

Implementation of the land-grant philosophy
during the early years at Iowa Agricultural
College, 1858-1890

by

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CONTENTS

	Page
INTRODUCTION	1
NOTES TO INTRODUCTION	10
CHAPTER I THE FOUNDATIONS	11
NOTES TO CHAPTER I	16
CHAPTER II THE WELCH YEARS, 1868-1883	17
NOTES TO CHAPTER II	35
CHAPTER III ADMINISTRATIVE INSTABILITY, 1884-1890	37
NOTES TO CHAPTER III	47
CONCLUSION	48
NOTES TO CONCLUSION	56
SOURCES	57
METHODS	58a
APPENDIX A COURSE OF STUDY, 1868	59
APPENDIX B THE COURSES OF STUDY, 1877	61
APPENDIX C COURSES OF STUDY, 1886	67
BIBLIOGRAPHY	73

LIST OF TABLES

	Page
TABLE 1 GRADUATES OF IOWA AGRICULTURAL COLLEGE, 1872-90	23
TABLE 2 OCCUPATIONAL CHOICES OF GRADUATES, IOWA AGRICULTURAL COLLEGE, 1872-83	28
TABLE 3 FEMALE GRADUATES' CAREER CHOICES, IOWA AGRICULTURAL COLLEGE, 1872-90	32
TABLE 4 PERMANENT RESIDENCES OF GRADUATES, IOWA AGRICULTURAL COLLEGE, 1872-90	34a
TABLE 5 OCCUPATIONAL CHOICES OF GRADUATES, IOWA AGRICULTURAL COLLEGE, 1884-90	41

INTRODUCTION

Iowa State University, during its early years, did not fulfill the purpose for which it was created. The legislative leaders who advocated the school's foundation in the late 1850s articulated a vision of an institution stressing practical scientific training over classical literary studies. They believed that the state needed trained technicians and farmers, but no school existed to provide appropriate training. Thus, Iowa State (then Iowa Agricultural College) was founded to provide industrial and agricultural education and to produce a body of trained workers to aid in the state's economic development. The school's early supporters maintained that the institution would serve a very different purpose from that of the already-established State University in Iowa City. The State University had opened in 1856 offering classical studies as background for careers in the traditional professions. In contrast, I.A.C. would provide practical training as background for professionals in Iowa's growing industrial and agricultural trades.

The first nineteen graduating classes, however, produced nearly as many traditional professionals (doctors, lawyers, and ministers) as industrialists and agriculturalists. The majority of graduates also eventually settled out-of-state. Early graduates of I.A.C. did not form the body of Iowa artisans, mechanics or farmers, envisioned by the school's founders.

Expanding industrialization transformed American society during

the nineteenth century. Developments in transportation, communications, technology, and agriculture contributed to a new American lifestyle and thus to new societal values. Traditional college education was out of step with this lifestyle and these values. Latin, Greek, philosophy, and theology held little relevance for the majority of the population whose lives centered on expanding industrial production and developing agricultural practices. "Here were conditions unknown before in this country, conditions with which the established educational institutions were unable to cope."¹ Innovative educational concepts emerged in response to these new conditions. In the 1840s and 1850s, many advocates of the innovative concepts agitated fruitlessly for a new form of higher education. Not until 1862 when the Morrill Act gave a federal subsidy to each state specifically to support practical education did viable institutions finally actualize the new ideas.

The brewing revolution against classical education first found numerous advocates in the embryonic "industrial classes" of the 1840s and 1850s. Disaffected by traditional higher education institutions, they advocated the foundation of technical and agricultural colleges which would provide them a more relevant learning experience. This movement championed practical instruction to train artisans and mechanics. Technical and scientific fields were providing increasing numbers of employment opportunities, but established colleges taught science only in a theoretical context. Advocates of industrial education endorsed colleges that emphasized the practical application of science and technology.

Farmers also formed an early support group for the movement endorsing practical education. They joined with industrial workers in promoting colleges that would offer studies in the areas of agriculture and mechanic arts. The early proponents of the education gave little firm definition of exactly what this education should include.

Leading American educators also acknowledged the need for an alternative form of higher education. In 1850, Brown University's president, Francis Wayland, described the necessity of a new educational system:

Lands were to be surveyed, roads to be constructed, ships to be built and navigated, soils of every kind, and under every variety of climate, were to be cultivated, manufactures were to be established which must soon come into competitions with those of advanced nations; and in a word, all the means which science has provided to aid the progress of civilization must be employed.²

The nation looked toward a seemingly limitless future of industrial expansion, and to exploit this economic growth to the fullest, workers had to be educated in employing those "means which science has provided to aid the progress of civilization. . . ."

During the 1850s, the first concrete expressions of the practical education movement were organized. State and local societies held exhibitions of agricultural and mechanical developments and served as agencies for the exchange of ideas. Harvard, Yale, Amherst, Brown, and Union offered experimental courses in applied sciences.³ By 1860, many states had independently founded technical and agricultural colleges, though most appropriations were meager and the state-supported schools had tenuous futures. The federal government also

evidenced support of the "new education" through the passage of the 1862 Morrill Act providing federal financial aid for the struggling state technical schools. This act awarded each state grants of federal land to provide an endowment fund for colleges oriented toward teaching agriculture and mechanic arts.

With the support of federal aid, the colleges advancing the new education stabilized and prospered. These land-grant colleges endorsed an education which differed significantly from traditional education by broadening enrollment opportunities, emphasizing technical and agricultural studies, and depending on government support. These aspects of land-grant institutions directly reflected the new values of higher education. The innovative philosophies upon which land-grant colleges were based grew out of the transition to an industrial economy.

Iowa's economy reflected national trends in the two decades following the Civil War. As transportation systems expanded and urban centers grew across the country, demands made on the state's agricultural production changed and accelerated. To meet the increasing demand, farming became more commercialized; farmers began to deal with complicated systems of credit, capital, management, and marketing. Agriculturalists also began to see needs for improved crop strains and livestock breeds. Changes in farming practices were developing rapidly and many farmers supported the concept of a land-grant school to educate their children in the new methods.

At the same time that long-term economic trends were oriented toward growth and expansion, the state's immediate economic situation

generally was not prosperous. Post-war inflation, the Panic of 1873 and its subsequent depression, and repeated infestations of insects all combined to produce hard times for Iowa farmers. Discontent with their economic lot, they joined forces in various kinds of collective action. Greenbackism, the free silver movement, the Grange, populism, and agitation for an agricultural college were all attempts by the farmers to assert their rightful place in the changing economy.

Cohesive class action was a new concept to nineteenth-century America; the democratic education it promoted was even more revolutionary.

For the first time in history all these classes of people--farmers, artisans, merchants, bankers, technicians, scientists, homemakers, engineers--were to be provided with the opportunity for higher education on the same basis as the clergymen, physicians and lawyers. The new type of college fulfilled the needs and aspirations of the common people. It offered equal opportunity for all.⁴

Educational opportunity for all was a cornerstone of the land-grant ideology; it also reflected a new societal value. Traditionally, American college education was available only to the elite; new ideals challenged this restriction. Land-grant colleges proposed to democratize higher education by lowering entrance requirements and minimizing general expenses. They even considered women as prospective students.

Practicality, along with specialization, was a by-word to the land-grant visionaries. The specialized education they planned was to be directly applicable in students' future lives. "Here, indeed, was a forward-looking move. Large numbers of America's middle and

lower classes were to be given courses which made sense to them, courses that were practical and useful."⁵ Some traditionalists characterized the emphasis on utilitarian vocational training as ". . . prostituting the sacred cause of education to the business of making a living." However, ". . . an industrial society had less and less room for idlers, however admirable it might be to gather hyacinths for the soul. . . ." ⁶ Economic advancement required specialized technical skills; land-grant colleges designed their training to that end.

The emphasis on technical and agricultural education implicit in the land-grant concept had a firm scientific foundation. Belief in science grew during the nineteenth century "in the sense that it developed . . . a claim for recognition of its competence by society at large." The publication of Charles Darwin's Origin of Species had opened minds to the "conviction that knowledge was attainable by the use of reason, applied objectively to evidence gained through research or experiment. . . ." Land-grant education incorporated scientific method as the basis of its learning process.⁷

The scientific emphasis of land-grant ideals contributed to the secularization of higher education. "The land-grant colleges . . . were the first to make the strong initial break from the traditional mixing of higher education and the church in the United States."⁸ Orthodox dogma no longer dominated intellectual debate; science and pure reasoning were the authorities of the new order. The land-grant colleges' subordination of religion mirrored the increasing secularization of society in general. Americans became fascinated by the new

technology and put more and more trust in science to provide answers that their religious beliefs had previously supplied.⁹

Financial backing by the federal government helped realize the dream of the speakers for the industrial classes. The 1862 Morrill Act provided land grants to endow the industrial colleges; the Second Morrill Act of 1890 reconfirmed the government's support by establishing continuing subsidies. All of nineteenth-century America began to depend on the federal government to facilitate development. "In these decades of industrial growth, politics and government were called upon to be the instrument of material progress. . . . There was only the pragmatic assumption that the business of America was to create wealth and that government at all levels should contribute to this task."¹⁰ Through land-grant colleges, the government could contribute to America's wealth by creating trained technicians and farmers.

As the Civil War neared its climax, Henry Thoreau died and Henry Ford was born. A general technological advance was in full career. . . . The goal was chosen; there remained only the pursuit and winning of it. Thenceforward, over the next generation, Americans fitted such of the older patterns to the new as they could, painfully abandoned such as they could not, and found ways through or around barriers to the promised affluence.¹¹

Americans founded land-grant colleges in an attempt to reach the "promised affluence." The institutions' founders had an idealistic vision of a radically new education, an education based on a new purpose, employing new methods, and producing new results. But did the schools fulfill the "land-grant prophecy"?

Implementation of the early advocates' idealistic vision proved to be difficult. Although the leaders in the land-grant education

movement knew clearly what results they expected from the schools, they had only hazy ideas of how to produce those results. Institutionalized training for industrialists and agriculturalists was a new concept and few educators had solid plans for translating their vision into actual course offerings. Exponents of practical education especially had difficulty defining an applied agriculture curriculum; such a subject had never before been taught in a classroom. The visionaries combined agricultural training with industrial training in the schools they founded with no clear idea of where the courses might overlap or diverge. With these vague beginnings, administrators of most land-grant schools struggled during their institutions' early years to come to their own understanding of the land-grant purpose and to translate that understanding into solid curricula.

This study examines the success of Iowa Agricultural College as a land-grant institution from its foundation in 1858 to 1890 by providing an analysis of the school's academic direction and its graduates' careers. It will demonstrate the divergence between the school's original stated purpose (to provide the state with trained artisans) and the actual results as measured by the occupations and residences of its graduates.

The college's objectives slowly changed over the first thirty years. Speeches by administrators and curricular revisions evidence a liberalization of I.A.C.'s declared mission from its original vocational emphasis. This essay traces the evolution in purpose and the concurrent trends in graduates' careers.

