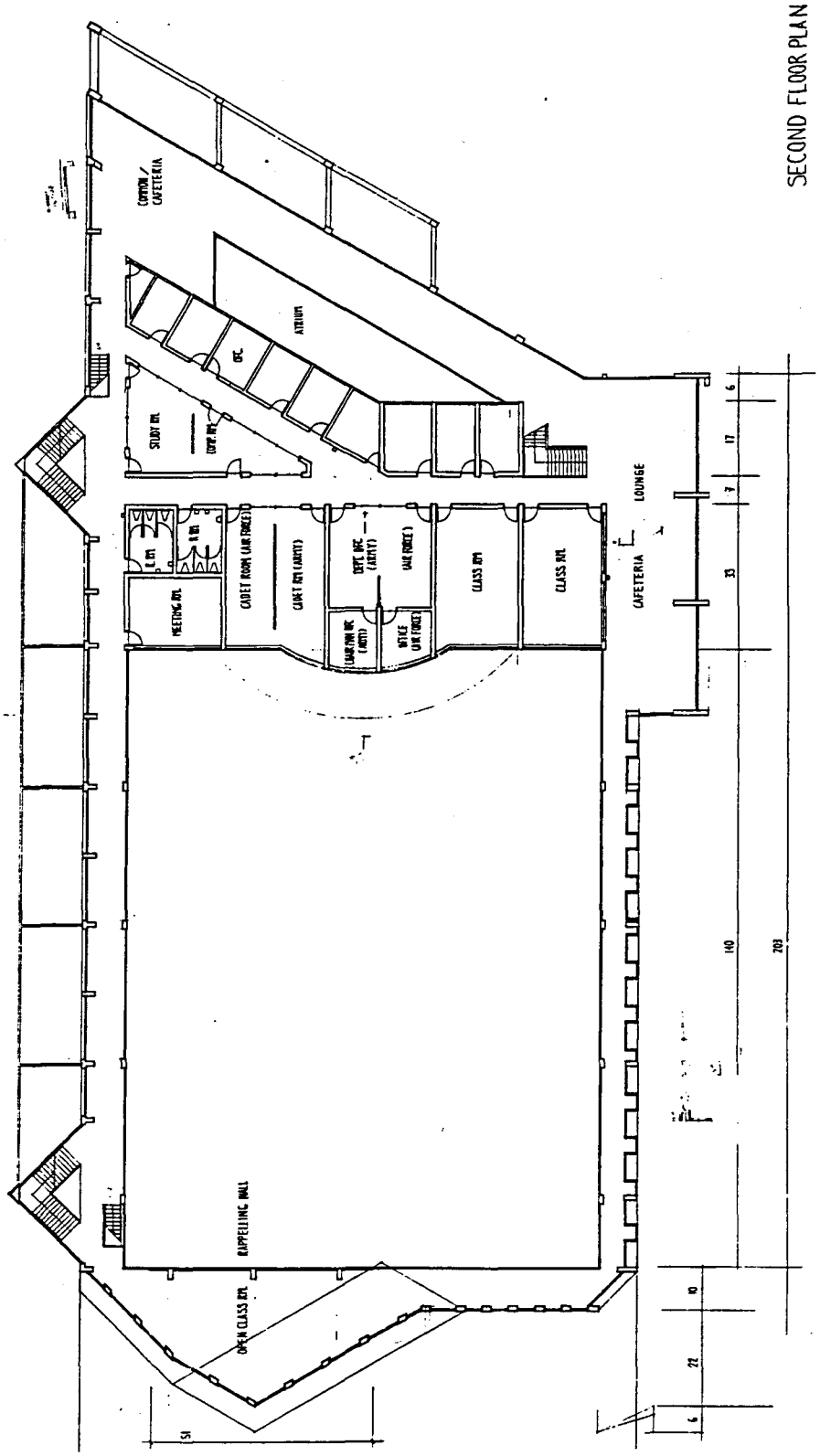


Figure 12. Second floor plan

