

Iowa State University, College Building
(Old Main Building)
On present site of Beardshear Hall, on
Morrill Road, facing east toward central
campus
Ames
Story County
Iowa

HABS No. IA-116

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
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HISTORIC AMERICAN BUILDINGS SURVEY

IOWA STATE UNIVERSITY,
COLLEGE BUILDING (OLD MAIN BUILDING) HABS No. IA-116

Location: On present site of Beardshear Hall, on Morrill Road, facing east toward central campus, Ames, Story County, Iowa

Statement of Significance: Although no longer standing, the College Building is significant because its history provides insight into: (1) the conduct of a public body--the Board of Trustees--in developing the architectural program and in dealing with matters of building construction, repair, alteration, and maintenance from the inception of the design through the life of the building; (2) the role of an architect in the years preceeding and following the Civil War in a newly-settled community; (3) the development of the building industry from largely pre-Industrial Revolution frontier conditions to those of a settled society in which the effects of the Industrial Revolution were felt.

Architecturally the building falls into Marcus Whiffen's style category of High Victorian Italianate, popular when the building was built.

HISTORICAL INFORMATION

Physical History

1. Dates of erection: 1864, excavation begun (2, 3-23-65, p. 15). 1868, completed (2, 11-19-68). North wing burned

early Dec. 1900 (10). Rest of building burned 14 Aug. 1902 (3, 8-21-02).

2. Architect: Charles A. Dunham of Burlington, employed in February 1865 (2, 3-23-65, p. 23; 2, 1-6-66, p. 59; 24, p. 178). Dunham is listed as an architect in the first city directory of Burlington, Iowa, published in 1859. Two buildings that he designed in Burlington are known: the First Congregational Church, built 1867-1870, and Burlington High School, begun in 1868 and not completed until 1873 (12, I, 113, 173; 13, pp. 558- 561). Dunham prepared the drawings and specifications that were finally adopted by the Board of Trustees, and these drawings formed the basis for the general contract for construction (2, 1-6-66, p. 88; 2, 6-21-66, pp. 144-146).

Three other architects were involved with the building before Dunham. The first of these was Milens Burt of Muscatine, Iowa, who prepared plans and specifications that were submitted with the First Annual Report of the Board of Trustees in December 1859 (14). In June of 1864 John Browne of Des Moines was employed as the architect, but was discharged by the Building Committee in September 1864, an action that was sustained by the Board of Trustees in January 1865, but not until they got from him the drawings that he had been paid to produce (2, 1-9-65, pp. 5, 6; 2, 3-23-65, pp. 15, 16). The third of these architects was John F. Edwards of Fort Madison, Iowa, who was hired for services during the latter part of 1864, after Browne's

dismissal by the Building Committee (2, 1-9-65, pp. 16, 18).

In 1892, Josselyn and Taylor prepared sketches for a recreation room-assembly hall addition (2, 4-12-92).

3. Original and subsequent owners: Iowa State Agricultural College and Farm, the name of which was changed to Iowa State College of Agriculture and Mechanic Arts in 1896, and to Iowa State University of Science and Technology in 1959.

4. Builders, contractors, suppliers:

W. J. Graham, excavation (2, 3-23-65, p. 15).

Scott and Kearney of Des Moines, stonework (2, 3-23-65, p. 15).

A. J. Graves, hired manager of the farm, assisted in the excavation (2, 3-23-65, p. 28).

Chamberlain and Company of Jones County, brickmaking (2, 3-23-65, p. 15).

J. M. Kellogg of Story County, carpentry (2, 3-23-65, p. 16).

S. A. Robertson of Des Moines, brickmaking and erection of brick walls (2, 3-23-65, p. 23).

Jacob Reichard of Marion County, Iowa, general contractor for the building after foundation work had been completed (2, 6-21-66, pp. 137, 144-146).

W. A. Pennal, Normal, Illinois, contractor for revision of the hot air heating system, 1869 (2, 1-11-69).

Haxton Steam Heater Co., Kewanee, Illinois, contractor
for low pressure steam heating system, 1876 (2,
5-2-76).

Peter Raft and Sons, Story County, boiler house and
rebuilt towers, 1876 (2, 8-16-76).

R. A. Wilson of Ottumwa, paint exterior, 1876 (2, 8-16-76).

H. O. Patton, gas works, 1877 (2, 11-12-77).

Western Edison Light Company, dynamo and electric lighting,
1884 (2, 8-21-84 and 12-2-84).

Eagle Sanitary and Cremation Co., incenerators, ca. 1897
(3, 6-30-97).

5. Original plan and construction:

Development of first design by Milens Burt, 1858-1862.

A State Agricultural College and Farm was established
by Act of the General Assembly of Iowa in 1858, and
\$10,000 was appropriated for the purchase of a farm on
which to locate the college. In the following year,
648 acres were purchased in Story County. Available on
the land were clay that might be used for brickmaking,
sand, gravel, and timber. Stone was available within
three and a half miles and lime within six miles. To
govern the new institution, the General Assembly estab-
lished a Board of Trustees appointed by the legislature
(2, 1-6-66, pp. 69, 70, 72, 73).

In 1860 construction of first buildings on the new
college site -- the Farm House and a barn -- was begun.

They were designed by Milens Burt. of Muscatine, who is described as an architect and builder (14, pp. 6, 7; 15, pp. 2, 3).

The First Annual Report (1858-1859) relates that "the place selected...for the College building is about sixty rods from the south line, and one hundred thirty rods from the west line... At this place [a small creek] makes a curve to the south leaving a handsome swell of land..." (The actual site appears to have been further west). Next, an investigation was made of the buildings of other agricultural colleges. The temporary President of the Board of Trustees obtained plans of buildings of the Michigan and the New York Agricultural Colleges. He visited the Farmer's College and Female College near Cincinnati, "which Horace Mann said was the best arranged College building he had ever seen". "It is warmed with steam, which they think far superior to any other mode of warming yet discovered". He also visited the Farmer's High School of Pennsylvania, a building to accommodate a hundred students (14).

