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PRESENT STATUS AND OPINIONS OF GRADUATES GRANTED  
BACHELOR OF SCIENCE DEGREES SINCE 1932  
IN AGRICULTURE CURRICULA AT IOWA STATE COLLEGE

by

Mark B. Rhea

A Dissertation Submitted to the  
Graduate Faculty in Partial Fulfillment of  
The Requirements for the Degree of  
DOCTOR OF PHILOSOPHY

Major Subject: Vocational Education

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1953

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## I. INTRODUCTION

It is trite, no doubt, to state that each institution of higher education must justify its existence in terms of its contribution to contemporary culture. The exact niche which any given institution attempts to assume in its contribution to culture, to a large extent, is a function of its self-imposed delimitation of responsibility. Of course, the scope of institutional programs is dependent upon available revenue.

Some institutions, for reasons which are sometimes obscure, have limited their responsibility to men or to women; others to some aspect of education such as vocational education, liberal arts, or professional education. Certain institutions have accepted responsibility for graduate work whereas many others have taken the position that graduate education is beyond the scope of their educational endeavor. Similarly, some institutions have included and some excluded teacher education, medical education, engineering education, et cetera.

Higher education in the United States is characterized more by differences than by similarities in prevailing purposes and programs. It is beyond the scope of this study to indicate the desirable characteristics of an institution of higher education. It may very well be that the lack of uniformity of purposes constitutes the strength rather than the weakness of higher education in the United States.

Institutions vary not only in respect to purposes but also in respect to the administrative organization designed for attaining their postulated

purposes. Perhaps no aspect of higher education is so confusing as the designations of university, college and institute. The definition of these words in terms of institutional function is impossible. For example, many of the outstanding institutions of higher education carry the name of university. On the other hand, many second-rate institutions struggling from mediocrity of program and inadequate financial support likewise are called universities. The rationale underlying the terminology that the Massachusetts Institute of Technology is an institute, Michigan State College is a college and Princeton University is a university is far from obvious. No attempt will be made in this study to add to or subtract from this confusion in terminology. The present study is concerned with Iowa State College which provides its proportional part to the semantic confusion of higher education. For example, the Graduate College is a college within a college, the humanities are included in the Division of Science, education is included in the Department of Vocational Education, et cetera. It is beyond the scope of this study to apologize for or to defend the organizational idiosyncrasies prevailing in institutions of higher education. A brief section dealing with the organization of Iowa State College as it relates to agriculture will be included to orient those readers in other institutions in which differences in organization prevail.

The standards and techniques by which an institution may be evaluated in terms of the degree to which it is attaining its purposes have been and are a perplexing challenge. On first thought it seems straightforward to evaluate an institution in terms of the product it turns out. An

adequate evaluation of such human product is virtually impossible. Vocational competency can be approximately evaluated but humanistic-social development, perhaps more important, remains intangible.

If evaluation should be undertaken in terms of the human product, should it be in terms of graduates from the institution or should it be also in terms of all former students regardless of graduation? The point of view is here taken that an over-all evaluation should include both those who graduated and those who dropped by the wayside. The problem of student attrition has been an issue of greater concern to higher education than its relationship to maintaining enrollment. This study has been delimited to include only graduates but it is hoped that a companion study will be undertaken to include those former students who withdrew from Iowa State College prior to graduation.

On theoretical considerations, objection may be raised to a survey of former graduates reflecting implications not for the present day program but rather for a past program which has been modified and improved over a period of time. In spite of this theoretical objection, the vocational competency of graduates, their opinions concerning curriculum content, extracurricular activities, organizational policies, etc., are considerations of vital importance to present day students, faculty and college administrators. To ignore such considerations would be financial and perhaps educational suicide to a state supported institution of higher education.

Informal and subjective polls by college students, staff members and administrators, unplanned though they may be, are not neglected by those

individuals interested in the improvement of higher education. The present study is designed to assemble in a more satisfactory and detailed manner some evidences of evaluation generally found by keeping an ear-to-the-ground.



## II. AGRICULTURE AT IOWA STATE COLLEGE

For almost one hundred years, research, extension and instruction in agriculture have been major functions of land-grant institutions in the United States. In some states the land-grant institution is also the state university and in others it is not. In general, the institution carries the designation of a university if the former, and a college if the latter. However, all land-grant institutions separate from state universities are not designated as colleges, i.e., Purdue University in Indiana. In general, it may be said that there is no apparent distinction in the program of agriculture between the land-grant colleges and the land-grant universities. There are major differences in organization among institutions regardless of their designation as a college or university. In some institutions home economics and forestry are administered within the framework of agriculture. It is not the purpose here to point out similarities and differences from one land-grant institution to another. On the other hand, some description of the Iowa State College organization plan needs to be included for orienting the reader.

Iowa State College was founded in 1858 and opened for students in 1869. During the formative years instruction in agriculture was centered about practical agriculture, dairying, animal husbandry, horticulture, botany and agricultural chemistry. Since that time the program at Iowa State College, like that of each land-grant institution, has been expanded and many times reorganized.

At the present time Iowa State College's responsibility for agriculture consists of research, extension and resident teaching. All of these functions are administered by a dean of agriculture with an associate director of the Iowa Agricultural Experiment Station, an associate director of the Iowa Agricultural Extension Service and an assistant dean in the Division of Agriculture responsible for resident teaching in agriculture. The Division of Agriculture at Iowa State College, administratively, is the same as a College of Agriculture in a land-grant university.

In addition to the Division of Agriculture, there are Divisions of Science, Engineering, Home Economics, and Veterinary Medicine. It can be seen that home economics is not administered within the framework of agriculture as it is at many land-grant institutions. There is no division of education or of liberal arts. The humanities and communication skills are administered in the Division of Science, and general education as well as vocational education is administered in the Division of Agriculture. Instruction in forestry is administered in the Division of Agriculture.