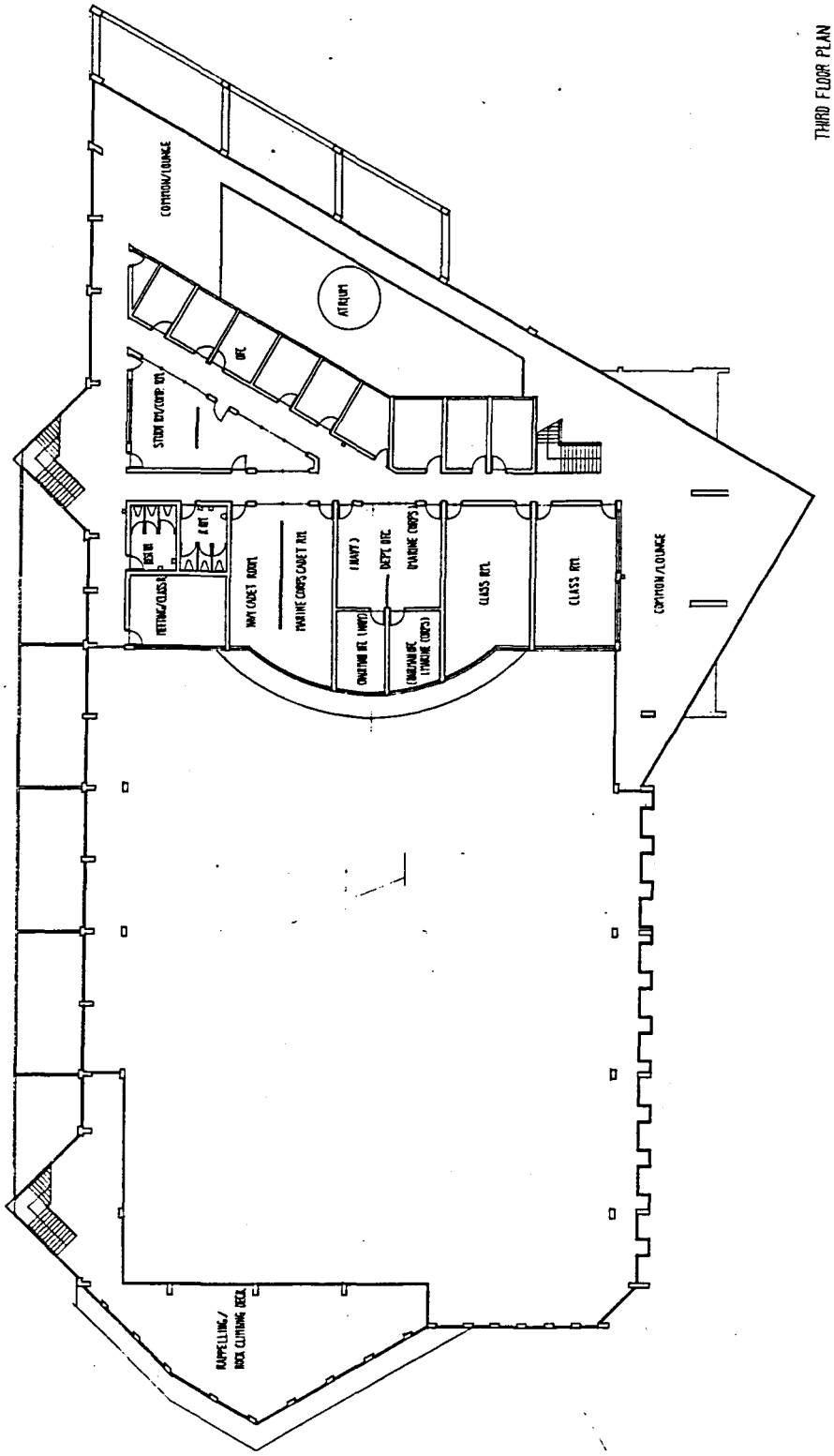


Figure 13. Third floor plan