Having considered these buildings, the Board of Trustees set forth its architectural philosophy: "We have studied every way to economize the funds of the State, having all the time in view a good school rather than a display of architectural beauty -- no costly dome or curious winding stairs -- but a solid stone foundation, a plain brick superstructure with four stories, with pilasters,

dentil brick cornice, projecting roof with brackets, with portico over the doors at each end: all of good respectable appearance, about good enough for the farmers of our State, and good enough for anybody else. For further details you are referred to the plans and specifications prepared by Mr. Milens Burt, of Muscatine, architect and builder, a prudent, judicious, and excellent mechanic, and a man of much care and prudence in all things" (14). It is curious today to observe that Beardshear Hall, which replaced the College Building after the fire of 1902, includes the "display of architectural beauty", the "costly dome" and "curious winding stairs" which had earlier been abjured. After forty-five years, the architectural needs of the college had changed, it would seem.

The Board at one time entertained the idea of building three separated buildings to contain the necessary facilities, instead of one large building, in order that wide intervening spaces between these buildings would act to prevent the spread of fire. This idea was abandoned, and the one large building was carried out. Had separate buildings been put up, the fires in 1900 and 1902 might have been less damaging (14; 3, 8-21-02).

Milens Burt's architectural drawings included alternate schemes. One was a building with four stories and a basement, 120 feet by 42 feet in plan; the other was a building with three stories and a basement and 150 feet by 42 feet in plan. "The cost of this building is estimated

at \$30,000, without stoves, furnaces, or steam for warming; of sufficient size to accommodate one hundred students, a President and his family, two or three professors, lecture and recitation rooms, library, and reading rooms, etc: and in the basement, store rooms, pantries, steward's rooms, kitchen, dining room, homes, lodging and boarding for one hundred twenty persons. It has required much time and effort and skill to arrange all this in one convenient building" (14). There must be some error in Burt's statement, or the transcribing of it into the Report, for it is doubtful that a hundred twenty people could be accommodated in basement rooms, even in the alternative plan with the greater basement floor area, if the other facilities mentioned were also included at that level. It would appear that Burt prepared drawings of a preliminary nature, together with an estimate of construction costs, in order that a request for funds could be made of the legislature.

In 1860, however, there was strong sentiment in the legislature for repeal of the bill that had authorized the agricultural college, but friends of the college were able to secure tabling of such a measure in order to procure a full report from the college before drastic action was taken. The bill remained tabled for the session, and this was the best that could be done (1, p. 4). The expected appropriations were thus politically impossible. In addition, the country was undergoing an economic depression. In 1862, funds again were not requested, but for a different reason.

The economic energies of Iowa were being directed toward the Civil War (2, 1-6-66, p. 74). In this year, however, a promise of assistance to the college came through the Morrill Act of July 1862, according to which Congress appropriated to the loyal states of the Union 30,000 acres of land for each senator and representative in Congress. The purpose of the grant was to support agricultural and mechanical colleges. Iowa was thus entitled to 240,000 acres. As one of the conditions of the grant, a state was required to erect the necessary college buildings without using any of the proceeds of the lands for that purpose within five years of acceptance of the grant. In a special session in September 1862 the state accepted the grant (1, pp. 74, 75). Since in Iowa a large amount of public land still remained available to be homesteaded, the problem of attracting people to the granted lands in order to obtain revenue from them was not an easy one to solve, in spite of the fact that the granted land had been carefully selected to include some of the best unentered land in the state. Benjamin Gue and Governor Kirkwood, to meet this situation, developed a ten-year lease plan under which a person could pay eight percent interest yearly upon the appraised value of the land as a lease and would then retain the option at the termination of the lease period to buy the land at the original valuation. The plan was enacted into law and secured the college a good income (1, pp. 5, 6).

Beginning of construction; redesign by C. A. Dunham,
1864-1866.

On 15 June 1864 a building committee was elected and in the same month it met to advertise for bids for the excavation and stonework and to employ John Browne of Des Moines as its architect "at fees of five percent on the cost of the building". His contract provided for termination at the option of either party (2, 3-23-65, p. 15). The foundation, as first built, substantially followed the plan of the building, and as rebuilt eighteen inches larger all around actually was the foundation of the building erected. Therefore it is obvious that Milens Burt's drawings were not the basis for bidding nor for construction. Burt's building was either five stories and 120' by 42' or four stories and 150' by 42', depending on which of his alternates were chosen, and presumably rectangular in plan. The building as built was five stories, 156' by 70', and of an E-shaped plan (14; 24, p. 178). There are several reasons that suggest that there may have been no drawings issued to contractors to form the basis for bidding or for construction. First, the complaints of the excavation and the stonework contractors that the architect did not attend to his duties and did not furnish proper working drawings. Secondly, Browne's refusal in September 1864 to turn over drawings to the committee and the fact that no drawings were presented until the meeting of the Board of Trustees in January 1865 (2, 1-9-65, p.

5; 2, 3-23-65, pp. 15, 22). Thirdly, John E. Edwards, who replaced Browne, did not visit the building site until December 1864 and did not prepare the drawings for which he was paid until later that month (2, 1-9-65, pp. 16, 18). Foundation construction would have been stopped for the winter by the beginning of December at the latest. Therefore, the possibility that seems most plausible to the writer is that Browne worked on the basis of rough drawings of some kind, but issued all instructions in connection with bidding and with construction orally or in written form. Only under pressure did he finally present his drawings, for the probable reason that he did not know to prepare the kind of architectural drawings that were required. C. A. Dunham's comments, mentioned following, on what are called the original drawings (which must have been Browne's), attest to Browne's inadequacy on this score.

The bids were opened on 11 July 1864. Since they were presented in terms of a price per unit of work, a system customary in the times, that there apparently were no drawings to delimit the exact extent of the work was not a source of difficulty. The excavation contract was let to W. J. Graham at twenty-four cents per cubic yard, and the stonework contract to Scott and Kearney at six dollars a perch, with the perch specified at twenty-five cubic feet, and at seventy-five cents a foot for surface work such as cut stone door and window sills. For

dimension lumber and "square timbers" a contract was drawn up to be entered into with a Mr. Warner of Boonesboro at twenty-six dollars per thousand board feet delivered at the building. The Building Committee signed the document, and Browne was instructed to obtain Warner's signature, but Browne neglected to do so, the first example of his ineffectiveness (2, 3-23-65, p. 15).