For many years Iowa State College has stressed research. Emphasis in this area has resulted in increased numbers of graduate degrees of Master of Science and Doctor of Philosophy. Most of these advanced degrees have been granted since the creation of the Graduate College in 1919. The Graduate College consists of approved staff members designated to the graduate faculty. Approval for graduate work is by departments rather than through the five divisions at Iowa State College. Actually the graduate program is largely administered by the graduate dean through

a delegated committee unique to each graduate student. Although no evidence has been here assembled, it is probable that the ratio of graduate degrees to baccalaureate degrees at Iowa State College is somewhat higher than at most land-grant institutions. No attempt was made to include in this study aspects of higher education beyond the baccalaureate degree, except to include within the group studied anyone with a Bachelor of Science Degree in Agriculture who may have received later a master's or doctor's degree from Iowa State College or some other institution.

Resident instruction in agriculture at Iowa State College is administered in the Division of Agriculture. There are currently twelve departments within this division. Two departments are jointly administered with other divisions, i.e., the Department of Agricultural Engineering jointly with the Division of Engineering and the Department of Economics and Sociology jointly with the Division of Science.

The twelve departments within the Division of Agriculture are:

Agricultural Engineering	Genetics
Agromony	Landscape Architecture
Animal Husbandry	Poultry Husbandry
Dairy Industry	Technical Journalism
Forestry	Vocational Education
Horticulture	Economics and Sociology

Several of the twelve departments administer more than one curriculum and one of them does not administer any undergraduate curriculum. The Animal Husbandry Department administers curricula in animal husbandry and dairy husbandry, and the Vocational Education Department administers curricula in agricultural education and industrial education. There is no

separate education division or education department on the Iowa State College campus, general education courses being taught within the Vocational Education Department. General education courses are taught not only for those in agricultural education and industrial education curricula, but also for students in the home economics education and science education curricula and for prospective teachers in other curricula in the Division of Agriculture.

The Department of Genetics is responsible for courses in genetics taken by the majority of undergraduates of other departments in the Agriculture Division. However, there is no genetics curriculum. The undergraduates who wish to major in genetics enroll in a curriculum administered by the Division of Science. The Department of Technical Journalism administers the agricultural journalism curriculum, another journalism curriculum jointly with the Division of Home Economics, and still another with the Division of Science. The Department of Economics and Sociology administers the agricultural business and rural administration curriculum. For the benefit of the reader who is unfamiliar with the curricula in the Division of Agriculture at Iowa State College a description of each<sup>1</sup> is shown.

Agricultural Engineering deals with the design, building, servicing and repair of farm machinery; with the planning, survey, earth moving, tiling, dam construction, contouring and terracing operations of soil and water conservation; with the design, construction, and maintenance of farm buildings and farm houses; with the planning for and utilization of electrical power on farms. Graduates go into the farm equipment or building materials industries. They also work for state and federal

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<sup>1</sup>Iowa State College, Division of Agriculture. Handbook for the Faculty. [Mimeo.] 1951. p. 9-14.

agencies on drainage, irrigation, land clearing, erosion control, and rural electrification. Farming, teaching and research claim others of them.

Agronomy deals with farm crops and the soils which produce them. Tillage, planting, growth, cultivation and harvesting of crops; plant breeding and plant nutrition; soils classification; soils mapping and survey; soils testing and fertility; soils management, land use and efficient crop production--all are the subject materials of agronomy. Many graduates step into fields of work in soil conservation planning, soil survey, land appraisal, farm management, commercial seed production and sales, fertilizer production and sales, seed technology, and grain inspection. Others go into teaching, research, extension, and farming. Students who desire to further their education in the Graduate College may register for a planned program of undergraduate study to prepare them for graduate work.

Animal Husbandry deals with the breeding, feeding and management of beef cattle, swine, sheep and horses. Students learn about methods of selection, systems of breeding, nutritional requirements, feedstuffs and feeding, livestock management, production, fitting and showing, marketing and meats. Many graduates go into livestock farming, commercial farm management, teaching and research. Meat packers, commission firms and the feed industry are taking increased numbers of them. Others go into extension work, become affiliated with various federal or state agricultural agencies, become connected with breed associations, or serve as livestock advisers for banks, railroads and insurance companies.

Dairy Husbandry is a curriculum administered by the Animal Husbandry Department. Prof. A. R. Porter is the Professor in charge of Dairy Husbandry at Iowa State. The curriculum deals with the breeding, feeding and management of dairy cattle. Students learn about methods of selection, systems of breeding, nutritional requirements, feedstuffs and feeding, dairy cattle management, fitting and showing, and dairy production. Graduates go into dairy farming, commercial farm management, teaching and research. Dairy cattle breed associations, artificial insemination associations and the feed industry provide a steady demand for graduates. Others go into extension work, become affiliated with various federal or state agricultural agencies or serve as livestock and dairy farm real estate advisers for banks, railroads and insurance companies.

Dairy Industry deals with the processing of market milk; butter, ice cream and cheese making; and the distribution and selling of these and other products incident to the operation of the facilities which constitute a modern dairy plant. Bacter-

iology, chemistry, business administration, engineering, psychology, advertising, and dairy husbandry are important fields of study for the Dairy Industry student. Graduates are employed as dairy plant operators and managers, sales and advertising executives for dairy products companies, and publicity men for dairy organizations and the dairy industry in general. Others go into teaching, extension, or research for governmental agencies or go into business for themselves.

Agricultural Business and Rural Administration provides an opportunity for students to specialize in (A) Agricultural Business, which provides training for work in farm management, farm credit and appraisal, marketing and distribution of farm products and farm supplies, (B) Rural Administration, which prepares a student for positions in agricultural administration, public relations and extension work in the field of agriculture, (C) Pre-graduate study in preparation for advanced training in agricultural economics or rural sociology. Graduates find positions in rural banking, government agencies, farm management companies, credit and real estate agencies, and in a variety of teaching, research and farming enterprises.

Farm Operation is designed for those who definitely want to operate a farm, either as the owner or an operator for someone else. The emphasis during the first two years of college is on agricultural economics, agricultural engineering, agronomy and animal husbandry. During the junior and senior years, the curriculum is planned by the student and his counselor to fit the student's own particular needs, and emphasis is placed on a balance among animal husbandry, agronomy and economics. There are a 2-year college program in farm operation and a 4-year curriculum. A certificate is awarded upon successful completion of the 2-year, while a Bachelor of Science degree is awarded to the graduates in the 4-year curriculum.