Graduates' occupations split into two major groupings: traditional professions and industrial professions. The traditional professions are law, medicine, and the ministry; industrial professions include both agriculture and technology. I.A.C. graduates who followed careers in the latter category realized the intention of the school's creators. By 1890, the majority of graduates had not followed careers in this category. The school's function had become distinctly different from its original stated purpose.

NOTES TO INTRODUCTION

¹W. J. Kerr, "The Spirit of the Land-Grant Institutions," in The Spirit of the Land-Grant Institutions (Addresses delivered at the forty-fifth annual convention of the Association of Land-Grant Colleges and Universities, Chicago, Illinois, November 16-18, 1931), p. 9.

²Allan Nevins, The State Universities and Democracy (Urbana, Illinois: The University of Illinois Press, 1962), p. 11.

³Earle D. Ross, The Land-Grant Idea at Iowa State College (Ames, Iowa: The Iowa State College Press, 1958), p. 14.

⁴Kerr, p. 11.

⁵Benjamin Fine, Democratic Education (New York: Thomas Y. Crowell Company, 1945), p. 46.

⁶Eugene Davenport, "The Spirit of the Land-Grant Institutions," in The Spirit of the Land-Grant Institutions, pp. 17.

⁷See E. A. Bryan, "The Spirit of the Land-Grant Institutions," in The Spirit of the Land-Grant Institutions, pp. 37-39; and Oscar Handlin and Mary F. Handlin, The American College and American Culture (New York: McGraw-Hill Book Company, 1970), p. 54.

⁸Edward Danforth Eddy, Jr., Colleges for Our Land and Time (New York: Harper and Brothers, 1957), p. 65.

⁹See Carl N. Degler, The Age of the Economic Revolutions, 1876-1900 (Glenview, Illinois: Scott, Foresman and Company, 1977), p. 157; and Eddy, p. 1.

¹⁰Samuel P. Hays, The Response to Industrialism, 1885-1914 (Chicago: The University of Chicago Press, 1957), p. 17.

¹¹Robert V. Bruce, "Two Roads to Plenty: An Analysis of American History," Boston University Graduate Journal 12 (Spring 1963): 83.

CHAPTER I

THE FOUNDATIONS

Proposals for institutionalized technical education in Iowa date back to territorial years. The first settlers in the area demonstrated a strong belief in practical education. In 1838, Davenport Manual Labor College opened but soon failed because of insufficient financial backing and a lack of students. Four years later the Mechanics Mutual Aid Association founded an industrial academy in Iowa City which also quickly closed, abandoned by its patrons. Although the actual attempts to establish educational institutions were failures, the advocates of practical instruction were not dissuaded from their goal. Support for technical schools was widespread but disorganized.¹

Gradually, leaders emerged with explicit proposals for practical education in the state. Suel Foster, an early proponent of the industrial education movement, formulated a definite plan for Iowa: a state-supported school.

The first man in Iowa to advocate the establishment of a State Agricultural College was Suel Foster of Muscatine. As early as 1847, his attention was called to similar schools in Germany and he was so impressed with the benefits such institutions would confer upon the young people of the west that he at once began by voice and pen to advocate the establishment of one in Iowa.²

Governor James W. Grimes officially endorsed Foster's proposal in his 1854 inaugural address. He defined the purpose of an industrial college by contrasting it with the "literary institutions"

already established:

They [literary institutions] can and will educate the young men who wish to enter the professions of law, physic [sic] and divinity. But the State has a greater want, than of lawyers and doctors. She wants educated farmers and mechanics, engineers, architects, chemists, metallurgists and geologists. This want can only be supplied by the establishment of a school of applied sciences.³

Support for a state school grew and finally in 1858 three state representatives introduced in the Iowa General Assembly "a bill for an act to provide for the establishment of a State Agricultural College." Opponents of the bill nearly succeeded in tabling it permanently, but its three champions, R. A. Richardson, Benjamin Gue, and Ed Wright, ". . . went to work among the members to explain the benefit an Agricultural College would confer upon the sons and daughters of farmers and mechanics. . . ." ⁴ Gue made the most effective appeal for educating industrial classes in an emotional, idealistic speech extolling the benefits of technical education. He ended with a very practical warning to the legislators that their farmer and laborer constituents would hold them directly responsible for defeating the bill. The measure passed with only ten opposing votes; the governor signed it March 22, 1858.⁵

The Organic Act founding Iowa Agricultural College narrowly defines the purpose and function of the school. It specifies the exact courses to be offered: "Natural Philosophy, Chemistry, Botany, Horticulture, Fruit Growing, Forestry, Animal and Vegetable Anatomy, Geology, Mineralogy, Meterology, Entomology, Zoology, the Veterinary Art, plain Mensuration Levelling, Surveying, Bookkeeping and such

Mechanic Arts as are directly connected with Agriculture."⁶ This required curriculum precluded the possibility of teaching any higher mathematics, English, languages, or liberal arts courses. The training delineated by the Organic Act aimed directly toward agricultural or industrial vocations, with an emphasis on agriculture. Yet, with the exception of "Fruit Growing," the course list failed to mention any specific applied agriculture courses.

This omission was an example of the difficulties inherent in formulating a program for an agriculture school. As well as not mentioning applied agriculture courses, the list failed to differentiate between the agricultural and industrial curricula. However ill-defined the 1858 course list might have been, the legislators left no doubt concerning their intentions for the school. "Indicative of the spirit of the new venture was the resolution that while the official name of the college was given in the act, in 'general use' the institution should be referred to as the 'Iowa Farmers' College.'"⁷ Ever mindful of their agriculturalist constituencies, the legislators had codified a plan for a school not just emphasizing agriculture and mechanic arts, but limited to producing workers for those fields. Humanities were pointedly omitted from the course offerings.

In addition to the \$10,000 appropriation the Organic Act provided, the legislature fully expected to receive federal financial assistance for its ambitious educational experiment. Industrial education advocates were not idle on the national level, and in 1862, Congress passed a nationwide grant, the Morrill Act. (Justin S. Morrill of

Vermont sponsored the bill.) This grant awarded public lands to each state in proportion to its representation in Congress; the land was to be sold and the profits utilized to endow a college dedicated to practical instruction.

The Iowa legislature accepted the grant on September 11, 1862, but the funds were not awarded to the Agricultural College until 1864. The State University at Iowa City asserted a claim to all or part of the grant and precipitated a two-year controversy over the appropriate recipient. Benjamin Gue once again defended the interests of industrial education:

A joint committee headed by Gue, now a senator, graphically pictured the contrast in organization, aims and program between an urban-centered sophisticated university and a simple rural farmers' college. For self-preservation the land-grant function was made narrow but distinct.⁸

Gue's rhetoric was once more successful; the agricultural college received all funds generated by the grant.

The land-grant function as defined in the Morrill Act has a relatively broad emphasis. The purpose, as stated in the act, is to provide

. . . endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and other classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner 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.⁹

The Morrill Act interpreted industrial and agricultural education much more liberally than Iowa's 1858 act. It specified that classical studies should not be excluded and termed the education liberal as well

as practical.

In accepting the federal grant, the Iowa legislature also accepted its vision of land-grant instruction. However, the original Organic Act was not superseded in actual law. The acceptance act dealt only with the disposal of the federal appropriation; it made no changes in the direction given the college by the 1858 act. In spite of the Morrill Act's stricture not to exclude classical studies, the very restrictive list of courses remained law. The actual organization of the agricultural college would test which direction practical education in Iowa would follow.

NOTES TO CHAPTER I

¹Earle D. Ross, A History of Iowa State College of Agriculture and Mechanic Arts (Ames, Iowa: Iowa State College Press, 1942), p. 7.

²Benjamin Gue, "Origin and Early History of Iowa State College," (Typewritten manuscript, Iowa State University Library), p. 1.

³Benjamin F. Shambaugh, ed., Messages and Proclamations of the Governors of Iowa, 7 vols. (Iowa City: The State Historical Society of Iowa, 1903), 2:8-9.

⁴Gue, p. 1.

⁵Ross, History of Iowa State, p. 20; Earle D. Ross, The Land-Grant Idea at Iowa State College (Ames, Iowa: Iowa State College Press, 1958), p. 27; and Gue, pp. 1-2.

⁶First Annual Report of the Secretary of the Iowa State Agricultural College, 1858-59, (Des Moines: John Teasdale, state printer, 1859), p. 5.

⁷Ross, Land-Grant Idea, p. 29.

⁸Ibid., p. 36.

⁹United States Statutes at Large, 1862. 12:503-505.

CHAPTER II

THE WELCH YEARS, 1868-1883

"The truly critical hour in the record of every state university, every land-grant institution struck when the grim hard work of converting blueprints into beams and girders began. . . ."¹ By 1866, construction on I.A.C.'s main college building was underway. The Board of Trustees now had to select a faculty, the leaders to guide the new school through its formative stages. In January 1867, the board appointed a committee which would visit other nascent agricultural colleges, formulate a plan of coursework, and nominate a prospective faculty. In a report to the board, Benjamin Gue, chair of the committee, emphasized the importance of the president's role in the college's creation:

The President, as the executive officer, the leading spirit, the head of the Institution, must be a man clearly comprehending the plan and objects of an agricultural college, who is in sympathy with its friends and a firm believer in the idea.²

The committee chose Adonijah S. Welch, a leader in the industrial education movement from Michigan, to fill this important position.

Welch outlined his views of the land-grant purpose and his proposal for implementing those views in a "Plan of Organization" submitted to the trustees in 1868. In this plan, Welch posited that the legislators conceded the college's purpose as outlined in the Morrill Act by accepting the grant: ". . . the trustees have no

alternative but to fulfill these conditions in an honest and liberal spirit."³ Welch eschewed the restrictions of the 1858 act arguing that while the "letter of the law" required agriculture and mechanical art instruction, the "spirit of the law" included other scientific and classical studies.

Welch reconciled his interpretation of the land-grant intent with the specifications of the Organic Act in a proposed course outline for the college. Welch's plan was the first to differentiate agricultural and mechanical training. (See Appendix A) The outline included only these two divisions of study. Students in either division took the same basic mathematics, science, and English courses for the initial year and a half. The two programs then divided and offered more vocationally oriented courses, except in the senior year when all students were required to take Mental Philosophy and Constitutional Law.

A decade after the passage of the Organic Act, before the institution's doors ever opened, I.A.C. was already exhibiting a change in purpose. Welch's plan was far different from that proposed by the framers of the original 1858 act. It included classical studies such as Rhetoric, English Literature, Political Economy, French, and German specifically omitted by the founding act. In defense of the courses, Welch referred to the non-exclusion clause of the Morrill Act and argued, "We should see to it then that while we train students in special pursuits, we give, at the same time, opportunities for such collateral attainments as will enable them, if needful, to do good

service in any public capacity."⁴ The framers of the Organic Act had not conceived collateral attainments as necessary in practical education.

A manual labor requirement was an integral part of Welch's plan. Each student worked two hours each day during the winter and three in the summer; women were to do housekeeping chores while men labored in the farm garden or workshop. The labor requirement filled several functions: The wages, though low, helped students partially meet expenses. The work itself educated students through the application of their studies. The work was also to keep students directed toward industrial careers.