Trouble developed quickly. The excavation contractor did not complete his work by the stipulated date, the first week in September. In order to minimize delays, A. J. Graves, the hired manager of the farm, began work on the excavation on 3 September 1864 with all the forces that he could muster. He cleared out all of the deep part of the excavation, which contained water, and dug a cistern (2, 3-23-65, p. 28). As the result of the delay, Scott and Kearney, the stone contractors, failed to complete their work by the mid-November date required in their contract and claimed damages from Graham. Graham in turn complained of the "architect not attending to his duties, therefore putting the work back" (2, 3-23-65, p. 15). In addition, Scott and Company also blamed the architect, stating "that more work and of a different character was required of them by the architect than was represented to them at the time of taking the contract. That they were not furnished with such working plans of the work as to enable them to proceed without making mistakes, consequently work was done that had to be taken down and put up in a

different manner, and that in consequence of these hindrances and delays they were not legally bound to complete the work" (2, 3-23-65, p. 22).

More trouble developed in connection with the manufacture of brick. The Building Committee reported at the March 1865 meeting that the contract for brickwork had been let to Chamberlain and Company of Jones County for 750,000 brick at five dollars per thousand, with the College furnishing the wood to be burned in the firing. Brickmaking was begun in June 1864. The first kiln of 200,000 brick was properly fired, and were "good solid bricks, but were filled with lime pebbles and when the rains came in contact with them and afterwards the frost, the lime in the pebbles slaked and burst to pieces destroying them for facings for the building, but they will answer every purpose for the interior walls. The second kiln contained 100,000 brick, better than those of the first kiln, but not as well fired". The committee was dissatisfied with this kind of workmanship, and Chamberlain Company were paid for work to date at a reduced rate and given no more work (2, 3-23-65, pp. 16, 19, 52; 2, 1-6-66, pp. 63, 64). After interviewing several brickmakers, a new contract for brickwork was made with S. A. Robertson to make all the brick and to erect the walls that could be put up in that season. For "furnishing all supplies and seeing that the work is well done he is to receive twenty-five percent on the

cost of the work". It was felt that this amount was the least that could be paid in order to get a good job (2, 3-23-65, p. 23).

Since Browne had neglected to obtain the lumber contract with Mr. Warner, it was necessary to hire J. M. Kellogg by the day to do all the necessary work. Kellogg was apparently a local farmer. Browne had not furnished the necessary plans or estimates (2, 3-23-65, p. 16).

Early in September 1864, the Building Committee decided that Browne had neglected his duty and, in the interest of the college, discharged him. In the following months he was asked to turn over his plans and specifications to the committee, but he refused to do so, in spite of the fact that he had been paid \$350 to prepare plans, specifications, and estimates. It was considered necessary to employ another architect to report to the Board of Trustees in January 1865 concerning the condition of the foundations; therefore, John F. Edwards of Fort Madison was engaged. He inspected the job in December 1864 and January 1865 and worked on the plans for the building (2, 3-23-65, pp. 16, 17, 18). At its January 1865 meetings, the Board of Trustees finally received Browne's drawings and specifications and sustained the earlier action of his dismissal, gave the Executive Committee the responsibility of erecting the building, and charged it with the responsibility of selecting a new

architect. Edwards' services, it appears, were only for the interim (2, 1-9-65, pp. 5, 6, 11).

Meeting several times in February 1865, the Executive Committee found that the stone used in the building foundation was not of suitable quality to be used above ground, for the stone appeared unable to withstand the frost and would therefore "render the building unsafe and worthless". It was therefore decided to use brick for all walls above ground instead of stone (2, 3-23-65, p. 21). The contract, previously mentioned, with Robertson of Des Moines for brickwork was made in order to be assured of a sound quality of brickwork for the building.

The committee reported concerning the problems of water supply. Difficulties had been encountered in getting water to the building from the spring. An Evens Watts engine was used "to elevate the water", but the dam did not provide enough water to run the machine. It was then decided to use a hydraulic ram. Drain tile of one and a half inch diameter and twenty-two barrels of cement were purchased, for a total cost of \$175, and the tile was laid in cement mortar to carry the water from the spring to the building. The tile leaked, so it was recommended that three quarter inch lead pipe be purchased for the line, which was estimated to cost \$1000. The committee recommended completion of the ram in order to supply water to the College Building, the Farm House, and the barn (2, 3-16-65, pp. 40, 41).

A further action noted by the committee in February was the decision to employ C. A. Dunham of Burlington, Iowa, as architect. "Our contract with him is, that he shall furnish all the plans, estimates, and specifications for the College Building; that while the work is being prosecuted he will give it constant personal supervision either by himself or by a competent assistant, for which he is to receive one hundred and twenty-five dollars per month for the time actually employed on the work" (2, 3-23-65, p. 23).

Dunham's appointment as architect of the College Building was made on 1 February 1865, and he was authorized to make such improvements in the original plans as he deemed beneficial without adding to the cost (2, 1-6-66, pp. 59, 60). The identification of the original plans poses a problem here. In connection with John Browne's failure to furnish drawings for bidding or construction of the foundation, mentioned previously, the writer assumes that the "original plans" referred to in the minutes of the Board of Trustees were in fact Browne's drawings. The writer feels that since Burt's drawings were for a substantially different building, as has been stated, and since Edwards worked for only nine and a half days on plans and tracings -- insufficient time to prepare the required drawings -- Browne's drawings are the only others known to exist which could be the "original drawings" (2, 3-23-65, p. 18).

On 22 February 1865 Dunham submitted revised plans to the committee, describing several inadequacies in the original plans and some of the changes which he made to correct them. The lecture room was of a shape that would have made it impossible to use, since there was no place for the speaker's stand and space for only a quarter of the required number of students. Elsewhere in the building the staircases were half the usual width for such a building and "were managed in the worst form conceivable". Dunham enlarged the building, "put in two good broad staircases easy of ascent and descent", and gave the building two more external doors at the rear. He enlarged the library and chemistry laboratory, using the space formerly taken up by four rooms for these two. He modified the towers, removing the buttresses, reducing the size in plan by seven feet, and discarding the balconies, which were wood and would be subject to decay. At the northeast tower brick walls had been shown to be built sixteen feet high on top of a light wood partition which in turn was "supported on what was intended to be a truss without any mechanical principle of construction properly applied" (2, 1-6-66, pp. 59, 60, 61).