Forestry includes the study of botany, soils, zoology, economics, surveying, and mathematics, along with the many technical subjects in forestry, such as, silviculture, logging, wood utilization, forest mensuration, timber preservation and range management. All Forestry students take part in an 8-week summer camp in a forested region outside the state. Forestry graduates are employed by many federal and state agencies, including state forestry and conservation agencies, U. S. Forest Service, U. S. Soil Conservation Service, Bureau of Land Management, and Office of Indian Affairs. Many of them go into industrial positions with lumber and paper companies, railroads and building trades.

Horticulture is much like Agronomy except that the emphasis is on vegetables, fruits, flowers, or nursery stock instead of field crops. Subjects covered included greenhouse management, plant propagation, nursery methods, fertilizers, soils, commercial

fruit crops, fruit judging, canning crops, vegetable crops, garden flowers, fundamental sciences, economics, English, and business administration. Many graduates go into businesses of their own, such as, orchards, vineyards, market gardens, truck farms, greenhouses, flower shops and nurseries. Others go into sales and promotion work with spray, fertilizer, and seed and nursery companies. Still others go into teaching and research, or vegetable and fruit grading and inspection.

Landscape Architecture deals with the arrangement of urban and farm buildings for convenience and beauty, the problems of tree and shrub planting, design and layout of public parks and recreation areas, as well as city planning. L. A. students study the basic sciences, engineering, surveying, architecture, history and government, as well as the professional courses in landscape architecture. Graduates go into private practice or join professional firms. Many are employed in the public service of cities, counties and states, as well as federal agencies. Others go into teaching or extension work.

Poultry Husbandry deals with all phases of breeding, feeding and management of chickens and turkeys. Students take courses in basic sciences, veterinary anatomy, avian physiology, embryology, incubation and brooding, nutrition, genetics, marketing and processing of poultry products, poultry sanitation, poultry breeding and others designed to provide technically trained men for the modern poultry industry. Graduates are employed with state and federal agencies, as well as private businesses, such as, hatcheries, processing plants, commercial poultry farms, feed companies and poultry journals. Those wishing to do research, extension or teaching work are encouraged to work toward an advanced degree.

Agricultural Journalism consists of the course work and training which provide the necessary background and know-how that will enable a graduate to bring the story of current research, good farming methods and rural interests and activities to the public through the several media of communication. Graduates are in demand for work on weekly and daily newspapers, farm magazines, technical publications, and radio assignments. The advent of television is opening a new field of opportunity which promises to be a lucrative one for those trained in journalism who have a thorough knowledge of agriculture.

Agricultural Education is designed especially to prepare teachers of vocational agriculture in high schools. The curriculum in Agricultural Education provides balanced training in soils and crops, animal husbandry, agricultural engineering and agricultural economics, in addition to courses in teaching methods, psychology, and communication skills which are essential for

training teachers, supervised practice teaching in a high school vocational agriculture department during one quarter of the student's senior year provides invaluable experience for later full-time teaching assignments. Some graduates go into extension work, farming or agricultural business enterprises either at graduation or after teaching several years.

Industrial Education students take courses in drawing, woodwork, metal work, electricity, crafts, radio, welding and pattern making, in addition to work in education, psychology, English, economics, history, mathematics and science which are also required of Agricultural Education students, along with their courses in technical agriculture. Graduates qualify for teaching industrial arts in high schools, for conducting vocational-industrial classes or for educational work in industry.

Thirteen of the 14 curricula here reported have been included in this study. The industrial education curriculum was eliminated from the study because it is so remotely related to agriculture. Of the 13 remaining curricula, all were established prior to 1932 except the one in farm operations, from which the first degree was granted in 1945. The farm operations curriculum is administered by the Division of Agriculture rather than by a department as are the other curricula.

Perhaps no summary of the responsibility of the Division of Agriculture should be complete without a distinction between farming and the industry of agriculture. Only the most naive individual thinks of farming and the agricultural industry as synonymous. As the technical aspects of farming increase, the demands of the nonfarm segment of the agricultural industry must expand to meet the contemporary demands upon its productive capacity. It may very well be that colleges of agriculture of the future may justify their existence in terms of the increasing proportion of graduates who are in nonfarming occupations. If the work of the agricultural colleges is to be acceptable to farmers, to other individuals in



the agricultural industry and to college administrators, the proportion of emphasis in higher education to be placed upon farming and other aspects of the agricultural industry is a problem which will require recurrent study.

## III. REVIEW OF LITERATURE

Many follow-up studies of graduates have been made by colleges and universities. The majority of such published studies have been in fields other than agriculture, relatively few having been devoted to agriculture graduates of land-grant institutions. Most follow-up studies have been primarily concerned with occupational status and present location of graduates. Several studies are under way at present as a part of a project of the Association of Land-Grant Colleges and Universities. Most of these studies, although in progress, have not as yet been published.

More than twenty years ago a study was made to describe and appraise the land-grant institutions. This study was directed by the United States Office of Education by representatives of the Association of Land-Grant Colleges and Universities. In 1930 the United States Office of Education published in two volumes A Survey of Land-Grant Colleges and Universities. Like most of the earlier surveys it was limited, to a great extent, to a description of land-grant programs as they existed prior to 1930. Since this date is prior to the twenty-one year period from 1932-1952, no review of it is here made.

In 1934 Johnson<sup>1</sup> published a study which in part was based upon information assembled in the foregoing survey. He placed major emphasis upon land-grant institutions of the Midwest, particularly University of

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<sup>1</sup>Johnson, Palmer O. Aspects of Land-Grant College Education. Minneapolis, University of Minnesota Press. 1934.

Minnesota. Summaries were made concerning expenditures of funds, library facilities, characteristics of students and graduates, and income of graduates.

Evidence was presented indicating that between the years 1915 and 1928 seven states appropriated more to charities, hospitals and similar institutions than to public schools or institutions of higher learning. Larger institutions allotted a greater portion of total funds to libraries than did smaller institutions. The larger institutions also had a more adequate collection of volumes as measured by the criterion used. It was concluded, however, that due to differences in accounting systems and lack of standardized terminology related to the phases of library administration an adequate evaluation of libraries is difficult.