It is a well established fact that students who go through a regular college course such as is generally adopted in literary institutions, very seldom engage thereafter in any industrial pursuit. Four or six years of study without labor at that period of life when habits and tastes are rapidly being formed, will almost inevitably destroy the inclination to return to farm or mechanical labor; and in too many instances the student has imbibed the notion that there is something degrading in manual labor. They generally turn to the so-called learned professions, as being more genteel and attractive, corresponding more nearly with the habits and education acquired while in College. Thus it is that these professions are continually overcrowded, while Agriculture is deprived of the best educated and most promising young men. . . .⁵

The manual labor plan at Iowa Agricultural College was to ensure that students did not lose touch with their farm origins and drift away to the "so-called learned professions."

At the formal opening of the college on March 17, 1868, Welch reiterated his liberal vision of land-grant instruction. He endorsed the course emphasis on agriculture and mechanics as preparatory training for farmers and industrialists, but continued, "If it be objected that this principle, rigidly followed, would destroy the

symmetry of a broad and graceful culture, the reply is at hand. Let the student add to the sciences special to his sic purpose in life, those sciences which embrace his duty to society and to his culture."⁶ Welch clearly did not see the school as merely a vocational institution.

Benjamin Gue also spoke at the opening ceremonies, stating his more specific aims for the school which he dedicated to the "working people of Iowa." Gue, representing the conservative original founders of the college, declared that Iowa Agricultural College would "correct the evil" of traditional colleges which trained students only for the learned professions. I.A.C. would offer industrial education which would guide students to industrial occupations. He also clearly expected graduates to use their practical training to enhance Iowa's development. He extolled the opportunities and resources available in the state and proclaimed, "Our material prosperity as a State and people is entirely dependent upon the degree of industry that shall characterize our citizens."⁷ The new college was to provide trained laborers who would guarantee the state's prosperity.

The early supporters of the school eagerly waited to see their project prove successful. The first six years of the institution's operation, 1869 to 1874, were a period of experimentation and organization. The trustees adopted Welch's "Course of Study," so the students could choose between only two curricula: agriculture and mechanic arts.

"As in all the land-grant colleges, the agricultural work which had been the primary motive in the founding of the College was the

slowest to become established."⁸ I.A.C.'s first agriculture faculty evidently ignored the specifications in Welch's course outline. Norton S. Townshend held the professorship in agriculture for just 1869. That first year, lectures were offered in geography, botany, and physics. From 1870 to 1873, I. P. Roberts headed the agriculture department. He formulated a more clearly defined curriculum and emphasized practical skills, teaching courses such as livestock breeding and farm crops. Two agricultural specializations, horticulture and veterinary medicine, began to evolve during these early years.⁹

The nascent agriculture curriculum had a low percentage of graduates who followed agriculturally connected careers. Twenty-six students of the first three classes graduated in agriculture. (See Table 1) Of these, only five returned to the farm and four became professionals in agricultural fields.¹⁰ Five agriculture graduates went into the learned professions. Eight chose miscellaneous careers. The training that was to create trained agriculturalists and industrialists had produced an equal number of traditional professionals and farmers.

"Mechanic Arts, the second main division of land-grant education, came earlier to standardization and specialization including all existing branches of engineering."¹¹ The mechanical program had difficulty in retaining faculty members; employment opportunities in private industry lured the ablest teachers from the college. The course offerings continued in the early years following Welch's outline with the addition of advanced lectures in mining engineering

TABLE 1
GRADUATES OF IOWA AGRICULTURAL COLLEGE, 1872-90^a

Major Area of Study	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881
Agriculture	14	12	...	6	9	11	9	8	11	1
Veterinary Medicine	...	...	...	...	...	...	...	...	3	...
Civil Engineering	4	2	6	4	4	1	6	4	...	4
Mechanical Engineering	4	...	...	1	...	2	1	3	...	...
Ladies' Course	1	...	...	6	4	7	6	6	1	...
General Science	3	1	5	3	2	...	...	...	...	...
Industrial Science	...	...	...	...	...	...	...	...	2	15
Science and Agriculture	...	...	...	...	...	...	...	...	...	...
Unknown	...	...	8	...	1	1	...	...	...	...
TOTAL	26	15	19	20	20	22	22	21	17	20

^aSee "Sources," p. 57, herein.

1882	1883	1884	1885	1886	1887	1888	1889	1890	Total	Percentage of Total Graduates
...	5	4	5	3	5	2	...	...	105	21
...	1	2	6	6	11	3	6	5	43	9
1	4	9	8	3	6	4	5	1	76	15
1	...	...	4	...	2	3	4	2	27	5
...	...	...	...	...	3	6	4	9	53	11
...	...	...	...	...	3	18	3	...	38	8
23	19	16	12	10	8	...	...	1	106	21
...	...	...	...	...	...	...	17	14	31	6
...	...	...	...	1	...	1	4	7	23	5
25	29	31	35	23	38	37	43	39	502	100

and architecture in 1871.¹²

From 1869 to 1874, the engineering department graduated industrialists in fewer number than did agriculture, and the more clearly defined course offerings had no discernable effect on graduates' career choices. Of sixteen mechanical arts graduates, only two followed careers with technological connections. Two became business men, four became traditional professionals, and eight had varied careers.

Only eleven out of forty-two graduates of the first three classes chose industrial occupations. These results were far from meeting the impatient enthusiasts' goals for land-grant education. The Iowa General Assembly, disillusioned by the development of the college, appointed an investigative committee in January 1874. The inquiry centered on the charge that

. . . the college is drifting away from its original intent as a school of agriculture and mechanic arts, and that it is not now fulfilling the purpose for which it was founded and particularly that its course of instruction and practice does not tend to make farmers and mechanics, but rather to turn them towards other professions.¹³

The college's critics denounced I.A.C. soundly for not fulfilling its founding purpose and added financial mismanagement and student disorder to their complaints. The ensuing public hearings lasted for over a month and resulted in an eight-hundred-page transcript of testimony and other documents. The committee conducted the hearings loosely; they rambled in questioning and admitted gossip and rumor as evidence. Witnesses presented much conflicting evidence. Professor George Jones supported the "drifting away" charge with his testimony:

Young men have spoken to me in the earlier part of their course

of their intentions in life, and in many instances stated that they proposed to be farmers. Later in the course they have expressed to me a different purpose of life. I understand from some cause their purpose was changed while they were students, and I attribute it to the course of study and practice there.¹⁴

The committee weighed all the testimony and compared the I.A.C. course of study with that of "similar institutions." They concluded "the charge is not sustained."¹⁵

Welch continued as president of Iowa Agricultural College until 1883 although his health was failing and, some said, his leadership increasingly feeble. For several years after the embroglio of the 1874 investigation, the course of the college proceeded smoothly. In 1877, the curricula underwent a general revision amplifying both technical and classical courses.

The new curricula (See Appendix B) appeared in the 1876/77

Biennial Report with an explanatory note:

The course of study which, during the present term, the Faculty have carefully and completely revised, will afford the student a rare opportunity to gain the "liberal and practical education" required by the congressional law. No pains have been spared to form curricula that are well balanced; for while the technical studies that give each course its special character are fully represented, there are not wanting those branches that contribute to a wider culture.¹⁶

The college had liberalized course offerings even further than Welch's plan had and justified the move by referring to the wording of the Morrill Act.

The new course of study did emphasize technical training in a few ways. It offered more practical courses in drawing and design for engineers, and mechanical and civil engineering became separate courses. The 1877 revision also introduced new liberalizations to

the studies. Every curriculum had a required course in French. Latin, previously anathema to industrial educators, was an option. The code of study listed additional classical studies that were not career-related such as Political Economy and Psychology. Every department now required an undergraduate dissertation for graduation. An emphasis on theoretical knowledge was beginning to supersede training in practical skills.

The revision created one entirely new curriculum which lasted until 1880. Juniors and seniors could concentrate in "Special Industrial Sciences" by omitting one class each term and spending the extra time in a chosen area of specialization. The faculty created this course "for the purpose of enabling students . . . to attain a high degree of proficiency in any branch of industrial science or art."¹⁷ Students could specialize only in scientific fields; the code prohibited concentration in literary studies. This course was not popular; only two students graduated in Special Industrial Sciences. One became an attorney and the other died soon after graduation.

In 1880, the college reorganized the industrial sciences course and rechristened it "Science Related to the Industries." This curriculum offered only theoretical sciences. It was aimed ". . . to give a liberal culture in the sciences and other branches of learning which underlie the great industries of the country without especially directing students to any particular pursuit or profession."¹⁸ Welch, in his report to the trustees, spoke lyrically of the "symmetrical completeness" of the program and described it as a "basis for the work

of the physician, druggist, merchant, teacher, journalist, etc."¹⁹

Iowa Agricultural College seemed to have forgotten its originally stated function was to produce trained technicians and farmers.

Sciences Related to the Industries became a popular course. In the remaining three years of the Welch administration, seventy-five students graduated in this curriculum, 40 percent of the total graduates. (See Table 2) Out of the seventy-five, only ten chose occupations in any way related to agriculture, mechanics, or even business. One-third of the graduates became doctors, lawyers, or ministers. The general background in industrial science directed students away from industrial careers more often than toward them. In following this diffuse course of study students had received little specialized training. It functioned exactly as Welch had outlined it to the trustees, as a preparatory course for varied careers.

The engineering curriculum from 1877 to 1883 evolved toward increasing specialization. The separation of mechanical and civil engineering allowed for more specific courses. Degrees awarded became more specific also; after 1878, graduates received B.M.E. or B.C.E. degrees rather than a general B.S.²⁰

The engineering program was relatively successful in directing its students into technical occupations. Only twelve students graduated in mechanical engineering during Welch's last nine years, but over two-thirds of these entered technical fields. Civil engineering graduated forty-nine students; sixteen chose technological jobs while eleven became traditional professionals. Engineering training

TABLE 2
 OCCUPATIONAL CHOICES OF GRADUATES,
 IOWA AGRICULTURAL COLLEGE, 1872-83^a

Occupations	Agriculture	Veterinary Medicine	Civil Engineering	Mechanical Engineering	General Science	Ladies' Course	Industrial Science	Unknown	Total	Percentage of Total
Agricultural Artisans	12	...	3	...	...	...	3	...	18	6
Technical Artisans	3	...	12	4	...	...	1	...	20	7
Agricultural Professionals	10	5	2	1	...	...	1	...	19	6
Technical Professionals	4	...	4	4	1	...	1	...	14	4
Traditional Professionals	25	1	11	1	4	...	25	6	73	25
Business	11	...	9	...	2	1	4	3	30	10
Homemakers	3	...	...	...	7	23	16	...	49	17
Other	12	...	2	...	...	6	14	1	35	12
Unknown	10	...	6	2	...	1	10	...	30	10
TOTAL	90	6	49	12	14	31	75	10	287	100

^aSee "Sources," p. 57, herein.

was following the land-grant idea more closely by leading a majority of graduates to industrial careers. Perhaps industrial careers were sufficiently well paid to attract graduates. It also seems likely that students would not choose the very specialized engineering training in the first place unless they envisioned themselves following a related career.