At this time the committee suggested more changes. One was the placing of a museum room close to the lecture room so that anatomical and other specimens could be kept handy for use in lectures, and apparently this change was incorporated. Another change was the abandonment of the

steam heating system which Dunham believed would cost at least \$30,000, or sixty percent of the estimated cost of the entire building, and which would involve a large annual expense and probably delays and inconveniences when repairs were needed. One member of the Board, Peter Melendy, advocated heating by means of hot air furnaces, because of the great economy, and the rest of the committee approved (2, 1-6-66, pp. 61, 62).

At the January 1866 meeting of the Board of Trustees, Dunham presented a report, dated 22 November 1865, plans, specifications, and a bill of quantities (2, 1-6-66, pp. 64, 86, 88). Following the 22 February 1865 meeting he had made further changes in the original plans. In this report he continued to point out the inadequacies of the original plans; noting several peculiarities in the roof construction as shown thereon. The form of the roof itself was expensive, requiring two sets of timbers. Although the slate roofing for the principal roof seemed satisfactory, the roofing of the towers was completely unsuitable -- ten-inch wide pine boards with three-inch wide molded battens over the joints, "a style of finish not much used on public buildings in this country", Dunham's understated comment reads. Another problem was the fact that dormer sash could be raised only five inches, making attic rooms most uncomfortably hot for study or sleeping in the summer, as was unsuitably elaborate cornice design. Leaving the roof area and considering the very

basic need to provide sufficient doors to get in and out of the building, a concern strongly related to safety in the event of fire or other panic-generating situations, Dunham noted that in the original plans there was only one exterior door at the main floor. He added two more doors. Perhaps his most telling comment about the designer of the "original plans" is a statement that indicates that the man simply did not know how to draw, for the elevations were "so different in design that it is almost impossible to believe that they were for the same building, in fact it would be impossible to work them up together, nor do they agree with the story plans" (2, 1-6-66, pp. 62, 63).

The report presented to the 6 January 1866 meeting included a description of the new heating and ventilating system, but lacked a good description of the building as he redesigned it. The detailed description which Dunham prepared for the Report of the Commissioner of Agriculture for the Year 1865 fortunately contains the needed information, an illustration showing the south and east sides of the building, and a more complete description of the heating system than the report to the Board of Trustees. The building was placed upon a five-foot high terrace of earth that was to project a hundred feet from the building on the south, east, and north sides. The main facade faced east and included a central pavilion with a verandah. Corner towers terminated the main facade. Counting the stone-faced basement story and the attic story located in

the mansard roof, the main portion of the building had five floors. Walls of the two corner towers were one story higher than the rest of the walls. The central pavilion was forty-two feet wide and projected seven feet from the face of the building. This pavilion's slate-covered mansard roof was steeper and higher than the adjoining roof. The towers projected four feet from the face of the building and were twenty-one feet square in plan. They were capped with slate-covered mansard roofs also, with a turret on top of the roof of the southeast tower. The walls above the basement were brick, ornamented with a belt course and door and window trimmings of the same cut stone as the basement walls. All openings in the walls were arched. In overall plan the building had the form of a letter E, with the flat side, which was one hundred fifty-six feet long, corresponding to the entrance, or east, side of the building. In the other direction the building measured seventy feet, with the three wings projecting toward the west. By means of increasing the length of these wings the building could easily be enlarged. The basement story was nine feet high, the main story fourteen, the two stories above this twelve feet each, and the attic ten and a half feet (24, pp. 178, 179). See illustrations.

Owing to a shortage of classrooms and recitation rooms from the first occupancy of the building, it was not possible to use many of the rooms as Dunham described. Nevertheless, his description, as follows, probably represents the origin-

ally intended uses of the various spaces. On the main floor there were: reception room, 16' x 24'; president's suite, which included a parlor, 16' x 24', a chamber 16' x 16', and ample closet room; library, 18' x 40'; museum, 18' x 52'; lecture room 34' x 50'; recitation rooms; two circular stairways 8' wide, entrance corridor, 8' wide; and other corridors. One entered the main entrance by ascending the steps at the verandah, coming into the building at a corridor on the right of which was the reception room and on the left the president's suite. Opposite the entrance, and on the west side of the building, projecting slightly to form the central wing, was the library. The museum occupied the northeast corner and the lecture hall was in the northeast wing. The museum was fitted with cases and shelves for specimens, and the lecture hall had seats placed on the arcs of circles centering on the lecturer's stand. A doorway at the rear of the lecturer's stand communicated with the museum to facilitate the use of museum specimens to illustrate lectures. The lecture room was to be ornamented with oil paintings "representing scenes in the life of the agriculturist and the arts and sciences". In the central part of the building, two circular staircases were placed in octagonal towers that in turn were located on the west side, flanking the library. These stairways lead from the basement to the attic. The remaining space on the main floor was occupied by recitation rooms (24, p. 178).

The basement was entered from the lower level of the verandah, after descending four steps from grade, and its corridors followed a pattern similar to those of the main floor. The basement contained: steward's room, laboratory, 18' x 36'; bath room, dining room, 33' x 40'; kitchen, 20' x 24'; pantry for dishes; scullery; kitchen storeroom; wash rooms, 16' x 22'; laundry, 16' x 22'; dry room, 14' x 16'; four servants' rooms; housekeeper's room. The dining room, kitchen, scullery, and store room were located along the north side of the basement. The laboratory occupied the projecting central portion of the west side. This was hoped to be a temporary location, anticipating the construction of an isolated laboratory building. Under the dining room, kitchen, laboratory, and corridors there was a cellar seven feet high, and there were fuel vaults in the rear of the cellar under the laboratory (23, pp. 178, 179).

On the third floor were professors' rooms and recitation rooms, 15' x 18', and twenty-one students' rooms, 14' x 16' each. The fourth floor contained two recitation rooms, 14 x 20', and thirty rooms 10' x 14'. These were presumably students' rooms. The fifth floor was the same as the fourth (24, p. 179).

"The building is heated with eight hot-air furnaces. Opposite to where the warm air is admitted into the rooms there is a register of the same capacity as that of the warm air register, to draw off the vitiated air downwards, by flues built on the hollow core of the walls. There is

also a small register near the ceiling line, for summer ventilation, opening into flues which will conduct it to the summit of the roofs" (24, p. 179).