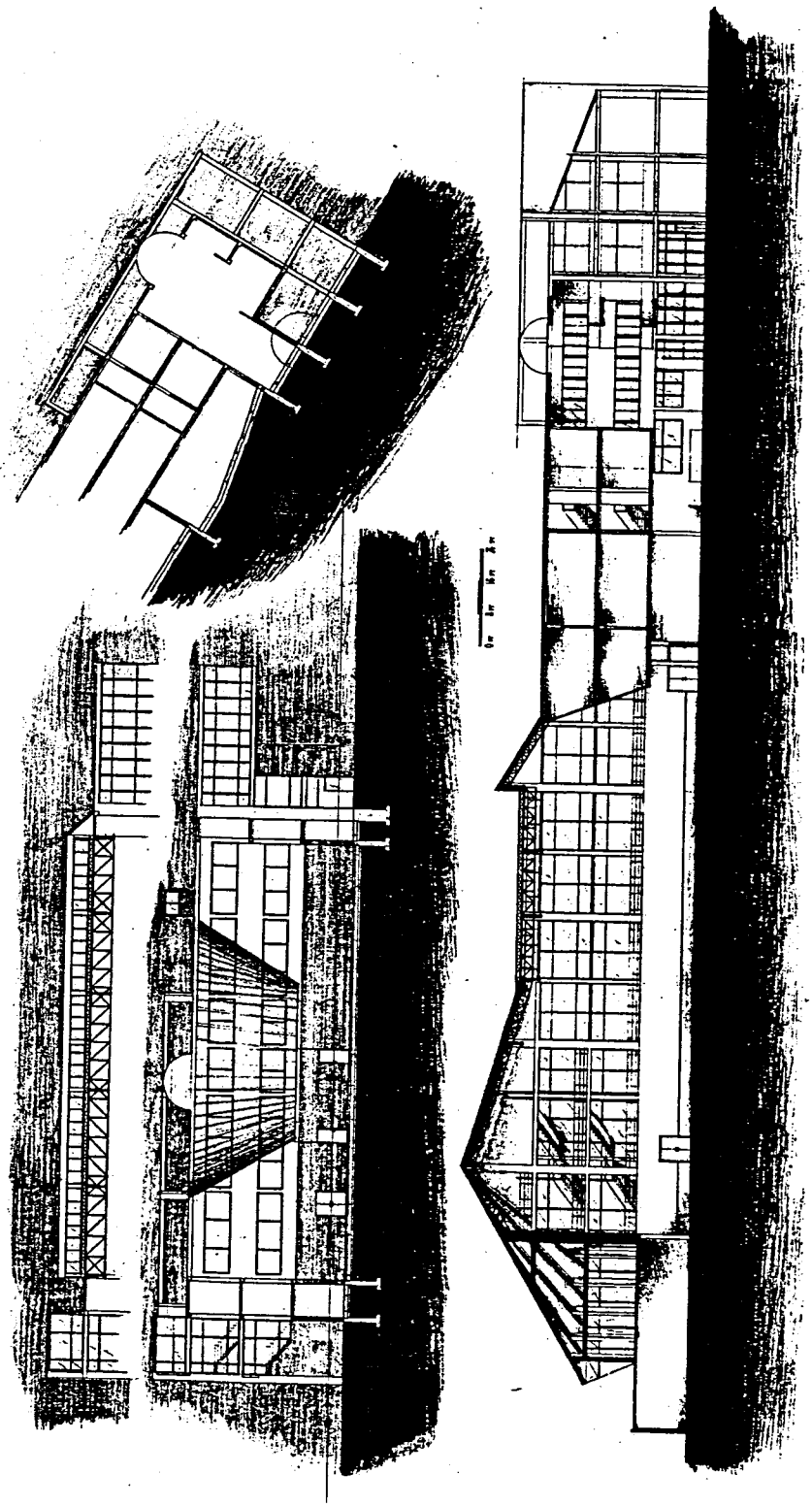
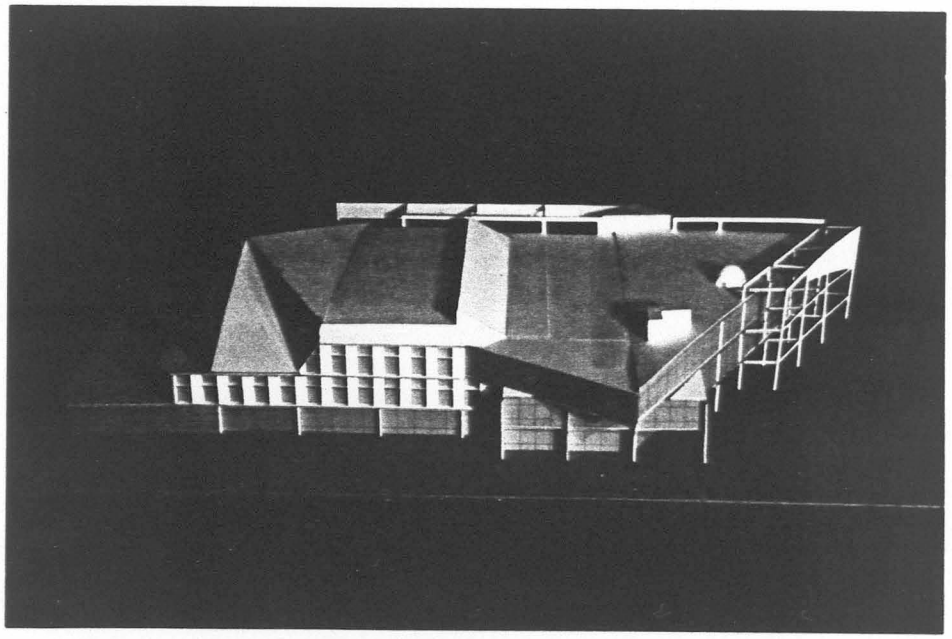