The same could not be said for the agriculture course. It continued to be ill-defined, the problem being a seeming inability by the faculty to present practical farming in an academic format. In the 1877 course revision, the agriculture course was renamed "Sciences Relating to Agriculture." Under the leadership of Millikan Stalker, 1877 to 1880, the curriculum became very generalized with no emphasis on teaching practical usable skills. "This course . . . aimed 'to make scientists in the branches which underlie agriculture' and 'to prepare students who desire it for scientific farming.'"²¹ Again, as in the industrial science course, the training stressed theoretical science rather than applied science.

Seaman A. Knapp reversed this attitude when he became head of the agriculture program in 1880. He reorganized the curriculum and made courses more specific. Agriculture graduates began receiving the more distinctive Bachelor of Scientific Agriculture degree.²²

Ninety students graduated in agriculture from 1877 to 1884, nearly one-third of the total graduates of this period. Graduates of both Stalker's and Knapp's programs evinced similar trends in selecting occupations. Almost equal numbers of graduates entered agriculturally

related occupations and classical professional fields. Twenty-two students became agriculturalists of some sort, while twenty-five became professionals. The end result had not changed since the early Welch years; agriculture graduates were just as likely to follow the learned professions as industrial pursuits. Very likely this was in large part due to the status of farming in the nineteenth century. Farmers worked long hard days with little financial reward. I.A.C.'s founders idealistically had envisioned transforming this situation by providing scientifically trained agriculturalists. The scientific training was slow to materialize, however, and students who had glimpsed brighter opportunities during their college years were clearly reluctant to return to their farm origins.

In May 1879, Stalker established a new course leading to a distinct degree in veterinary medicine. Even this highly specialized course produced one graduate who chose the professions over his major study. Six graduates received veterinary medicine degrees by 1884; five became veterinarians and one became a human physician.²³

Iowa Agricultural College was co-educational from the beginning. "The training of farmers' wives was regarded as essential as the training of farmers themselves but there was great uncertainty about what such training involved."²⁴ The first women admitted to the college took the same agriculture or mechanics arts courses as men. Mary B. Welch, the wife of President Welch, recognized the need for a separate program in housekeeping skills and organized domestic economy lectures. In 1872, these lectures became a separate curriculum

in "General Science for Ladies." The 1880 Sciences Related to the Industries curriculum incorporated the women's studies by providing a strong domestic economy emphasis; besides homemaking arts, ". . . the young ladies devoted a fair share of their time to such subjects as English, literature, Latin, French, history and political economy."²⁵ The women students received practical training obviously aimed at producing homemakers, but also received training in the humanities that contrasted sharply with the tone of the Organic Act, still in effect at this time.

Seventy-four women graduated from I.A.C. during Welch's presidency. (See Table 3) Two-thirds did become homemakers. Nineteen had lifetime careers, usually as teachers or shopkeepers. Two women became farmers.

Manual labor, which had been an early keynote of practical education, lost its popularity by 1884.

. . . in the early days, when campus and farm as well as methods of instruction, were in the rudimentary stage, and before athletic activities had evolved, it operated fairly well. But as elemental conditions in plant, program and living gave way to the more stabilized and sophisticated, this feature of land-grant education proved to be inappropriate and too demanding upon time and energy.²⁶

By 1876, the college differentiated instructive and non-instructive labor; students received wages only for tasks unrelated to their coursework. Manual labor was limited to a freshman requirement in 1880. Four years later, the school abolished the practice. Again the college seemed to have forgotten earlier public statements which defined the labor requirement as essential in keeping students oriented toward industrial occupations.

President Welch guided Iowa Agricultural College along increasingly

TABLE 3
 FEMALE GRADUATES' CAREER CHOICES
 IOWA AGRICULTURAL COLLEGE, 1872-90^a

Occupations	Year of Graduation		Total
	1872-83	1884-90	
Agricultural Artisans	2	...	2
Technical Artisans	...	...	...
Agricultural Professionals	...	1	1
Technical Professionals	...	1	1
Traditional Professionals	1	4	5
Homemakers	49	17	66
Business	1	2	3
Other	16	5	21
Unknown	5	2	7
TOTAL	74	32	106

^aSee "Sources," p. 57, herein.

liberal lines during its first fifteen years. Each general revision of the course outline included additional humanities and liberal arts courses. The manual labor facet of the technical training became less important and eventually disappeared. Sciences Related to the Industries, a curriculum emphasizing theory rather than practice, was by far the most popular major.

The graduates' careers proved the final results of this trend to liberalization. In its first fifteen years, I.A.C. awarded 287 undergraduate degrees. Seventy-one graduates became agriculturalists or technicians, directly or professionally. Almost an equal number, seventy-three, became physicians, attorneys, or clergy. Gue's dream of a school to direct students into industrial careers was not being realized.

Gue's second vision of training laborers to aid in Iowa's growth was also not fully actualized. Graduates often settled outside of the state. (See Table 4) Only 42 percent of the graduates from 1872 to 1884 continued as permanent residents of Iowa. The 58 percent who settled out-of-state scattered throughout the United States with significant concentrations in the states immediately surrounding Iowa (17 percent) and on the West Coast (11 percent).

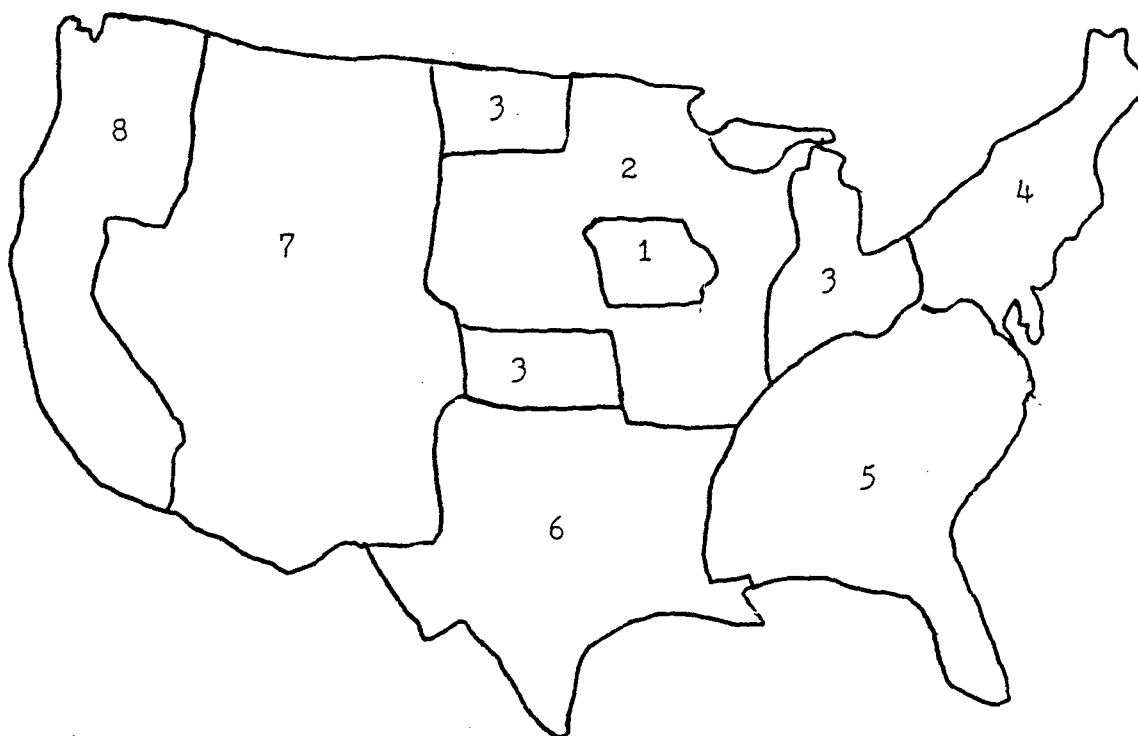
The school's results were clearly not fulfilling the early goals. It was not producing workers for the state as the early enthusiasts had envisioned. Perhaps the vision was askew. In their failure to follow occupations which fit the original purpose, students demonstrated that it was not relevant to their lives. The industrial and agricul-

TABLE 4

PERMANENT RESIDENCES OF GRADUATES,
IOWA AGRICULTURAL COLLEGE, 1872-90^a

Area	Year of Graduation		Total	Percentage of Total
	1872-83	1884-90		
1	120	80	200	40
2	49	46	95	19
3	12	10	22	4
4	12	19	31	6
5	5	6	11	2
6	11	7	18	4
7	21	10	31	6
8	40	26	66	13
Outside U.S.	4	3	7	1
Unknown	13	8	21	4
TOTAL	287	215	502	100

^aSee "Sources," p. 57, herein.



tural classes who had championed the land-grant movement had done so to gain opportunities in the expanding economy. The students may have seen surer opportunities for economic advancement in the professions rather than in industry or agriculture as the visionaries had hoped. Not only had the school's stated intent changed through administrative reorganizations of course offerings, but it had changed through the actual results, the students who utilized the education offered for their own purposes.

The Welch years drew to a close. In 1883, Welch's poor health worsened. He took a tour of European agriculture schools as a respite from the pressures of the presidency. In his absence, his enemies instigated another controversial investigation which culminated in a request for his resignation. The faculty protested this decision vehemently, but "alumni of various classes were quoted anonymously in approval of Welch's removal, largely on the ground that he was not a true champion of industrial education."²⁷ He had certainly guided the institution in far different directions than those its founders had foreseen twenty years earlier.

NOTES TO CHAPTER II

¹Allan Nevins, The State Universities and Democracy (Urbana, Illinois: University of Illinois Press, 1962), p. 25.

²Second Biennial Report to the Board of Trustees of the Iowa State Agricultural College, 1866-67 (Des Moines: F. W. Palmer, state printer, 1868), p. 27.

³A. S. Welch, "Plan of Organization," 1868, Iowa State University University Archives, Record Group 2/1/0/1, p. 2.

⁴Ibid., p. 8.

⁵First Annual Report of the Secretary of the Iowa State Agricultural College, 1858-59 (Des Moines: John Teasdale, state printer, 1859), p. 37.

⁶A. S. Welch, "Inaugural Address" in Addresses Delivered at the Opening of the Iowa State Agricultural College (Davenport, Iowa: Gazette Premium Book and Job Printing Establishment, 1869), p. 22.

⁷Benjamin Gue, "Dedication Address," in Addresses Delivered at the Opening of the Iowa State Agricultural College, p. 6.

⁸Earle D. Ross, A History of Iowa State College of Agriculture and Mechanic Arts (Ames, Iowa: Iowa State College Press, 1942), p. 122.

⁹Ibid., pp. 122-3, 126-7.

¹⁰I will not refer to a table for statistics pertaining to narrower class year groupings than the two general categories 1872-1883 and 1884-1890. These figures are, however, available for verification.

¹¹Earle D. Ross, The Land-Grant Idea at Iowa State College (Ames, Iowa: Iowa State College Press, 1958), p. 74.

¹²Ross, History of Iowa State, p. 124; and Ross, Land-Grant Idea, p. 74.