A brief comment about the kind of instruction that was going to take place at the new college would be appropriate at this time. The following is a quotation from the Board of Trustees: "The course of instruction shall include the following branches to wit, Natural Philosophy, Botany, Horticulture, Fruit Growing, Forestry, Animal and Vegetable Anatomy, Geology, Mineralogy, Meteorology, Entomology, Zoology, the Veterinary Art. Plane Mensuration, Leveling, Surveying, Bookkeeping, and such mechanic arts as are directly connected with agriculture. Also such studies as the Trustees may from time to time prescribe not inconsistent with the purpose of this act". Tuition was to be free to all who had been residents of the state for more than six months and who were over fourteen years of age. Compulsory labor was required of all students, reflecting the belief that labor is honorable and a part of education, not less than two hours in the Winter and three in the Summer -- presumably daily (2, 1-6-66, pp. 76, 77).

To return to the meeting of the Board of Trustees on 6 January 1866, we find that Dunham's plans and specifications were adopted, with one exception. It was decided to build the foundation of stone (2, 1-6-66, p. 88).

Faulty construction of the foundation, 1864-1866.

At this point, we must look back to the period of time during which John Browne was supposed to have been performing architectural services and later Charles Dunham did in fact do so. On 22 February 1865 Dunham inspected the work of 1864 at the site. The foundation walls were then about one quarter built, some up full height, and the tops of the walls were covered with straw for protection from the snow. The bases of the walls were well covered, and what he was able to see of the walls looked good. There were a few light fractures visible, which he could not account for. When the excavations later were made for the furnace cellars, the cause of the fractures was discovered. In building the foundations the earth had been dug away only to the exact size that the building was to be. "The contractors made single faced walls using the best stone on the inner face where it would show their work to the best advantage. In many places the walls were several inches thicker at the top than they were at the base. Those parts of the wall between the bank and the inside course of stone were found to be filled with all kind of stone rubbish, occasionally bedded in mortar composed of sand and loam. If there was any lime in its composition my eyes failed to discern it", Dunham wrote. These foundation walls could not, of course, support even a twelve-inch thick two-story brick wall without its falling down or fracturing so badly

that it would have to be taken down. The foundation walls were of such poor workmanship and, in part, of such poor materials that they had to be rebuilt during 1865. Dunham stated that the new wall was good, substantial, and was a double-faced wall, true to line on both sides, well bonded and tied together (2, 1-6-66, pp. 61, 62). The Building Committee report gives substantially the same information, stating that "on examination the walls showed that the work of last year [1864] was entirely worthless, owing to the manner in which it was put up and the material used in its construction". Under the direction of the architect the walls were torn down, the excavation was enlarged, and "new substantial walls put up" (2, 1-6-66, pp. 56, 64). The report of the Superintendent of Brick supplies information that helps to clarify what was actually done. Because of a change in the plan of the basement of the building, he had to "enlarge the old cellar and basement some eighteen inches around the entire building where mason work had been done before". His job was hard, slow, and tedious, "but absolutely necessary to make a two faced wall (2, 1-6-66, pp. 64, 66). Dunham, in his report of January 1866, stated that the stone foundation walls then stood at a height of one foot above grade (2, 1-6-66, pp. 56, 64).

But there seems to have still been some doubt about the construction, for in its meeting on 3 May 1866, the Board of Trustees elected a building committee of three to examine the construction completed to that date and to de-

cide what changes were necessary owing to defects in construction or other reasons. If the present foundations could be made satisfactory with slight alterations, these were to be done. If unsatisfactory, arrangements were to be made for the Board to meet as soon as practical. The committee was empowered to employ a competent architect to assist them in their examination (22, pp. 110, 111). Apparently the committee chose Dunham as their architect, for the report that they made in June of their inspection mentions that they examined the building with him. The conclusion was to remove the defective foundation work as soon as possible. These walls were taken down and rebuilding was begun (2, 6-21-66, pp. 131, 133). The repairs on the foundation walls were completed on 28 July 1866 (2, 6-21-66). This last work was done during the time between the conclusion of the meeting of the Board on 22 June and 28 July. The short period of time required indicates that the amount of work was not extensive and that conditions were apparently better than the Board had feared.

Principal construction, under general contract, 1866-1869.

On 22 June 1866 Jacob Reichard of Marion County, Iowa, submitted his proposal for the completion of the building for the sum of \$73,872. The contract was dated 25 June 1866 and included a bonus payment of \$2,000 for early completion by 1 Oct. 1867 and the provision that if he were unable to enclose the building for the winter by 1 December 1866 he would be obligated to protect it at his own expense.

In all cases, the building was to be completed 1 January 1868. The contract included a payment schedule and provision for proportional adjustments in the contract price to cover changes. The work was to be done under the control and superintendence of C. A. Dunham, Superintendent (2, 6-21-66, pp. 137, 139, 140, 144-146). The contract and the bond were signed on 17 July 1866 (2, 6-14-67).

Although Reichard attempted to complete the work on time, he was frequently delayed by obstacles beyond his control. For the winter of 1866-1867 he had to provide temporary protection for the partially completed structure -- a board roof to keep out the rain and the snow and a clay embankment around the bases of the walls to protect the foundations (2, 1-14-67). In one case the protection was not enough, the ground under a partition foundation froze, and the partition raised up in the center and cracked the stonework of the exterior basement walls where it intersected them. With the Spring thaw the partition settled down into its proper place again, and the cracked materials were repaired. During the Summer of 1867 a severe storm caused the northeast tower to settle slightly, but it was repaired "by the application of screws and other means... without great expense". During 1867 a shortage of brick may have contributed to Reichard's delay (2, 1-13-68). During the winter of 1867-1868 only carpentry work was done. In May 1868 the Building Committee was instructed to procure water, build cisterns, provide clock and bell,

provide for grading the grounds around the building and the necessary out buildings, and to superintend the waterclosets, sewerage, and other extra work about the college (2, 5-11-68).