In each of the eight institutions studied, the majority of their students were residents of their own state, the mean percentage of students from the state being 88 per cent. It was found that enrollment in agriculture at 17 land-grant institutions increased from 1903 to 1916. During the first half of this period the increase in enrollment was quite rapid. During the second half of the period enrollments varied as a result of World War I and some resulting economic conditions of prosperity and depression.

Several interesting findings were presented concerning the students of the College of Agriculture, Forestry and Home Economics at the University of Minnesota.

1. Median grade point ratios made by present upper classmen during their freshman year were significantly higher than those of the freshmen group of which they were members.

2. During two consecutive years there were 60 and 56 freshmen agriculture students; 28.3 and 16 per cent respectively of these students graduated in the regular four-year period.

3. Students from farm homes had significantly lower percentile ranks on the college aptitude tests, yet their achievements equaled or exceeded those of students from the largest cities.

4. There was a negative relationship between ability and time spent in study.

5. Apparently there was no relationship between time spent in study and honor point ratios.

Information was collected and summarized concerning the salaries of graduates of the University of Minnesota. Findings with respect to salaries are not here reviewed since they are not comparable with 1952 salaries. It was found that the majority of graduates who entered farming had decided to do so prior to college entrance. Interest in farming was reported to be a major factor in the choice of farming as an occupation.

Recently Peacock<sup>1</sup> and others prepared and sent to 1975 graduates of the college of Agriculture at the University of Tennessee a comprehensive questionnaire concerning positions held and farming status. The questionnaires were sent to graduates of the period 1921-1950. Sixty-three per cent of the questionnaires were returned. Approximately 17 per cent of the respondents enclosed with the returned questionnaire a letter, which was requested, of general suggestions concerning program improvement.

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<sup>1</sup>Peacock, N. D., McSpadden, B. J., and Wingo, G. H. A Study of the Employment Opportunities for Agricultural Graduates of the University of Tennessee. (Bulletin) College of Agriculture, University of Tennessee, Knoxville, Tennessee. n.d.

Peacock found that 30 per cent of the graduates had transferred from other colleges, 11 per cent coming from colleges outside of Tennessee. Seventy-two and one-half per cent of the graduates were employed in Tennessee at the time of the study.

The majority of graduates or 85 per cent of those responding reported their first employment as directly related to agriculture. The areas of employment were as shown in Table 1. It is interesting to note that many more graduates listed farming as their present occupation than as their first occupation. Although only 8.6 per cent listed farming as their major occupation, a total of 30.1 per cent indicated that they owned or were operating a farm.

A mean salary of \$4,499 was reported by 942 graduates. College teachers' salaries were close to the mean of the entire group, while vocational agriculture teachers' salaries were below the mean. Mean salaries by degree were Bachelor of Science - \$4389, Master of Science - \$4881, and Doctor of Philosophy - \$6333. The letters accompanying the returned questionnaires indicated an overwhelming need for more emphasis on public speaking, English and journalism.

Shepardson<sup>1</sup> conducted a follow-up study of the graduates of the School of Agriculture at Texas A. and M. College primarily seeking answers to two questions: (1) Why go to college to learn to farm? (2) Why do your agricultural graduates not go back to the farm? Questionnaires were sent to 4702 graduates. Of these, 1927 were completed and returned in time to be

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<sup>1</sup>Shepardson, C. W. A Study of the Agricultural Graduates of the Agricultural and Mechanical College of Texas. Bulletin, fifth series, vol. 7, number 7. College Station, Texas. 1951.

Table 1

Types of Employment, First and Present  
University of Tennessee

Type	First employment after graduation	Employment at time of survey
	(% of total)	(% of total)
Related to agriculture		
Educational		
High school		
Vocational agriculture	28.3	20.5
Veterans' training	7.7	7.9
Total high school employment	36.0	28.4
College		
Teaching	2.2	3.8
Research	3.4	1.3
Extension	8.7	10.1
Total college employment	14.3	15.2
Graduate Study	0.7	1.7
Total Educational	51.0	45.3
Federal and state agencies	14.3	16.3
Commercial	13.8	12.5
Farming	5.9	8.6
Total related to agriculture	85.0	82.7
Unrelated to agriculture		
Commercial	8.8	10.8
Military service	1.4	4.0
Teaching	4.0	1.7
Miscellaneous	0.8	0.8
Total unrelated to agriculture	15.0	17.3

included in the analysis. Among other information requested, graduates were asked to list their current occupations. A summary of occupational listings is shown in Table 2.

Only 18.6 per cent of the respondents were engaged in full-time farming or ranching. However, 44.1 per cent were owners or part time operators of farms or ranches or both. Thirty-five per cent of the animal husbandry

Table 2  
Summary of Occupations, Texas A. and M.

Occupation	N	Per cent
Related to agriculture		
High school vocational agriculture	311	16.1
Agricultural extension	165	8.6
College teaching and research	203	10.5
S.C.S. and other government agencies	202	10.5
Commercial public relations	24	1.2
Farming	359	18.6
Business related to agriculture	248	12.9
Unrelated to agriculture	415	21.5

graduates were engaged in farming. No other curriculum had such a large proportion of its graduates in farming.

Of graduates reporting, 76.2 per cent came from homes of farm owners or operators. Seventy-eight and four-tenths per cent of the farm reared graduates anticipated farm ownership at the time of college entrance, 76.1 per cent at time of graduation and 51.9 per cent at time the study was made.

Mean salaries for occupations were: farmers - \$8,450, non-related business - \$6,750, related agricultural business - \$5,900, and others (teacher, Soil Conservation Service, public relations, and government workers) - \$4,800. The average for the entire group of graduates was \$6,000.

Principal criticisms of the School of Agriculture included lack of practical training, lack of vocational guidance, lack of training in agricultural economics and social relations, and lack of training in English and public speaking.