Figure 14. Sections



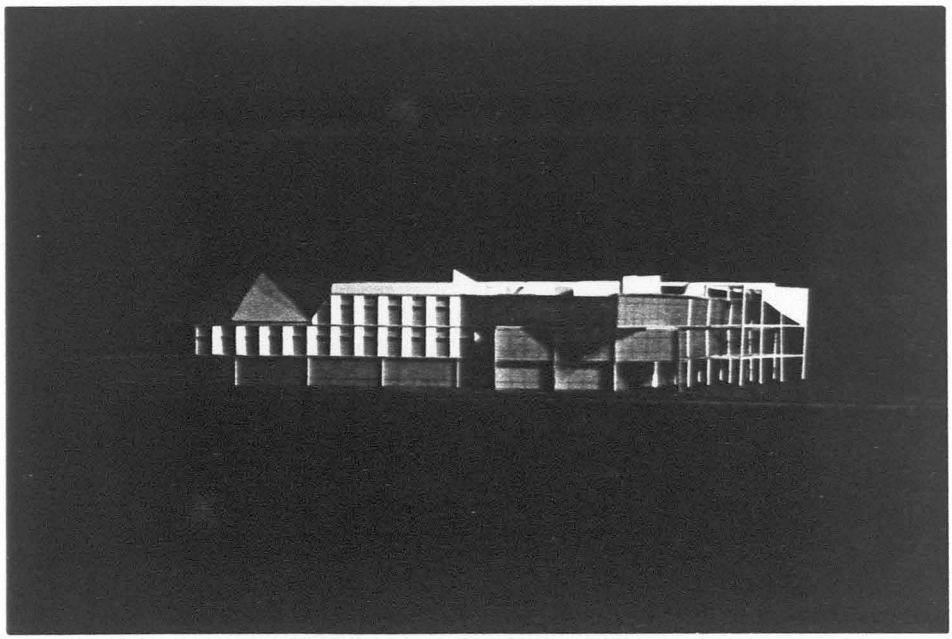
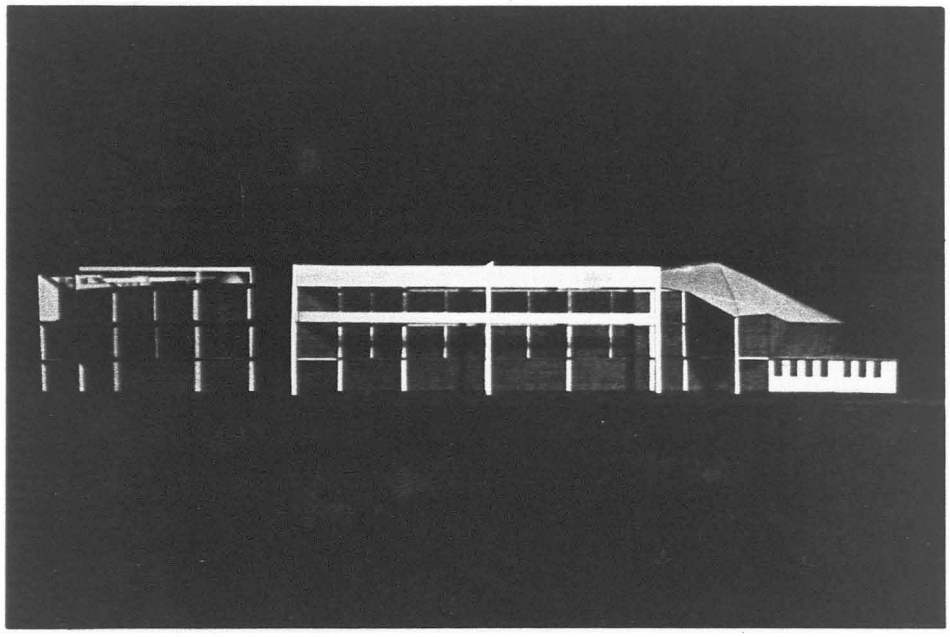