The Second Biennial Report (1866-1867) describes the College Building as "one of the finest in the West, and one in which the people of the State may well feel a just pride" and notes that the building "will accommodate about two hundred students, the steward and necessary help, and two or three teachers" (15.1). This may have been the information put out for the public, but the president elect reported the true conditions to the Board of Trustees. The institution had opened in the Fall of 1868, although work on the building was not completed. Candles had to be used for lighting because the gas-manufacturing apparatus was still waiting in Chicago for shipment. The water pipes in the building had not been completed, so water had to be drawn from the Farm House well and brought to the kitchen door in a tank on wheels. The laundry facilities were not completed, so laundry had to be done at the Farm House. Subsequently a windmill had been put up to pump water, but it was found that the water was hard, so a cistern was thought to be necessary for the laundry and the kitchen. The cellar windows were very drafty and the exterior stonework had not been completed. The ventilating system of exhaust flues seemed not to conduct foul air properly from the basement, possibly be-

cause of the use of flooring boards for the construction of the flues. The outbuilding screens had not been put up. (This early mention of what appears to be insect screening is of historical interest.) No changes were recommended for the laboratory in the building if money could be found for construction of a separate laboratory building. It was felt important to remove the sources of gases that were considered unhealthful (2, 11-19-68).

The president elect's complaint about the ineffectiveness of the heating system, however, begins the documentation of a long series of heating problems that were not solved until 1877. He noted that the furnaces were unsatisfactory. By November it was impossible to inhabit the attic story because it was unheatable, and so it was closed off. Only the central portion of the rest of the building could be heated comfortably, and it was taking two tons of coal a day to do this much. He feared that severe weather would force the abandoning of the building (2, 11-19-68). The college did in fact have to close on 28 October 1868 because the building could not be satisfactorily heated (2, 1-10-70). An investigation of heating systems of buildings in Chicago had been made early in 1868, and as a result the Building Committee had favored steam heat over hot air (2, 5-11-68). However, when bids were received for a steam system, it was found that it would cost considerably over the \$10,000 appropriated for heating -- \$13,400 for the system and an additional \$1500 for building alter-

ations. It was necessary therefore to choose another course of action. W. A. Pennal of Normal, Illinois, was invited to make a proposal using the "Ruttan System" of heating and ventilating. Pennal proposed to warm the building to at least 65° in the coldest weather if two of the flues were enlarged for the full height of the building, if several hot, cold and foul air conductors were built, and if certain less important modifications were made in the building. The amount of their proposal was \$6500, and the total expense was within the appropriation, so they were ordered to proceed. Upon completion it was still not possible to warm the building as required, and the expenses up to January 1869 had come to \$10,339.89. The agent of the company had ordered four more furnaces after nearly a month spent in "perfecting" the exhaust flues (2, 1-11-69). Satisfactory operation still was not obtained, and on request of Pennal and Company additional changes required for proper furnace operation were approved on the condition that Pennal provide a \$1000 bond in case the contract still were not met. Pennal proposed to add four new furnaces and to replace two existing "overhead" and "injured" furnaces with new ones (2, 1-10-70). There is no further action pertaining to the furnaces until the June meeting of the Board in 1875, when an inspection of them was ordered and a recommendation appears in the 6th Biennial Report for 1874 and 1875, in which some of the construction of Pennal's work is described. See below.

In 1869, President S.A. Welch reported that "the terrace in front of the College Building is thirty-nine feet wide by one-hundred ninety-eight feet long and an average of three feet high. Its three sides are neatly turfed, its surface covered with gravel and finished with a border suitable for the planting of shrubbery next Spring." Expenditures for the building were considered in January 1869 to be completed, and the architect, C. A. Dunham, was paid in full (2, 1-11-69).

6. Known alterations and additions:

Extension of north and south wings.

The building was scarcely occupied than it was found to be too small. President Welch listed the shortcomings in January 1870. More dormitory space was needed. It was necessary to use all possible rooms for class recitations and lectures, so that there was no space left for a library or a museum, and rooms designated for these uses were considered too small anyway. In the room intended for a library temporary shelves had been installed, and it was used for recitation as little as possible. Two thousand dollars had been appropriated for chemical apparatus, but there was no room available for use as a laboratory, and it was felt that no room should be used for a laboratory in a building in which students eat and sleep. At the same meeting of the Board of Trustees in which the original construction of the building was considered completed, President Welch recommended extending the north and south

wings of the building fifty feet. The extension of the south wing would provide space in the basement for the laundry, first-floor space for the library and second floor space for the gallery (to the library, presumably), and the third and fourth floors would be for a museum, with the fourth as a gallery to the museum. At the north wing the extension would allow enlarging of the dining room at the basement to seat 350 students, enlarging of the chapel on the first floor to seat 600 people, allow space for several recitation and lecture rooms on the second and third floors, and provide a large attic for practice in drawing. Halls within the building would give access to all of these rooms and a hall constructed across the west end of the extended wings would provide access from the outside. (This last was not built.) The placing of the kitchen in a separate building was also suggested. This extension was proposed in the original design and would provide just the spaces needed by the college. The president's statement was acted upon by the decision to procure drafts and specifications for the additions to the north and south wings (2, 1-10-70). The existing portions of the building were modified as made necessary by the additions to the wings, which were completed in 1872 (2, 5-15-72; 23, pp. 274-277). In the same year a gas house was erected, and a coal house was proposed (2, 11-12-72 and 12-11-72).

Finkbine's inspection and report and related work, 1875-1877.

At the June 1875 meeting of the Board of Trustees, the President of the Board was authorized to employ Robert S. Finkbine -- whose competence in construction matters had become known through his work as Superintendent of Construction of the Capitol in Des Moines -- to inspect the College Building, especially the north wing, and the heating system (2, 6-8-75, pp. 5, 8). Finkbine in his report readily identified the structural difficulties at the north wing. When the wing had been extended to the west the portion of the original west end wall at the main floor had been removed in order to expand the space of the chapel. There remained, however, two stories of brick wall above, and the weight of these was placed upon a wooden girder spanning the width of the wing with two iron columns as intermediate supports. A brick arch was constructed at the base of the remaining portion of the upper wall in order to relieve the wooden girder of some of the weight, estimated as thirty-five tons for each of the two outer, fourteen-foot spans. The wooden girder shrunk, as was to be expected, the thrust of the arch began to force the exterior walls outward, and the brick partition wall supported on the arch settled and cracked. Finkbine recommended removal and rebuilding of the brick partition wall (the now-cracked former west wall), the replacing of the wooden girder with a girder made of two rolled-iron ten-inch I-beams, and rebuilding

of the side walls and the partition with the partition bonded to the side walls (16).