¹³"Report of the Joint Committee of the Fifteenth General Assembly of Iowa, Appointed to visit the State Agricultural College and Farm," in Legislative Documents, Iowa General Assembly (Des Moines: R. P. Clarkson, state printer, 1874), p. ii.

¹⁴Ibid., p. 21.

- ¹⁵Ibid., p. v.
- ¹⁶Seventh Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm, 1876-77 (Des Moines: R. P. Clarkson, state printer, 1877), p. 54.
- ¹⁷Ibid., p. 75.
- ¹⁸Iowa Agricultural College Catalogue, 1880 (Ames, Iowa: By the college, 1880), p. 38.
- ¹⁹Ninth Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm, 1880-81 (Des Moines: F. M. Mills, state printer, 1881), p. 3.
- ²⁰Seventh Biennial Report, p. 54.
- ²¹Ross, History of Iowa State, p. 123.
- ²²Ibid.; and Ross, Land-Grant Idea, p. 72.
- ²³C. H. Flynn, DVM '83, became a general practitioner at Postville, Iowa, apparently with no further medical training. See Elizabeth Tiernan, ed., Iowa State College Biographical Directory, 2 vols. (Ames, Iowa: Iowa State College Press, 1952), 1:54.
- ²⁴Ross, History of Iowa State, p. 130.
- ²⁵Ercel Sherman Eppright and Elizabeth Storm Ferguson, A Century of Home Economics at Iowa State (Ames, Iowa: Iowa State University Press, 1971), p. 27.
- ²⁶Ross, Land-Grant Idea, p. 81.
- ²⁷Ross, History of Iowa State, p. 100.

CHAPTER III

ADMINISTRATIVE INSTABILITY, 1884-1890

Welch's removal precipitated a tumultuous period in the leadership at Iowa Agricultural College. "A sketch of the history of the College, written in 1920, refers to the period from 1883 to 1891, with marked understatement as one of 'administrative instability.'"¹ Seaman Knapp, agriculture professor, temporarily replaced Welch. Joseph L. Budd served a few months a president pro-tem after Knapp. In early 1885, Leigh S. J. Hunt took office as president. Hunt was young, brash, and arrogant; he tried to rule I.A.C. tyrannically through an "executive government." After a near revolt of the senior class in 1886, Hunt resigned. William Isaac Chamberlain served as president of Iowa Agricultural College from 1886 to 1890. Chamberlain had a strong background as a classics instructor at several small colleges, as an agricultural writer and lecturer, and as secretary of the Ohio Board of Agriculture. Yet his personal characteristics of timidity and indeciveness, added to an obsession for details, hindered his effective leadership of the school.² In this vital formative period I.A.C. sadly lacked leadership.

The years of administrative instability actually followed a major revision in the Iowa Code adopted March 20, 1884. The Iowa legislature had never reconciled the narrow Organic Act founding I.A.C. and the more liberal Morrill Act. By accepting the land grant, the

legislature demonstrated tacit approval of its precepts, but the very specific Organic Act remained law. The Sutton Act, named for its sponsor, Preston M. Sutton of Marshalltown, repealed the 1858 act and stated the provisions for a new course of study:

There shall be adopted and taught at the State Agricultural College a broad, liberal and practical course of study in which the leading branch of learning shall relate to agriculture and the mechanic arts, and which shall also embrace such other branches of learning as will most practically and liberally educate the agricultural and industrial classes in the several pursuits and professions of life. . . .³

By positive phrasing, including the liberal studies rather than not excluding them, the Sutton Act interpreted land-grant education even more liberally than the Morrill Act had done. The codified guidelines for I.A.C. had changed considerably since the 1858 act.

Preston Sutton made a plea for liberalized industrial education in a speech supporting the bill. He reasoned that the Land-Grant Act, in directing students to the "several pursuits and professions in life," guided them to all professions, not just those directly connected to agriculture.

It acknowledges the usefulness and necessity of the several pursuits and professions in life and also the desirableness of having those pursuits and professions filled by men who are well educated in, and who are in full sympathy with, the agricultural and mechanical interests of the country.⁴

According to Sutton, the intention of industrial education was not just to train agriculturalists and technologists but also to educate industrially minded professionals.

Iowa Agricultural College revised all courses of study after the passage of the Sutton Act, but the curricula actually changed only

slightly. (See Appendix C) History became a requirement for every student. Some courses assumed a theoretical rather than a practical emphasis: Principles of Mechanism and Theory of Motors replaced shop practice for mechanical engineers. The I.A.C. curricula needed few alterations to comply with the Sutton Act; the legislation merely codified the general attitude that the school had long evidenced through its course offerings.⁵

The agriculture program continued to grow and thrive under the strong, vocationally directed leadership of Seaman Knapp until 1886. After Knapp, the curriculum reverted to its former troubled status and entered a severe decline. His son, Herman, replaced Knapp and attempted to carry on the firmly established course. However, Herman did not have his father's abilities and the course offerings in agriculture suffered. Chamberlain attempted to augment Herman Knapp's course with practical lectures, but they "did not take well." In 1889, Loren Smith replaced Knapp as head of agriculture. Smith redirected the course to a more diffused instruction by combining it with the industrial course under the title "General Course in Science and Agriculture." This move was unpopular with the original land-grant enthusiasts. "It was felt advantage had been taken of the Sutton Act to change the farmers' college into an old-line 'classical' institution."⁶

The overall results of the Knapp and Smith programs were not demonstrably different. (See Table 5) The exact number of agriculture majors under Smith cannot be determined; they received an unknown number of the thirty-one degrees in Science and Agriculture. However,

TABLE 5
 OCCUPATIONAL CHOICES OF GRADUATES,
 IOWA AGRICULTURAL COLLEGE, 1884-90^a

Occupations	Agriculture	Veterinary Medicine	Civil Engineering	Mechanical Engineering	General Industries	General Science	Science and Agriculture	Ladies' Course	Unknown	Total	Percentage of Total
Agricultural Artisans	5	4	2	1	2	5	5	...	2	26	12
Technical Artisans	...	1	12	6	3	...	2	...	1	25	12
Agricultural Professionals	6	23	...	...	2	1	3	1	1	37	17
Technical Professionals	...	4	2	3	1	2	2	1	1	16	7
Traditional Professionals	...	5	4	1	4	5	10	2	6	37	17
Business	1	...	...	3	3	5	3	2	...	17	8
Homemakers	...	...	...	...	7	...	...	10	...	17	8
Other	2	...	2	...	5	3	4	5	1	22	10
Unknown	1	...	5	1	4	3	2	1	1	18	8
TOTAL	15	32	27	15	31	24	31	22	13	215	100

^aSee "Sources," p. 57, herein.

each program produced only five agricultural artisans. The Knapp program trained six students who entered agricultural professions; only three future professional agriculturalists completed Smith's general program.

Ironically, the agriculture students graduating during the period of administrative instability, 1884 to 1890, engaged in agricultural vocations in much higher percentages than those trained during the Welch years. Fewer students of this period studied straight agriculture. Only fifteen graduates received the B.S.A. degree, plus an unknown number of Smith's thirty-one Science and Agriculture students, as compared to ninety agriculture majors during the Welch years. But out of those few students, ten became farmers of some sort and nine entered agriculturally related professions. The earlier program, with probably over three times as many graduates, produced only twelve farmers and ten agriculture professionals. No straight agriculture majors from 1884 to 1890 became traditional professionals. Although the course offerings had been significantly liberalized through repeated revisions of Welch's original plan, the agriculture course was producing a much higher percentage of graduates who returned to the farm.

The Science and Agriculture curriculum had questionable success in guiding students into industrial careers. It trained thirty-one students for both agriculture and industry, but only twelve entered either of those fields. Almost an equal number, ten, became professionals. As it had earlier, the diffuse course served as preparation for varied careers.

As in the Welch years, the more specific civil and mechanical engineering courses were more successful in producing technicians. The engineering curricula continued from 1884 to 1890 much the same as they had been set up after the first course revision of 1877. The combined engineering programs graduated a total of forty-two students. Of these graduates, eighteen chose technical careers and five chose professional technological careers. All together, twenty-three civil and mechanical engineering graduates entered industrial occupations while only five became traditional professionals. At least one curriculum at I.A.C. was approaching the land-grant purpose.

With the resignation of Mary B. Welch in 1883, Emma P. Ewing assumed the leadership of domestic economy studies. She moved the curriculum to professionalization by offering a graduate degree in the field. Severely curtailed funds hampered her efforts, however; her four-year budget totaled nine hundred dollars and she was forced to pay assistant instructors from her own pocket. After 1885, the course entered a period of slow growth and increasing liberalization. It emphasized history and literature requirements and awarded a Bachelor of Letters degree.⁷ A B.L. degree was quite a departure for a school established in opposition to classical education! Again, the majority of alumnae became homemakers (seventeen of the total thirty-two); four chose traditional professions and eleven followed assorted careers.

In his 1886 inaugural address, President Chamberlain had stated his vision of land-grant education as distinguished from traditional colleges:

It would seem plain . . . from the known facts of history in regard to the passage of the act, that the intention of Congress was to found a class of colleges essentially different from the class that then existed in the country; viz., in the main, literary and classical colleges, founded chiefly to educate young men for the Christian ministry (a noble end), or for law, medicine, and literature with courses of study adapted to those ends, and in point of fact, actually sending the bulk of their students into the so-called learned professions.⁸

An "essentially different" school would not send the bulk, or even half, of its students into the learned professions. For this reason, Chamberlain proposed that a land-grant school should differ from a classical college in courses, teaching methods, and "entire atmosphere." Leaders of the school were still occasionally espousing its originally stated goals.

Ironically, the curricula liberalized through the Sutton Act and weakened through administrative instability did move closer to fulfilling the college's original intent. The overall alumni statistics for 1884 to 1890 do show that Iowa Agricultural College was slowly directing graduates away from professions and toward technical occupations. Two hundred and fifteen students completed their education at I.A.C. from 1884 to 1890. One hundred and four or 48 percent of these followed land-grant careers. Only thirty-seven or 17 percent became professionals. The college had started to move closer to Benjamin Gue's goals for land-grant schools. Students finally may have been conceiving the opportunities in industry and agriculture that the early enthusiasts had originally seen. Both farming and industry had developed considerably since the school's opening; opportunities in those fields may have been more obvious than they had been earlier.

The college was not any closer to fulfilling the second part of Gue's vision, however. A majority of I.A.C. graduates (63 percent) still settled out of Iowa; only eighty out of 215 alumni remained in the state. The largest blocs of out-of-state settlement were still in the neighboring states (21 percent) and the West Coast (12 percent).

In 1890, I.A.C.'s failure to produce farmers and mechanics precipitated an administrative crisis that had been brewing for two years.⁹ Farm interests had become increasingly disillusioned with agricultural education at the school as disseminated through Smith's vague program. Using the Iowa Farmer's Alliance and the Iowa Homestead, a farm journal, as channels of complaint, the farmers strongly voiced their views to the college's trustees. The ensuing investigations and bitter debate resulted in the resignations of both President Chamberlain and Professor Smith.