O'Brien<sup>1</sup> conducted a study of the graduates of the agricultural engineering curriculum at Iowa State College. He mailed 534 questionnaires and received 465 or an 87 per cent return. The major purpose of his study was to obtain employment status of graduates and to secure an evaluation of selected courses in the agricultural engineering curriculum. It was found that education ranked first as an occupational outlet with approximately one in four so employed. The graduates were classified according to their major interests while in school, farm power was listed by the majority of majors. Both the first and present areas of employment tended to follow the major interest while in school. O'Brien found that the present employment did not differ greatly from the first employment.

The graduates included in the study were polled concerning the emphasis they thought should have been given various course areas. Approximately four out of five reported that about the correct amount of emphasis

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<sup>1</sup>O'Brien, Michael. Evaluation by Graduates of the Program of Agricultural Engineering at Iowa State College. Unpublished Ph.D. Thesis. Ames, Iowa, Iowa State College Library. 1951.



was given to three areas in productive agriculture and about the same number for four areas in engineering. However, as in the Texas study and in the Tennessee study, graduates thought much more emphasis should be given to English and speech.

Bell<sup>1</sup> conducted an investigation concerning 288 men who had qualified at Iowa State College to teach vocational agriculture. He attempted to isolate characteristics which distinguish between those who remain in teaching and those who enter but do not remain. He collected information concerning 288 graduates. Not all of these graduates were agriculture education majors. Some of them majored in agronomy, animal husbandry or some other area while at Iowa State College.

Ninety-two per cent of the respondents to Bell's questionnaire were engaged in occupations classified as education or agriculture. He found that farm background experience could not be used to distinguish between those who had and those who had not stayed in teaching. However, he did find a significant difference due to the nonfarm work experiences. Those who stayed in teaching had more nonfarm work experiences than those who left teaching. Another significant difference in favor of those who had stayed in teaching was "married when started teaching". Nonsignificance was found for number of years of high school vocational agriculture, number of years of 4-H experience and farming as father's occupation.

Qualified graduates who did not enter vocational agriculture teaching gave as reasons for not doing so, a lack of security of tenure, higher salaries elsewhere, and a desire to use their training for purposes other

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<sup>1</sup>Bell, Everette L. Factors Influencing Occupational Choice of Men Qualified to Teach Vocational Agriculture. Unpublished M.S. Thesis. Ames, Iowa, Iowa State College Library. 1950.

than teaching. The vocational agriculture teachers who changed teaching positions reported they do so primarily for a higher salary. These teachers also listed the desire for broader personal and professional experience as a major reason for moving from one school to another.

Udoh<sup>1</sup>, by means of a questionnaire, secured information concerning 181 B.S. graduates of the industrial education curriculum at Iowa State College (1921-1950). He found sixty-four per cent of the graduates were living in Iowa, 6 per cent were in the armed forces and the remaining 30 per cent were working in twenty-three other states. He found 67 per cent of the graduates were teaching and 23 per cent engaged in other occupations. One hundred twenty-seven of the respondents had taken a first position in education. However, at the time of the study 19 per cent of them had changed to an occupation other than education. On the other hand, only 9 per cent of those who started in non-teaching positions had changed to teaching.

Seventy-two per cent of the respondents reported they had transferred from various curricula of the Engineering Division. Only 10 per cent reported they enrolled in the industrial education curriculum upon entering Iowa State College.

In response to the question: "In the light of your experience what courses should a prospective student in your field elect?", the respondents to Udoh's questionnaire suggested shop courses as a first choice. English as a third choice and courses in agriculture as a last choice. The

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<sup>1</sup>Udoh, Benson A. Industrial Education Baccalaureate Graduates of Iowa State College from 1921 to 1950. Unpublished M.S. Thesis, Ames, Iowa, Iowa State College Library. 1952.

graduates rated industrial education laboratory courses as being of great value to them.

Sutherland and LeCount<sup>1</sup> conducted a survey of the graduates of the University of California, Davis, California. Questionnaires were sent to 466 graduates and 192 returns were received. The purposes of the study were:

1. To determine the occupations chosen by degree graduates of the College of Agriculture for the fifteen-year period, 1933-47.
2. To assemble information which might be of value in advising and counseling students who have made their occupational choices and who are attending the University with the express purpose of entering specific occupations.
3. To obtain from graduates suggestions for making adjustments in undergraduate curricula.
4. To obtain information which might be of value in the placement of subsequent graduates.

Results of the study showed that approximately 25 per cent of the graduates were farming, 20 per cent teaching vocational agriculture, 20 per cent in agricultural business and the remaining 35 per cent were engaged in a variety of occupations, some of which were nonagricultural. Very few changes in occupations were noted among those who started in college teaching or research. This same group, college teachers and researchers, were most satisfied with the undergraduate courses being offered. Those who were engaged in other occupations recommended more courses out-

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<sup>1</sup>Sutherland, S. S. and LeCount, S. N. A Survey of Degree Graduates of the College Of Agriculture, 1933-47 (10 page mimeo.) Davis, California. 1948.

side their major area, more practical instruction in agriculture, more field work and more agricultural engineering.

Sutherland and LeCount reported the graduates who had completed their university training ten or more years ago were earning approximately \$5000 per year, those who had graduated five to ten years ago had a mean income of about \$4000 and those who had graduated during the past two years had a mean starting salary of about \$3600 per year. These writers reported a need for a more consistent program of follow-up of graduates of that institution. They indicated that adequate addresses were not available for a large number of graduates.

Havemann and West<sup>1</sup> published a study based on a survey of United States college graduates made by Time Magazine and analyzed by the Columbia University Bureau of Applied Social Research. They described in detail many of the economic, religious, social and political characteristics of 9064 graduates of U. S. colleges, universities, teachers colleges, professional schools and technical institutions. This publication is of broad general interest, but only a few items are pertinent to the study at Iowa State College:

1. Three per cent of the graduates surveyed majored in forestry or agriculture, 9 per cent in education.
2. Twenty-seven per cent of the graduates in forestry or agriculture wished they had prepared for another profession.
3. When asked how much college had helped their present occupation, 70 per cent reported "a lot", 28 per cent report "some" and 2

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<sup>1</sup>Havemann, Ernest and West, Patricia Salter. They Went to College. New York, Harcourt, Brace and Company. 1952.

per cent reported "not at all". Seventy-four per cent of the graduates in agriculture reported "a lot".