Figure 15 Bird's eye view from south (top) and south elevation (bottom)



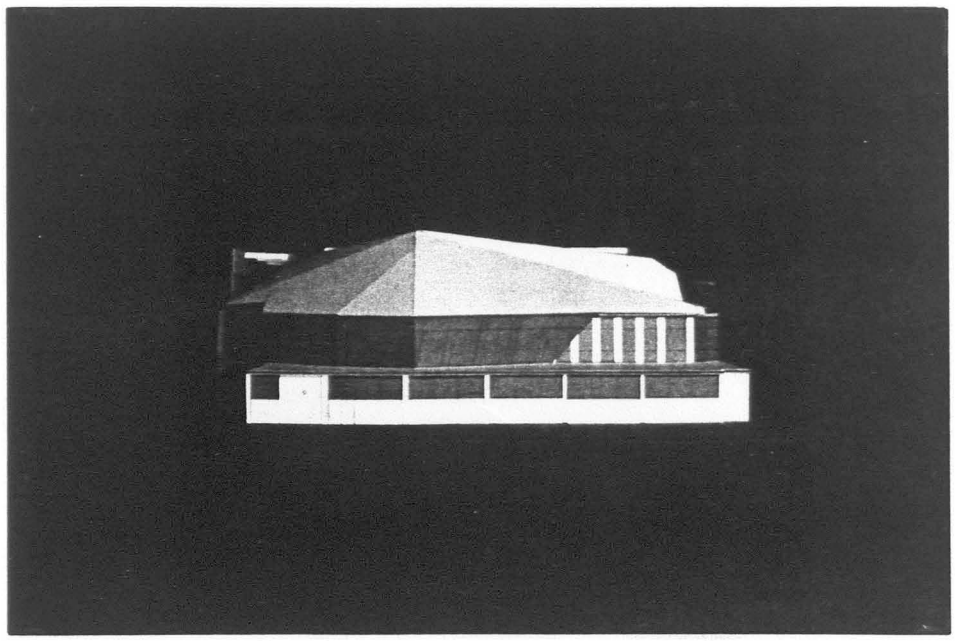


Figure 16 North elevation (top) and west elevation (bottom)