Difficulties from a similar cause had been experienced at the two corner towers of the east facade. While the two outer walls were of masonry construction for their full height, the brick walls of these towers on the sides adjacent to the roof rested upon the wood-frame construction of the interior of the building, and here a total three to four inches of shrinkage in the collected thicknesses of wood construction over the height of the building had caused cracking of the brick. Reconstruction would be required here also (16).

Inspecting the general condition of the building, Finkbine recommended repainting of the exterior woodwork and of the tin roofs, gutters, valleys, and conductors. The floors of the water-closets needed to be covered with five-pound sheet lead, the tanks lined with lead, and the soil pies relocated. Corridor and hall floors should be relaid with hardwood, the interior woodwork needed painting, the plastering, which was badly cracked, needed repair and kalsomining. At the exterior, the "brickwork would be improved in durability and appearance if it was painted" (16).

Finkbine's report on the heating system is quite descriptive. "The iron work of the furnaces projects above the lower line of the joist. The joist in most instances being half cut away to make room for the furnace

-- over the iron work a brick arch is placed. The expansion of the heated iron cracks this almost as soon as put up. I consider these furnaces absolutely dangerous and think that they should be removed at once. In my judgment, the attempt to properly heat so large a building as the College, in this climate, with hot air furnaces will be a failure. The best substitute is steam. The best way to do this, is to erect an engine boiler and coal house, considerably in the rear of the present building, with a main duct leading to the central building, and wings. Many of the air ducts now in, will be used in this system, as well as the registers you now have." His estimate for all the repair work that he described was \$31,720 (16).

In its November 1875 meeting the Board of Trustees recommended removal of the hot air furnace, installation of a steam system, and an arrangement of annual appropriations for repairs (2, 11-10-75). Proposals for the steam heating system were advertised for, and a contract was signed with Haxton Steam Heater Co., Kewanee, Illinois, for the installation of a low-pressure heating system in May 1876 (2, 3-30-76 and 5-2-76). In August 1876, Peter Raft and Sons of Story County were given the contract to build a boiler house and a cistern. Student labor was used for the disassembly and removal of the old furnaces (2, 8-16-76). Testing of the new heating system in November 1876 at 18° exterior temperature proved that the

temperature in the upper halls could be maintained at 65°, and that with increased steam pressures the colder weather could be dealt with (2, 11-13-76). In May 1877 the contract by Haxton was considered to have been completed "to the entire satisfaction of all concerned" (2, 5-2-77). Thus ended some nine years of difficulties with heating the building owing to a lack of funds for purchase of an adequate system at the outset.

The other repair work recommended by R. S. Finkbine was also undertaken. The exterior painting contract was given to R. A. Wilson of Ottumwa, and that for tin-work repairs to Wright and Little of Ames. The Mechanical Department of the College undertook taking down and rebuilding the wall in the north wing and the plumbing and repairs to the water closets (2, 8-16-76 and 11-13-76).

Other work not related to Finkbine's report was done at approximately the same time, and it will be mentioned here. A cellar was built under the kitchen and two water tanks seven and a half feet square and seven feet high were built, one in the north wing and one in the south, and they were painted on the inside with lead and oil paint and on the outside with two coats of asphaltum (2, 11-13-76 and 12-12-76 and 5-2-77).

Sanitation, 1877 - ca. 1889.

In October 1877 Professors Budd and Beal were requested to investigate the condition of the College sewer and the advisability of removing the water closets from the build-

ing and placing them outside (2, 10-1-77). The sewer was thought to have been the cause of malaria among the students during the preceeding year and of the greater severity at the College of the sickness that had prevailed throughout the state. The sewer had been constructed nine years earlier and the south wing addition was later built over it (17). Upon inspecting the sewer the Committee discovered that it had been built too large, so there was no current to carry the contents out, and that it had in effect become a "sewer of deposit". It was suspected that little that had ever gone into it had ever come out. Since plumbing fixtures in the building had no traps and since the sewer was not vented, the sewer gases readily entered the building through the fixtures. In addition, the sewer outfall was to the south of the building, and frequent winds from the south in the summer both created a pressure within the sewer itself, forcing gases into the building, and carried the stench at the outfall to the building. The recommended course of action included the removal of the portion of the sewer that was underneath the building and the construction of a new sewer of ten-inch diameter "round cement pipe" to some point on the brook near the eastern limit of the campus. This new sewer was to be vented, and the water tanks of the college were to be arranged to empty into it at intervals to provide flushing action (2, 11-12-77 and 12-1-77).

No action was taken regarding the placing of toilet facilities in separate structures for another ten years. In 1887 the Board recommended "removing privies and waterclosets from Main building and placing the same in outside towers" (2, 11-9-87). The Biennial Report for 1888-1889 records an appropriation of \$3500 for removal of privies and waterclosets from the Main Building (19). The photograph of the rear of the building shows the two tower-like structures that were built, the purpose being to help prevent the spread of disease (18).

Lighting.

The original lighting system for the building utilized an "apparatus for manufacturing gas from gasoline". It operated poorly in cold weather, so construction of a small brick building over the gasometer was felt necessary to rectify this difficulty (2, 1-10-70). This was done (2, 11-12-72). Late in 1877 arrangements were made for H. O. Patton to install a new gas works for \$650, and the College was not to pay unless the new system resulted in savings of \$650 or more in one year (2, 11-12-76 and 12-1-76). The estimated savings came to \$732 yearly (2, 5-21-78). In 1882 a committee was formed to investigate the best means of lighting the College Building, and its conclusion was "favorable to the present system" (2, 5-5-82 and 5-23-82). The conclusion did not stand for long, because in 1884 the Board recommended the purchase of a

dynamo, which would be operated by means of the engine belonging to the Mechanical Department (2, 5-17-84). Western Edison Light Company proposed to install two-hundred fifty ten-candle lamps in the College and the Office Building for \$3050, and the installation was made in this same year (2, 8-21-84 and 12-2-84).

Further remodeling and maintenance work, 1886-1897.