4. Only nineteen per cent of the graduates who majored in education were earning \$5000 or over, whereas 62 per cent of those who majored in law, medicine or dentistry were earning \$5000 or more.
5. In both high and low paid professions, the graduates with the best grades earned considerably more money than graduates with low grades. However, in the field of business there were only slight differences in the earning power of the A students and the C or D students.
6. Graduates of more recent years participated in more extracurricular activities while in college than did those who graduated 15 years or more ago.
7. Graduates reported they had not received adequate training in public speaking or English.

As previously mentioned studies are now in progress concerning the agriculture graduates of many of the land-grant institutions and no doubt in several years a composite summary of the opinions of the graduates of all these institutions can be made. Based on the studies here reported the majority of agriculture graduates enter agricultural occupations or occupations closely allied with agriculture. Not so many of the graduates reported themselves as farm operators as the writer expected. However, more graduates listed themselves as currently farming than gave farming as their first occupation. In those studies where graduates were asked to respond to questions concerning course offerings, there was a unanimous

vote for more courses involving communication skills. Several of the investigators reported difficulty in obtaining adequate addresses for many of the graduates.

## IV. METHOD OF PROCEDURE

To provide factual information suitable for educational and vocational guidance of students in the division of agriculture at Iowa State College it seemed advisable to secure current opinions and occupational status of a large number of graduates. To secure such information, a questionnaire<sup>1</sup> was mailed to graduates who had obtained baccalaureate degrees from 1931-1932 to 1951-1952. Information concerning first and present occupation, advanced degrees earned, value of counselor, value of course work, recommendations for curriculum changes and opinions concerning other items were included in the questionnaire.

Returned questionnaires were coded and the information was placed on International Business Machine cards. Grade point average and year of graduation of each graduate was secured from the registrar's office.

An occupation distribution was desired by which it would be possible to classify all graduates in agriculture. Such a classification was made and will be used for certain analyses. However, the occupational outlets differ so widely from one curriculum to another, that a second plan of classification unique to each curriculum was devised. Difficulty was encountered in classifying the occupations of some of the graduates. In such cases department heads and counselors were consulted for a more adequate description of the occupation. Location of position was classified by state only. Iowa, Illinois, Wisconsin, Minnesota, Missouri, and

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<sup>1</sup>Copy shown in Appendix.

Nebraska were classified individually, however, all other states were classified as a single group.

Graduates were asked to estimate the average (of the last two or three years) income from their major job. The figure given in each case was reduced to the nearest hundred dollars; i.e., \$4540 to \$4500. For purposes of this study the estimate given was used as 1952 income.

When properly classified, the information concerning each graduate was placed on International Business Machine cards. All group separations were made mechanically by use of International Business Machine equipment.

The study here undertaken should be considered a census survey rather than a sampling survey. Within the twenty-one year period an attempt was made for complete coverage. The graduates who returned questionnaires can not be considered a sample from any known or hypothetical population except in rare instances. Therefore, the use of statistical inference either in estimation or in testing hypotheses, for all practical purposes, is nonexistent in this study.



## V. ENROLLMENT TRENDS

During the 25-year period ending in 1952, male undergraduate enrollment in the 52 land-grant institutions for whites increased by approximately 135,000 students. This increase has not been without fluctuations. During this period two major catastrophes occurred, namely, the depression and World War II. As may be seen in Table 3, each of these events had its effect upon enrollment in the land-grant institutions. Apparently many prospective students were deprived of a college education due to the economic conditions of the period 1932-1935. The prevailing conditions affecting enrollment during the war and post-war period were different from those during the depression period. Enrollment reduction was more drastic during the war years than during the depression years. However, as shown by the enrollments of 1947-1950, the shrunken enrollments of the war years represented a delay rather than a sacrifice of formal education for many students. Although not shown in Table 3, when the enrollments were fitted to a straight line,  $Y = 8886.6X + 175,322.8$  where  $Y$  = enrollment and  $X$  = number of years since 1940, a mean annual increase of 8,887 students was found. Except for the depression and the war years, the straight line formula yielded estimates close to actual enrollment for the 25-year period. The estimates were somewhat high for the early and the late years and slightly low for the middle years. The low enrollment of the depression years which occurred during the early years of the 25-year period and the high enrollment following World War II caused the straight

Table 3

Actual and Predicted Male Undergraduate Enrollment  
in Land-Grant Institutions

Year	Total	Agriculture*	Per cent in agriculture	Agriculture enrollment predicted by equation	
				Linear	Log
1928	103,619	11,461	11.1	8,325	5,576
1929	107,088	12,604	11.8	9,508	7,944
1930	116,053	12,772	11.0	10,691	10,066
1931	116,110	13,123	11.3	11,873	11,984
1932	114,350	12,219	10.7	13,056	13,735
1933	105,327	11,161	10.6	14,238	15,343
1934	103,246	11,192	10.8	15,421	16,835
1935	117,243	13,818	11.8	16,604	18,225
1936	129,565	17,827	13.8	17,786	19,522
1937	141,264	21,393	15.1	18,969	20,741
1938	151,327	25,679	17.0	20,151	21,895
1939	160,622	27,451	17.1	21,334	22,983
1940	164,560	29,519	17.9	22,517	24,012
1941	163,455	27,917	17.1	23,699	24,994
1942	151,640	23,356	15.4	24,882	25,930
1943	143,106	18,354	12.8	26,064	26,825
1944	171,383	4,207	2.5	27,247	27,682
1945	82,950	4,751	5.7	28,430	28,502
1946	170,215	18,971	11.1	29,612	29,294
1947	324,595	38,475	11.9	30,795	30,077
1948	353,681	45,270	12.8	31,977	30,786
1949	349,605	45,848	13.1	33,150	31,490
1950	325,202	45,518	14.0	34,343	32,171
1951	278,312	37,922	13.6	35,525	32,834
1952	238,542	32,105	13.5	36,708	33,469
1955				40,257	35,276
1960				46,172	37,963
1965				52,087	40,331
1980				69,832	46,122

\*United States Office of Education. Statistics of Higher Education. Biennial Reports, 1928-30 to 1950-52.

line formula to yield large annual increments. For obvious reasons use of the straight line formula for extrapolation of future enrollment is open to serious question.