The board of trustees compromised on the critics' additional requests. Although they refused to eliminate completely all studies not directly related to agriculture, they did establish a new distinct agriculture curriculum and inaugurated an agricultural short course for the winter months. James ("Tama Jim") Wilson received the appointment as head of the new agriculture studies and William Beardshear became president of the college; both men had been highly recommended by the Farmers' Alliance.

All parties to the controversy expressed pleasure at the board's actions. The Iowa State Register predicted a glowing future for the school as Beardshear would spark growth "by emphasizing practical aspects of education, but not at the expense of other classical courses."¹⁰

The farmers were also satisfied with the decision "to reverse the liberal trend and reinstate the stiffest agriculture course in the United States."¹¹ The school seemed to be stabilized with successfully balanced curricula.

NOTES TO CHAPTER III

¹ Earle D. Ross, The Land-Grant Idea at Iowa State College (Ames, Iowa: Iowa State College Press, 1958), p. 59.

² Earle D. Ross, A History of Iowa State College of Agriculture and Mechanic Arts (Ames, Iowa: Iowa State College Press, 1942), pp. 102-6; and Ross, Land-Grant Idea, pp. 60-66.

³ Quoted in Ross, History of Iowa State, p. 118.

⁴ "Senator Sutton's Speech," reprinted in Ross, History of Iowa State, p. 417.

⁵ Iowa Agricultural College Catalogue, 1886 (Ames, Iowa: By the college, 1886), pp. 30-39.

⁶ Ross, Land-Grant Ideas, p. 90.

⁷ Ercel Sherman Eppright and Elizabeth Storm Ferguson, A Century of Home Economics at Iowa State (Ames, Iowa: Iowa State University Press, 1971), p. 132.

⁸ W. I. Chamberlain, "Industrial Education," in Addresses Delivered at the Inauguration of W. I. Chamberlain, November 9, 1886 (Ames, Iowa: By the college, 1886), p. 25.

⁹ For a full discussion of this controversy see Edward A. Goedeken, "An Academic Controversy at Iowa State Agricultural College, 1890-91," Annals of Iowa 45 (Fall 1979): 110-122.

¹⁰ Iowa State Register, 10 January 1891, quoted in Goedeken, p. 122.

¹¹ Goedeken, p. 122-123.

CONCLUSION

The 1863 report to the secretary of Iowa Agricultural College stated the purpose of the developing school:

The Iowa State Agricultural College has for its object to associate a high state of intelligence with the practice of Agriculture and the industrial or mechanic arts, and to seek to make use of this intelligence in developing the agricultural and industrial resources of the state and protecting its interests.¹

To this end, the college offered science-based education originally stressing application of the sciences. Early land-grant supporters proposed to educate industrial laborers. By the 1880s, the school's instruction had become increasingly liberalized with an emphasis on theory rather than practice and additional required humanities courses. This liberalized attitude sought not just to supply artisans with vocational training, but to educate them generally. "The theory is that a young agriculturalist or industrialist must aspire to a liberal education that will make him the peer of any educated professional man in life."² Unfortunately for the original vocational intent, often the liberal education did not merely elevate aspiring agriculturalists and industrialists to peerdom with professionals but converted them entirely to classical professions. Of the 502 students graduating from 1872 to 1890, 175 followed occupations which fit the original definition of I.A.C.'s purpose; 110 entered law, medicine, or the ministry.

Perhaps the students' motivations for attending I.A.C. were at

fault for this failure. Many arrived with hazy career goals, attracted more by the advantages of a state-supported institution than by any desire for industrial training.

Probably a considerable number of these first students were attracted more by the low costs and opportunities for support than by the special program. Some, it is known, were concerned with being freed from the classical requirements than by the special appeal of the subjects.³

While the original founders sought to educate the industrial classes and return them to the farm and factory, students were attracted to the school for the very opportunity it provided to escape. Some students arrived at I.A.C. with the preconceived intention of gaining practical scientific backgrounds for advanced professional degrees.

The public may have been slow to truly understand the benefits of an industrial education. The transition to an industrial economy was just beginning at the school's founding. A land-grant institution such as Iowa Agricultural College was an experiment in higher education. The figures for the classes of 1885 through 1890, when occupational opportunities in industry were more apparent, do show more students choosing industrial careers than do those for the classes of 1872 through 1890. Even in this more successful period only 104 (48 percent of the period's graduates) entered industry or agriculture. Whatever improvement was made, the school by 1890 was only fulfilling its original intent in the cases of less than half of its graduates.

William Chamberlain, in his 1886 inaugural address, criticized traditional education for returning a low percentage of its graduates to farms and workshops:

. . . the classical colleges drew half their students from the farms, and returned only one out of fifty of their graduates to the farms; that is, of the farmers' boys that came to them, they sent back to the farms only one in twenty-five. The percentage was probably about the same for the mechanic arts.⁴

Presumably, more than half of I.A.C.'s students came from farms. If all Iowa Agricultural College students had rural origins, the return rate is not much higher than the classical colleges Chamberlain derided. The return rate improves somewhat if one considers that only half the students had agricultural backgrounds (the same percentage Chamberlain claimed for the classical colleges). I.A.C. trained forty-four farmers and fifty-six technicians from 1872 to 1890. If half of all graduates were from industrial or agricultural backgrounds, the college was returning 17 percent or approximately four in twenty-five to the workshop. The land-grant school was improving the return rate of the classical colleges as quoted by Chamberlain, but the increase was not overwhelming.

If the college was failing to return its students to the farms or workshops, however, in its second decade it was producing professionals in both agricultural and technological fields. From 1884 to 1890, I.A.C. produced thirty-seven agricultural professionals and sixteen technological professionals. In comparison to these fifty-three students entering land-grant professions, thirty-seven chose traditional professional careers. Some early proponents were disappointed in their hope that I.A.C. would function as a strictly vocational school, training better dirt farmers and factory workers. The shift to an industrialized economy which originally had prompted the farmers to support an agri-

cultural school had also created professional career opportunities in land-grant fields such as industrial chemistry, U.S.D.A. positions, faculty positions at other land-grant schools, etc. Understandably, students who had gained a four-year college education preferred to advance into these positions.

The school's stated intent did slowly change over the early years. The public statements of administrators demonstrate a gradual evolution from the very narrow definition given the school's function in the 1858 Organic Act. The land-grant enthusiasts surrendered their vocational vision reluctantly, spurring such controversies as the 1874 investigation and Welch's and Chamberlain's resignations, but the faculty and administration persevered with their own vision. By 1884, the stated intent of the school conformed more closely to its results as demonstrated through graduates' careers and, with the Sutton Act, Iowa law was finally updated to describe more accurately the college's function. Preston Sutton may have voiced the most reasonable interpretation of I.A.C.'s mission in his defense of this act when he argued that training professionals who would be "in full sympathy with agricultural and mechanical interests" was as important as educating industrialists.⁵ His vision was certainly more in line with the actual results of the school's educational process.

I.A.C. was not alone in its early struggles. Nearly all of the schools endowed by the Morrill Act floundered through the first few decades of their existence. Many were newly established colleges and solidifying a financial base. All land-grant institutions dealt with

the dilemma of their academic direction. They were mandated by law to present instruction in agriculture and mechanic arts, but few precedents existed for teaching either curriculum. Most schools attempted to present their students an amalgam of traditional classical studies and practical technological lectures, a combination President John Anderson of Kansas State Agricultural College described in 1873 as "flying a literary kite with an agricultural tail."⁶ The hybrid curricula could not give students adequate instruction in either the literary or the practical courses:

. . . the early work of the land-grant colleges cannot be said to have been successful. They served efficiently neither the purposes of higher education nor did they contribute importantly to the farmers as a class.⁷

The early years of Kansas State Agricultural College (now Kansas State University) evidenced many of the same problems as did those of I.A.C. and epitomized the difficult formative period of many mid-western state land-grant schools. An 1867 college catalogue, published soon after the school's founding, advertised the two available curricula: the classical course or the agricultural course. As in Iowa and many other midwestern states, the agricultural interests in Kansas (the Grange, the agricultural press, the state agricultural society) were displeased that any classical studies were offered by "their" college. Their agitation culminated in the appointment of John Anderson, a practical vocational educator, as college president in 1878. He wrested the curricula from their classical directions, had Latin and Greek excised from the course offerings, and redirected the school into a stricter vocational training institution. Anderson's successor,

George Fairchild, gradually reintroduced liberal arts courses, and slowly the school broadened its humanities offerings while maintaining a strong agricultural emphasis.⁸

Purdue University also originally offered a diffuse curriculum with a classical emphasis; students could major only in "general science" courses supplemented by foreign languages, literature, and history. Not until a decade after its founding did the school institute separate programs in agriculture and applied mechanics. Purdue also experienced controversy over academic direction in its early years, but it suffered the most virulent public criticism for its refusal to allow fraternities and other "secret societies" on campus.⁹

Cornell University, like Purdue, received relatively little public censure for its academic direction. Perhaps because both schools enjoyed private endowments in addition to the land-grant funds, industrial education advocates were hesitant to make demands for practical vocational courses. Cornell, however, did undergo public criticism during its early years when the administration declined to alter the school's nonsectarian status to one of denominational control.¹⁰

Michigan Agricultural College (now Michigan State University) followed a different path than many land-grant schools in its evolution to a modern university. Far into the twentieth century, long after most land-grant schools had begun their transformation to broad-based education, M.A.C. continued the manual labor requirement, maintained its official "agricultural college" label, and in general, retained the ideals of practical industrial education through its course

offerings.¹¹

Massachusetts Institute of Technology also maintained a strict vocational emphasis into the twentieth century. Although founder William Barton Rogers formulated theories of broad-based professional scientific education, "within a few years a marked decrease took place in the time devoted to general studies."¹² The institute de-emphasized theoretical sciences and humanities while emphasizing practical technical training. In the 1930s, M.I.T. altered its vocational emphasis, recognizing that an integration of technical training and cultural education constituted a more complete background for professional scientific careers.¹³

American land-grant colleges were founded with strongly stated goals and functions: they were to educate the industrial classes with an emphasis on agricultural and mechanical training. Though the first several decades of their existences proved that few fulfilled this function well, by the early twentieth century most had stabilized academically and had started providing unique services to their constituencies. The formation of the American Association of Land-Grant Colleges and Universities (1887), the passage of the Hatch Act funding agricultural experiment stations (1887), and the passage of the Smith-Lever Act funding state extension services (1914) all helped give the institutions direction and renewed purpose. Their research and community outreach efforts established their reputations as centers of scholarship and service.

Land-grant institutions have continued to grow and expand, until

today, nearly a century and a quarter after the passage of the Morrill Act, many have become "megaversities" with tens of thousands of students, huge campuses, and countless varied course offerings.