In 1886 the chairman of the Building Committee recommended to the Board that it would be wise to keep the College Building in good repair, but some time elapsed before the funds were appropriated and the work done (2, 11-8-86). A special committee made its recommendations in 1891 (2, 5-12-91). The president's report in the 1890-1891 Biennial Report summarized what was done: "In place of the former library and museum rooms, have been fitted up living rooms for students and these are more than full already. By change of the chapel we were enabled to make a much needed provision for dining room [The college chapel had been moved to Morrill Hall, just completed to the north]. The old chapel is converted into a commodious, tasteful and inviting dining room. Important additions of new floors and wood furnishings have been made in this building. A new coat of paint has added much to its preservation and graced the entire structure. The new gutterings of the roof came none too soon. A water main with hose ready for action upon each floor and excellent fire escapes have added much to the

security of the building and the safety of the students... The main building is sadly in need of an assembly room for students during recreation hours. At present it is just like a large hotel would be without any lobby or large parlor. Such a room can be arranged conveniently over the boiler room" (20).

In 1892 architects Josselyn and Taylor submitted sketches of combination recreation hall and assembly room for the Building (2, 4-12-92). In the same year the two boilers were completely overhauled and placed on new foundations (2, 9-27-92).

A common boiler house to serve the Main Building and Morrill Hall was built "just back of the main building", and is reported in the Biennial Report of 1892-1893. This report also mentions that the "boiler room roof in the rear of the main building had completely worn out and had to be replaced by a new roof", a statement which indicates that the recreation room mentioned was not built above the boiler room (21). It appears, from the account of the fire in 1902, that some heating equipment must still have remained within the building, for the boilers were considered as the source of that fire (10).

In the Biennial Report for 1892-1893 the need is mentioned for extensive repairs to the walls and floors of the two top floors of the building, and in the following Biennial Report it is recorded that: "the two upper floors of the main building were stripped to the studding,

rewooded, replastered with adamant and finished in native oak" (21; 22).

In the Minutes for April 1894 appears another report by R. S. Finkbine, who had been requested to examine the foundation walls of the building. He had found no settlement, but did discover some disintegration of the limestone of the foundation walls, which he attributed to "the bad practice of building the stone on edge instead of on their beds" and to the dampness in the subbasement. However, two of the brick piers near the center of the west wall of the Main Hall had settled some time before, he noted, and he recommended repair here and, when the subbasement had dried out after proper drainage had been installed, the removal of the disintegrated stone and replacement of it with good stone or with brick (2, 4-2-94).

Another structural matter appears in the Minutes in 1897, when Architect Hallet who had been commissioned to examine the towers of the Main Building for their safety, reported "the walls safe, for the present, but that careful measurements should be made and recorded as to their movements; that none of the settling is of recent occurrence; that the south tower is a solid square brick structure, while the north tower is a frame in its interior construction" (3, 11-10-97 and 11-16-97).

Some minor items of interest: in 1897 plans were made to install a telephone system to connect with other buildings on the campus; in the same year Eagle Sanitary

and Cremation Co. was to put in Eagle fire closets in the Main Building, apparently some type of incinerator for trash (3, 5-18-97 and 6-30-97).

Fires, 1900 and 1902.

The College Building was destroyed by two fires. The first, early in December 1900, destroyed the north wing; and the second, in mid August 1902, destroyed the rest. The report in the Ames newspaper indicated that the fire originated "in the boiler room of the heating plant in the basement of the north wing at four o'clock. It caught in a heap of shingles used as kindling. This was directly under the conduits through which the steam pipes lead to the upper floors. This created a strong draft and the fire was sucked up to the top floor in an instant". Students rushed to the fire escapes and no one was seriously injured, "and it was the perfect discipline of the students which prevented more destructive spread of the flames", for the college fire department was inadequate to the job. Student efforts saved most of the \$10,000 botanical collection from the first floor of the north wing (10). H. F. Liebbe, the State Architect, inspected the damage, and recommended reroofing and repairs for the central portion of the building, in order to make it usable, and general renovation and repair of the south wing, all for temporary use. He commented that the boiler room roof was "entirely consumed and in my judgement was the source of the fire" (3, 12-20-00).

Emergency Hall, a temporary building, was put up, and plans were made for the construction of a new main building (3, 1-3-01 and 9-5-01 and 12-20-01). Foundations of the latter were to begin in the fall of 1902 (3, 5-1-02). On 14 August 1902 the second fire destroyed the remaining portion of the College Building. Again the botanical collection was saved, and much of the furniture, but this time as the result of the efforts of the college fire department. The college, after this fire, was lacking five recitation rooms, and it was necessary to add to Emergency Hall in order to have sufficient facilities for classes that fall (3, 8-21-02).

Sources of Information

Primary or unpublished sources:

- (1) Gue, Benjamin. "Origin and Early History of Iowa State College." Typewritten, copy of a manuscript found among Gue's letters and papers, ca. 1891.
- (2) Iowa State Agricultural College and Farm. Minutes of the Board of Trustees. First date of meeting as indicated, from 1859 to 1895.
- (3) Iowa State College of Agriculture and Mechanic Arts. Minutes of the Board of Trustees. First date of meeting as indicated, from 1896 to 1902.

Secondary or published sources:

- (10) Ames Times, 9 Dec. 1900, in Ames Daily Tribune, 5 Sept. 1942.

- (11) Andrews, L. F. Pioneers of Polk County, Iowa. Des Moines: Baker-Trisler, 1900 (2 vols.).
- (12) Antrobus, Augustine M. History of Des Moines County, Iowa, and Its People. Chicago: S. J. Clarke, 1915 (2 vols.).
- (13) History of Des Moines County, Iowa. Chicago: Western Historical Co., 1879.
- (14) Iowa State Agricultural College and Farm. First Annual Report (1858-1859).
- (15) ----- . Second Annual Report (1860).
- (15.1)----- . Second Biennial Report (1866-1867).
- (16) ----- . Sixth Biennial Report (1874-1875).
- (17) ----- . Seventh Biennial Report (1876-1877).
- (18) ----- . Twelfth Biennial Report (1886-1887).
- (19) ----- . Thirteenth Biennial Report (1888-1889).
- (20) ----- . Fourteenth Biennial Report (1890-1891).
- (21) ----- . Fifteenth Biennial Report (1892-1893).
- (22) ----- . Sixteenth Biennial Report (1894-1895).
- (23) ----- . Iowa State College of Agriculture and Mechanic Arts. History and Reminiscences of Iowa State College. Des Moines, 1867.
- (24) United States Department of Agriculture. Report of the Commissioner of Agriculture for the Year 1865. Washington: Government Printing Office, 27 Nov. 1865.