Enrollment in agriculture at the land-grant institutions has also increased during this 25-year period. When enrollments were fitted to straight line,  $Y = 1182.8X + 21334$ , a mean annual increase of 1183 students was found. As shown in Table 3 the straight line prediction yielded a low estimate of enrollment for the first four of the 25 years. As in the case of total enrollment, the straight line formula for agriculture enrollment yielded a large annual increment. Since, in the judgment of the writer, it is not logical to assume that enrollment in agriculture will continue to increase on a straight line basis, enrollments were fitted to a log curve. Using the formula  $Y = a \log X + C$ , the equation became  $Y = 46333.32 \log(X - 1920) - 36367.57$ . The log curve resulted in very different predictions of present and future enrollment from those obtained from straight line prediction. The predicted enrollment using the log curve was considerably below actual enrollment during the early years and appreciably lower than the straight line prediction for future years. It is probably realistic to assume that future enrollments will be between the log curve and the straight line predictions.

A further inspection of Table 3 indicates the effects of periods of depression and war upon enrollment. It is interesting to note the paralyzing effect of World War II on agriculture enrollment. The low of 4,207 students enrolled in agriculture during 1944 reflects the relatively few potential agriculture students who were not engaged in war work, food production or military service. The percentage enrollment

decrease during the war years was not nearly so great for total undergraduate enrollment as it was for agricultural enrollment. This difference in reduction might be explained by the difference in proportions of women enrolled in agriculture and general college enrollment as well as by military sponsored students in areas other than agriculture.

During the past two decades there has been a decrease in the percentage of United States population engaged in farming. On first thought it might be assumed that the percentage of students enrolled in agriculture in the land-grant institutions during the past 25 years has also decreased. The percentage of undergraduates in land-grant institutions enrolled in agriculture, as shown in Table 3, indicates that there was no greater reduction in agriculture enrollment than in total enrollment during the depression period. By fitting a straight line to the reported enrollments it was found that the percentage of the total enrollment enrolled in agriculture has increased slightly during the 25-year period. The increase was approximately two-tenths of one per cent per year.

During the same period, 1928-1952, undergraduate enrollment at Iowa State College increased from 4,534 in 1928 to 7,189 in 1952 with a high of 10,259 in 1949. These enrollments by years are shown in Table 4. When these enrollments were fitted to a straight line a mean increase of 228 students per year was found. Agriculture enrollment at Iowa State College has also increased during this 25-year period. When these enrollments were fitted to a straight line a mean increase of approximately 64 students per year is found. The large enrollments at Iowa State College in recent years caused the straight line equation to yield a low value for the early years. The straight line formula and the log formula were used for

Table 4

Actual and Predicted Undergraduate Enrollment  
at Iowa State College

Year	Total	Agriculture	Per cent in agriculture*	Agriculture enrollment predicted by equation	
				Linear	Log
1928	4,534	1,088	24.0	711	593
1929	4,527	1,078	23.8	775	718
1930	4,566	1,064	23.3	840	830
1931	4,686	1,089	23.2	905	932
1932	4,229	942	22.5	970	1,024
1933	3,491	755	21.6	1,035	1,109
1934	3,484	778	22.3	1,099	1,188
1935	3,864	1,006	26.0	1,164	1,261
1936	4,653	1,310	28.2	1,229	1,330
1937	5,011	1,413	28.2	1,294	1,396
1938	5,615	1,524	27.1	1,358	1,455
1939	6,296	1,673	26.6	1,423	1,512
1940	6,630	1,751	26.4	1,488	1,567
1941	6,753	1,607	23.8	1,553	1,619
1942	6,761	1,432	21.2	1,617	1,668
1943	6,144	1,202	19.6	1,682	1,715
1944	5,675	276	4.9	1,747	1,754
1945	4,007	270	6.7	1,811	1,804
1946	7,634	1,337	17.5	1,876	1,846
1947	10,113	2,355	23.3	1,941	1,887
1948	10,172	2,669	26.2	2,006	1,928
1949	10,259	2,881	28.1	2,070	1,962
1950	9,100	2,868	31.5	2,135	1,998
1951	8,081	2,668	33.0	2,200	2,033
1952	7,189	2,158	30.0	2,265	2,066
1955				2,457	2,162
1960				2,785	2,303
1965				3,110	2,428
1980				4,085	2,734

\*Iowa State College. General Catalogue. 1929-1954.

predictions of future enrollment in agriculture at Iowa State College. The straight line prediction of 4,085 students to be enrolled in 1980 is approximately double the present enrollment in agriculture and is higher than might logically be expected. A log curve prediction using the formula  $Y = 2446.692 \log(X - 1920) - 1616.4182$  yielded a mean prediction of 2,734 students for 1980. The log predictions are much lower than those found by use of the straight line formula. It is probably realistic to assume, barring any major catastrophe, that future enrollments will be between the two estimates shown in Table 4.

There has been a slight increase in the percentage of male undergraduates at Iowa State College who enrolled in agriculture during the 25-year period, 1928-1952. These percentages, shown in Table 4, when fitted to a straight line yielded an increase of less than one-tenth of one per cent per year. Attention should be given to the effects of World War II on the percentage of total enrollment enrolled in agriculture at Iowa State College. The low of 4.9 per cent during 1944 may indicate a need for a change in national policy should an emergency of a military nature occur in the future.

Upon examination of past and present birth rates, it becomes apparent that there will be more young men of college age in the future quarter century than there were in the past quarter century. Birth rates by years are shown in Table 5. An increase in birth rate can be expected to affect college enrollment approximately 18 years later. On this basis it seems reasonable to infer that college enrollment will increase appreciably in the year 1964 and will continue to increase for several years thereafter.