The next hundred years will be filled with greater change than the past. The identity of the land-grant institution as such probably will be lost. The thirty-two state universities which are also land-grant have come to think of themselves first as state universities. In some states, such as Colorado, Iowa, Kansas, Michigan, Oregon, and Washington, the separate land-grant college of yesterday has become another state university. In other states, such as North Carolina and Texas, it has been absorbed into the large complex of state institutions. . . . But their contribution will stand as an historic achievement. . . .¹⁴

Will land-grant institutions be satisfied with having made an historic contribution? Or do they aim to provide continuing, vital, and unique services? They might well re-examine their turbulent early years when they struggled to establish an identity and offer a unique education, when their course offerings were diffuse and undirected, when they served neither the interests of higher education nor contributed importantly to the farmers as a class. After their early floundering, most land-grant schools were able to define balanced course offerings and supply outstanding agricultural and industrial education. A renewed understanding of how early administrators defined the purpose of their schools and brought that intent into alignment with the colleges' functions may well aid current administrators as they struggle to fit the land-grant philosophy into the education offered by their colleges in the twenty-first century.

NOTES TO CONCLUSION

¹Fourth Annual Report of the Secretary of the Iowa State Agricultural College and Farm (Des Moines: n.p., 1863), p. 5.

²Earle D. Ross, The Land-Grant Idea at Iowa State College (Ames, Iowa: Iowa State College Press, 1958), p. 9.

³Earle D. Ross, A History of Iowa State College of Agriculture and Mechanic Arts (Ames, Iowa: Iowa State College Press, 1942), p. 70.

⁴W. I. Chamberlain, "Industrial Education," in Addresses Delivered at the Inauguration of W. I. Chamberlain, November 9, 1886 (Ames, Iowa: By the College, 1886), p. 25.

⁵"Senator Sutton's Speech," reprinted in Ross, History of Iowa State.

⁶Frederick B. Mumford, The Land Grant College Movement (Columbia, Missouri: n.p., 1940), p. 30.

⁷Ibid., p. 32.

⁸James C. Carey, Kansas State University: The Quest for Identity (Lawrence, Kansas: The Regents Press of Kansas, 1977), pp. 39-66.

⁹William Murray Hepburn and Louis Martin Sears, Purdue University: Fifty Years of Progress (Indianapolis: The Hollenbeck Press, 1925), pp. 61-67, 73-74.

¹⁰Morris Bishop, A History of Cornell (Ithaca, New York: Cornell University Press, 1962), pp. 180-211.

¹¹Madison Kuhn, Michigan State: The First Hundred Years (East Lansing, Michigan: Michigan State University Press, 1955).

¹²Report of the Committee on Educational Survey, Massachusetts Institute of Technology (Cambridge, Massachusetts: The Technology Press, 1949), p. 12.

¹³Ibid., pp. 9-12.

¹⁴Edward D. Eddy, Jr., "The First Hundred Years. in Retrospect and Prospect," in The Development of the Land-Grant Colleges and Universities and Their Influence on the Economic and Social Life of the People, West Virginia University Bulletin, 1963, p. 12.

SOURCES

The alumni data used in this study came from three basic sources: Biennial Reports to the Board of Trustees, Iowa Agricultural College Catalogues, and Iowa State College Graduates, Biographical Directory. The first two series provided data on the graduates as students, i.e., hometown, major areas of study, degree received. The latter source supplied information on the graduates' later lives, i.e., career, marital status, permanent residence.

I verified the accuracy of the data from the Biennial Reports and the Catalogues by cross-checking each source with the other. The Biographical Directory is a compilation of information furnished by the graduates themselves. The editor, Elizabeth Tiernan, carefully verified the information. The preparatory note to the first volume states:

In preparation of the biographic sketches, each living graduate (or a near relative) was urged to furnish personnel (sic) information used as the basis of his sketch. Available supplementary material was incorporated. When completed, the sketch was returned for verification to the person supplying the information.

Even with such precautions, ". . . errors may have crept in." In spite of the possibility of misinformation in this sort of secondary reference, it is the most accurate and accessible source available.

METHODS

In computer coding the alumni data, a few variables were easily and directly categorized: sex, marital status, class year, and major area of study. Other information on graduates necessitated some assumption and generalization; a separate code for each occupation, hometown, or permanent residence was impractical.

I recorded permanent residence on the basis of a general geographic location in the United States. (See map accompanying Table 4) The occupation variable, based on the longest continuing position, also required grouped coding. Since this investigation hinges on Iowa State's mission to train students for industrial occupations versus traditional classical professions, I preserved that distinction. The professional category includes graduates who became doctors, lawyers, and ministers. The "land-grant" occupations broke down into narrower categories: 1) agricultural artisans--farmers, stockbreeders, etc.; 2) technical artisans--surveyors, industrial chemists, etc.; 3) agricultural professionals--educators, journalists, etc.; 4) technical professionals--company owners, government consultants, etc.; and 5) businessmen--bankers, merchants, etc. The "artisan" categories (1 and 2 above) included those directly involved in producing agricultural goods or providing technical services, those actually farming or working with tools. The agricultural professionals and technical professionals included graduates whose occupations removed them from fields and

drawing boards; these categories included those in positions still connected to agriculture and mechanic arts but not actually working with their hands.

APPENDIX A

COURSE OF STUDY, 1868

Department of AgricultureDepartment of Mechanic ArtsFirst YearFirst Term

Algebra
 Physical Geography
 Rhetoric
 Bookkeeping

Second Term

Geometry
 Physiology and Hygiene
 English Language and Literature

Second YearFirst Term

Trigonometry, Mensuration and
 Surveying
 General Chemistry
 Botany

Second Term

Mechanics

Analytical Chemistry
 Zoology, Practical Agriculture

Analytical Geometry
 Descriptive Geometry

Third YearFirst Term

Analysis of Soils
 Entomology, Practical Agriculture
 Botany, Horticulture and Forestry

Mechanics of Engineering
 Shades, Shadows and Perspective
 Differential and Integral
 Calculus

Department of AgricultureDepartment of Mechanic ArtsThird YearSecond Term

Chemical Physics

Geology and Mineralogy

Comparative Anatomy and Physiology

Practical Agriculture

Mechanics of Engineering

Machine Drawing

Fourth YearFirst Term

Agricultural Chemistry

Landscape Gardening

Rural Architecture

History and Principles of

Architecture

Architectural Drawing

Carpentry and Masonry

Political Economy

Logic

Second Term

Mental Philosophy

Constitutional Law

Veterinary Science and Art

Civil Engineering

The French and German Languages, Music and Free-hand Drawing are optional throughout the course.

SOURCE: A. S. Welch, "Plan of Organization," 1868, Iowa State University Archives, Record Group 2/1/0/1, pp. 5-6.

APPENDIX B

THE COURSES OF STUDY, 1877

The Course in Sciences Related to AgricultureFreshman YearFirst Term

Practical Agriculture
 Advanced Algebra
 Geometry (begun)
 Bookkeeping
 English or Latin
 Drawing
 Composition

Second Term

Practical Horticulture
 Elementary Botany
 Animal Physiology
 Geometry
 Elements of Criticism or
 Latin
 Drawing
 Composition

Sophomore YearFirst Term

Systematic Botany
 General Chemistry
 General Zoology
 Plane and Spherical Trigonometry
 Land Surveying
 Physics: Mechanics of Solids,
 Liquids and Gases

Second Term

Stock-Breeding
 Economic Botany
 General Chemistry
 Entomology and Vegetable
 Zoology
 Physics: Light and Sound
 Analytical Geometry

Junior YearFirst Term

Horticulture
 Vegetable Physiology
 Cryptogamic Botany
 Quantitative Chemistry
 Physics: Heat
 English Literature
 Differential and Integral Calculus

Second Term

Landscape Gardening
 Farm Engineering
 Organic Chemistry
 Comparative Anatomy
 Physics: Electricity,
 Magnetism and Meteorology
 Political Economy
 French
 Dissertations

Senior YearFirst Term

Agricultural Chemistry
 Veterinary Science: Anatomy and
 Physiology
 Geology and Mineralogy
 Psychology
 Dissertations

Second Term

Veterinary Science: Physi-
 ology, Disease, Treatment
 Lectures on Foods
 Philosophy of Science
 Science of Language
 French
 Preparation of Thesis

The Course in Mechanical EngineeringFreshman YearFirst Term

Practical Mechanics
 Advanced Algebra
 Geometry (begun)
 Bookkeeping
 English or Latin
 Drawing
 Composition

Second Term

Practical Mechanics
 Geometry
 Elemental Botany
 Animal Physiology
 Elements of Criticism or
 Latin
 Drawing
 Composition

Sophomore YearFirst Term

Plane and Spherical Trigonometry
 Land Surveying
 Physics: Mechanics of Solids,
 Liquids and Gases
 Systematic Botany
 General Zoology

Second Term

Analytical Geometry
 Descriptive Geometry
 Physics: Light and Sound
 General Chemistry

Junior YearFirst Term

Principles of Mechanism
 Analytical Mechanics
 Stereotomy
 Shades, Shadows and Perspective
 Model Drawing
 Differential and Integral Calculus
 Physics: Heat

Second Term

Theoretical and Applied
 Mechanics
 Mechanical Drawing
 Physics: Electricity, Magnet-
 ism and Meteorology
 Landscape Gardening
 Farm Engineering
 Political Economy
 French
 Dissertations

Senior YearFirst Term

Principles of Mechanism
 Theory of Motors
 Mechanical Drawing
 French
 Psychology
 Geology and Mineralogy
 Dissertations

Second Term

Prime Movers
 Mechanical Designing
 Philosophy of Science
 French
 Preparation of Thesis

The Course in Civil EngineeringFreshman YearFirst Term

Advanced Algebra
 Geometry (begun)
 Practical Mechanics
 Bookkeeping
 English or Latin
 Drawing
 Composition

Second Term

Geometry
 Practical Mechanics
 Elemental Botany
 Animal Physiology
 Elements of Criticism or Latin
 Drawing
 Composition

Sophomore YearFirst Term

Plane and Spherical Trigonometry
 Land Surveying
 Physics: Mechanics of Solids,
 Liquids and Gases
 Systematic Botany
 General Zoology

Second Term

Analytical Geometry
 Descriptive Geometry
 Physics: Light and Sound
 General Chemistry

Junior YearFirst Term

Railroad Surveying
 Analytical Mechanics
 Stereotomy
 Shades, Shadows and Perspective
 Model Drawing
 Differential and Integral Calculus
 Physics: Heat

Second Term

Theoretical and Applied Mech-
 anics
 Mechanical Drawing
 Farm Engineering
 Astronomy
 Political Economy
 French
 Dissertations

Senior YearFirst Term

Roof and Bridge Structures
 Geology and Mineralogy
 Psychology
 French
 Dissertations

Second Term

Roof and Bridge Structures
 Designing
 Philosophy of Science
 French
 Preparation of Thesis

The Ladies' Course in ScienceFreshman YearFirst Term

Advanced Algebra
 Geometry (begun)
 English or Latin
 Bookkeeping
 Composition
 Practical Agriculture
 Drawing

Second Term

Geometry
 Elements of Criticism or Latin
 Elementary Botany
 Animal Physiology
 Composition
 Practical Horticulture
 Drawing

Sophomore YearFirst Term

Plane and Spherical Trigonometry
 History
 Systematic Botany
 General Zoology
 Physics: Mechanics of Solids,
 Liquids and Gases

Second Term

Economic Botany
 Entomology and Vertebrate
 Zoology
 Physics: Light and Sound
 General Chemistry or Analytical
 Geometry

Junior YearFirst Term

English Literature
 Vegetable Physiology
 Cryptogamic Botany
 Physics: Heat
 Quantitative Chemistry or Differen-
 tial and Integral Calculus

Second Term

Domestic Economy
 Domestic Chemistry
 French
 Comparative Anatomy
 Political Economy
 Landscape Gardening
 Physics: Electricity, Magnetism
 and Meteorology
 Dissertations

Senior YearFirst Term

French
 Drawing
 Psychology
 Geology and Mineralogy
 Dissertations

Second Term

French
 Science of Language
 Philosophy of Science
 Preparation of Thesis

Course for Juniors and Seniors in
 Special Industrial Sciences

The special student in Chemistry may omit:

Junior Year: first term-Botany or Physics
 second term-Comparative Anatomy or Physics or Landscape
 Engineering
 Senior Year: first term-Geology or Veterinary Science
 second term-Veterinary Science or Science of Language

The special student in Botany may omit:

Junior Year: first term-Chemistry or Physics
 second term-Chemistry, Physics or Comparative Anatomy
 Senior Year: first term-Geology or Veterinary Science
 second term- Veterinary Science or Science of Language

The special student in Zoology may omit:

Junior Year: first term-Chemistry or Physics
 second term- Chemistry or Physics and French
 Senior Year: first term-Geology or Veterinary Science and French
 second term-Veterinary Science and French

The special student in Physics may omit:

Junior Year: first term-Chemistry or Botany
 second term-Chemistry or Comparative Anatomy or Landscape
 Engineering
 Senior Year: first term-Geology or Veterinary Science or Agricultural
 Chemistry
 second term-Veterinary Science or Science of Language

The special student in Agriculture may omit:

Junior Year: first term-Physics or English Literature
 second term-Physics
 Senior Year: first term-Geology
 second term-Science of Language

The special student in Horticulture may omit:

Junior Year: first term-Physics or English Literature
second term-Physics

Senior Year: first term-Geology
second term-Science of Language

The special student in Geology may omit:

Senior Year: first term-Veterinary Science
second term-Veterinary Science

The special student in Veterinary Science may omit:

Junior Year: first term-Botany or Chemistry
second term-Agricultural Chemistry or Physics

Senior Year: first term-Geology
second term-Science of Language

SOURCE: Seventh Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm, 1876-77 (Des Moines: R. P. Clarkson, state printer, 1877), pp. 54-56.

APPENDIX C

COURSES OF STUDY, 1886

The General Course in Sciences
Related to the IndustriesFreshman YearFirst Term

Advanced Algebra
 English Language and Composition
 History or Latin
 Elocutionary Drill
 Drawing
 Stock Breeding
 Military Drill

Second Term

Geometry
 Applied Rhetoric or Latin
 Elementary Botany
 Elementary Zoology
 Elocution
 Drawing
 Practical Horticulture
 Military Drill

Sophomore YearFirst Term

Botany
 General Chemistry (Laboratory Practice)
 Entomology
 Physics: Mechanics
 Plane Trigonometry
 Land Surveying (Field Practice)
 Elocution
 Military Drill

Second Term

Zoology (Laboratory Practice)
 Botany: Vegetable Anatomy
 (Laboratory Practice)
 Physics: Heat and Electricity
 General Chemistry
 (Laboratory Practice)
 Analytical Geometry
 Military Drill

Junior YearFirst Term

Electives
 Botany: Vegetable Anatomy
 and Physiology
 Physics: Electricity, Optics and
 Acoustics
 English Literature
 Quantitative Chemistry
 (Laboratory Practice)
 Calculus
 German
 Zoology (Laboratory Practice)

Second Term

Electives
 Physiology
 Political Economy
 Commercial Law
 Astronomy (Laboratory Practice)
 Organic Chemistry
 (Laboratory Practice)
 German
 One Dissertation

Senior YearFirst Term

Electives
 Geology and Mineralogy
 Psychology
 Laboratory Practice in Agricultural
 Chemistry
 Anatomy of Domestic Animals
 German
 One Dissertation

Second Term

Electives
 Ethics
 Literary Criticism
 History of Civilization
 Veterinary Medicine and Surgery
 Preparation of Thesis

The General Course for LadiesFreshman YearFirst Term

Advanced Algebra
 Latin or French
 Drawing
 Domestic Economy
 (Laboratory Practice)
 English
 English Language and Composition
 Elocutionary Drill

Second Term

Geometry
 Latin or French
 Applied Rhetoric
 Elementary Botany
 Drawing
 Elocution
 Elementary Zoology

Sophomore YearFirst Term

Latin or French
 Modern History
 Botany
 Elocution
 And a choice of Chemistry (Lab) or
 any two of the following:
 Entomology, Physics: Mechanics,
 Plane Trigonometry.

Second Term

Latin or French
 Ancient History
 Domestic Economy
 (Laboratory Practice)
 And a choice of two of the
 following: Zoology (Lab),
 Vegetable Anatomy (Lab), Physics:
 Heat and Electricity, Chemistry
 (Lab), Analytical Geometry.

Junior YearFirst Term

German
 English Literature
 And a choice of two of the following:
 Vegetable Physiology (Lab), Quanti-
 tative Chemistry (Lab), Physics:
 Electricity, Optics and Acoustics,
 Calculus, Zoology (Lab).

Second Term

German
 Political Economy
 One Dissertation
 Domestic Economy
 (Laboratory Practice)
 And a choice of two of the
 following: Organic Chemistry
 (Lab), Astronomy, Commercial Law.

Senior YearFirst Term

Psychology
 German
 One Dissertation
 Geology or Chemistry

Second Term

Ethics
 Literary Criticism
 History of Civilization
 Physiology
 Preparation of Thesis

The Course in AgricultureFreshman YearFirst Term

Stock Breeding
 Farm and Garden Work
 Advanced Algebra
 History
 English Language and Composition
 Drawing
 Military Drill
 Elocutionary Drill

Second Term

Practical Horticulture
 Farm and Garden Work
 Elementary Botany
 Elementary Zoology
 Geometry
 Dairying
 Applied Rhetoric
 Elocution
 Drawing
 Military Drill

Sophomore YearFirst Term

Botany
 General Chemistry (Laboratory Practice)
 Entomology
 Physics: Mechanics
 Plane Trigonometry
 Land Surveying
 Field Practice
 Elocution

Second Term

Zoology (Laboratory Practice)
 Botany: Vegetable Anatomy
 (Laboratory Practice)
 Physics: Heat and Electricity
 General Chemistry
 (Laboratory Practice)
 Horticulture
 Practical Agriculture

Junior YearFirst Term

Horticulture
 Practice in Agriculture and
 Horticulture
 Botany: Vegetable Anatomy and
 Physiology (Laboratory Practice)
 Quantitative Chemistry
 (Laboratory Practice)
 Zoology (Laboratory Practice)
 English Literature, German, Physics

Second Term

Applied Botany
 Practice in Agriculture
 Horticulture
 Organic Chemistry
 (Laboratory Practice)
 Commercial Law
 Political Economy
 One Dissertation

Senior YearFirst Term

Stock Feeding
 Experimental Agriculture
 (Laboratory Practice)
 Anatomy of Domestic Animals
 (Laboratory Practice)
 Geology
 Psychology
 German
 One Dissertation

Second Term

Farm Drainage
 Climatology
 Agriculture (Laboratory Practice)
 Veterinary Medicine
 Diseases of Plants or Injurious
 Insects
 History of Civilization
 Preparation of Thesis

The Course in Mechanical EngineeringFreshman YearFirst Term

Advanced Algebra
 Free-hand Drawing
 Shop Practice
 English Language and Composition
 French
 Military Drill
 Elocutionary Drill

Second Term

Geometry
 Free-hand Drawing
 Shop Practice
 Applied Rhetoric
 French
 Elocution
 Military Drill

Sophomore YearFirst Term

Plane Trigonometry
 Land Surveying
 Physics: Mechanics
 Field Practice
 General Chemistry (Laboratory Practice)
 Shop Practice
 Elocution

Second Term

Principles of Mechanism
 Mechanical Drawing
 Analytical Geometry
 Descriptive Geometry
 Physics: Heat and Electricity
 Shop Practice

Junior YearFirst Term

Principles of Mechanism
 Resistance of Materials
 Shop Practice
 Mechanical Drawing
 Differential and Integral Calculus
 Physics: Electricity, Optics, and
 Acoustics

Second Term

Analytical Mechanics
 Thermodynamics
 Shop Practice
 Political Economy
 One Dissertation
 Mechanical Drawing
 Laboratory Practice in Physics

Senior YearFirst Term

Mechanical Engineering
 Shop Practice
 Mechanical Drawing
 Psychology
 One Dissertation

Second Term

Mechanical Engineering
 Shop Practice
 Mechanical Drawing
 History of Civilization
 Ethics
 One Thesis

The Course in Civil EngineeringFreshman YearFirst Term

Advanced Algebra
 Free-hand Drawing
 French
 English Language and Composition
 History
 Military Drill
 Elocutionary Drill

Second Term

Geometry
 Free-hand Drawing
 French
 Elementary Botany
 Military Drill
 Elocution
 Applied Rhetoric (optional)

Sophomore YearFirst Term

Plane Trigonometry
 Landscape Surveying
 Field Practice
 Physics: Mechanics
 Systematic Botany
 General Chemistry (Laboratory Practice)

Second Term

Railroad Surveying
 Field Practice
 Analytical Geometry
 Descriptive Geometry
 (Laboratory Practice)
 Physics: Heat and Electricity

Junior YearFirst Term

Railroad Surveying
 Field Practice
 Resistance of Materials
 Stereotomy
 Draughting
 Differential and Integral Calculus
 Physics: Electricity, Optics and
 Acoustics

Second Term

Analytical Mechanics
 Field Practice and Office Work
 Political Economy
 Astronomy
 Sanitary Engineering
 One Dissertation

Senior YearFirst Term

Roof and Bridge Structures
 Designing
 Geology and Mineralogy
 Psychology
 Structure of Woods
 One Dissertation

Second Term

Roof and Bridge Structures
 Designing
 Retaining Walls
 Ethics
 History of Civilization
 Preparation of Thesis

The Course in Veterinary ScienceJunior YearFirst Term

Materia Medica
 Anatomy of Domestic Animals
 Zoology
 Botany
 Chemistry (Laboratory Practice)
 Clinics

Second Term

Veterinary Medicine and Surgery
 Materia Medica
 Analytical Chemistry
 Urine Analysis and Toxicology
 (Laboratory Practice)
 Comparative Anatomy
 Ophthalmology
 Animal Parasites
 Histology
 Clinics

Senior YearFirst Term

Surgery
 Cryptogamic Botany
 (Laboratory Practice)
 Therapeutics
 Physiology
 Pathology
 Clinics

Second Term

Practice of Veterinary Medicine
 Pathology
 Therapeutics
 Ophthalmology
 Surgical Therapeutics
 Clinics

SOURCE: Iowa Agricultural College Catalogue, 1886 (Ames, Iowa: By the College, 1886), p. 30-39.

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