Table 5

Iowa and United States Birth Rates by Years  
(Based on per 100 population)

Year	Iowa*	U.S.**	Year	Iowa	U.S.
1928	17.7	22.2	1939	17.4	18.8
1929	17.1	21.2	1940	17.9	19.4
1930	17.3	21.3	1941	18.5	20.3
1931	17.0	20.2	1942	20.0	22.3
1932	16.3	19.5	1943	20.3	22.9
1933	16.0	18.4	1944	20.8	21.5
1934	17.0	19.0	1945	20.2***	20.7
1935	16.4	18.7	1946	23.6	24.5
1936	17.1	18.4	1947	26.3	27.0
1937	17.0	18.7	1948	24.4	25.3
1938	17.4	19.2	1949	24.3	24.0

\*Wakeley, R. E. Changes in Iowa Population. Iowa Agricultural Experiment Station Bulletin 356. 1947.

\*\*United States National Office of Vital Statistics, Births and Birth Rates in the United States. Vital Statistics Special Report, vol. 33, no. 8. 1950.

\*\*\*United States National Office of Vital Statistics. Vital Statistics of the United States, Part 2. 1945-1949.

Table 6

Actual\* and Predicted\*\* Iowa Male High School Graduates by Year

Year	N	Year	N
1928	8,791	1947	12,230
1929	8,733	1948	11,875
1930	9,302	1949	11,634
1931	9,779	1950	11,654
1932	10,582	1951	11,469
1933	11,310	1952	11,506
1934	11,746	1953	11,919
1935	12,107	1954	12,070
1936	12,281	1955	11,959
1937	12,181	1956	12,102
1938	13,023	1957	11,890
1939	13,726	1958	11,812
1940	13,964	1959	11,995
1941	13,887	1960	12,863
1942	13,302	1961	12,594
1943	12,238	1962	12,256
1944	10,441	1963	11,825
1945	10,002	1964	14,944
1946	10,379	1965	16,975

\*Iowa Department of Public Instruction. Biennial Reports, 1928-1952. Des Moines. 1952.

\*\*Iowa State Educational Association. Research Report, no. 4, (Mimeo.) Des Moines. 1950.



Since the majority of entering college freshman students for any one year are high school graduates of that year an examination of actual and predicted Iowa male high school graduates by years may be helpful in determining future enrollment in agriculture at Iowa State College. Actual and expected numbers of graduates are shown in Table 6. According to these figures only small changes are expected in the number of male high school graduates until the academic year 1963-64. During that year the size of graduating class is expected to exceed the previous class by approximately 3,121 graduates.

It is a wholesome situation for technical agriculture that enrollments in agriculture have tended to increase in the land-grant institutions during the past 25 years. It appears that agriculture enrollment at Iowa State College and at other land-grant institutions will continue to increase in the future with a large increase beginning in 1963-64. These increases coupled with the decrease in the percentage of the United States population engaged in farming will, no doubt, make available more technically trained men to the agricultural industry.

## VI. RESPONDING GRADUATES

There were 20,770 baccalaureate degrees conferred by Iowa State College during the 21-year period ending in June 1952. Of these degrees, 4,439 were conferred in the Division of Agriculture and 348 were conferred at the successful completion of the agricultural engineering curriculum, jointly administered by the Division of Agriculture and the Division of Engineering. With 65 exceptions, these degrees have been granted in curricula which currently exist. The 65 graduates from discontinued curricula, who have been eliminated from this study, may be classified as follows:

Agriculture and Science	43
General Agriculture	18
Agriculture and Manual Training	4

In addition to the 65 graduates of discontinued curricula, there were 239 graduates of the industrial education curriculum who were not included in this study because of the remote connection of this curriculum to agriculture. Thus, there were 4,483 graduates of the thirteen curricula during the 21-year period ending in June 1952 as shown in Table 7. These 4,483 graduates constitute the population or universe concerning whom this study was designed.

An inspection of Table 7 suggests that interpretations of the 21-year period will be weighted heavily by recent graduates since more than half of 4,483 individuals have been graduated in the 6-year post-war period. The impact of World War II and of the subsequent post-war financial assistance to veterans is particularly obvious.

Table 7

## Degrees Granted Each Year by Curriculum

Year	Ag. Econ.	Ag. Ed.	Ag. Eng.	Ag. Agron.	An. Husb.	Dairy Husb.	Dairy Indus.	Farm Op.	For.	Hort.	Land. Arch.	Poul. Husb.	Ag. Journ.	Total
1932	11	16	11	13	41	6	19	-	11	9	12	2	4	155
1933	3	9	8	10	21	5	26	-	15	1	9	3	3	113
1934	4	8	4	14	30	7	18	-	17	5	12	1	7	127
1935	8	4	10	7	23	3	12	-	23	3	6	3	5	107
1936	4	2	8	8	21	5	18	-	29	4	9	1	2	111
1937	8	4	8	11	28	2	25	-	29	13	12	3	1	144
1938	19	8	9	13	37	8	29	-	45	2	11	6	5	192
1939	18	10	21	28	42	13	33	-	45	8	6	2	6	232
1940	11	21	17	26	53	7	22	-	63	7	11	0	4	242
1941	16	23	18	23	46	7	21	-	34	9	8	3	5	213
1942	11	26	13	23	55	2	22	-	20	5	6	4	3	190
1943	12	28	12	25	41	0	18	-	25	7	4	0	3	175
1944	3	5	5	3	11	1	1	-	8	5	4	0	1	47
1945	1	0	0	3	8	1	1	1	2	3	2	0	0	22
1946	6	11	4	6	10	5	3	3	7	3	2	0	0	60
1947	14	45	13	24	33	6	13	7	28	9	6	4	6	208
1948	18	34	24	33	48	9	24	10	50	4	5	7	5	271
1949	19	58	46	68	68	7	32	16	75	5	20	11	12	414
1950	23	88	46	63	92	10	36	47	98	18	25	11	14	571
1951	20	79	42	53	83	9	18	58	88	6	18	16	6	496
1952	15	72	30	44	56	12	18	54	51	12	11	6	12	393
Total	244	551	348	476	847	125	409	196	763	138	199	83	104	4483

A further inspection of Table 7 indicates that the popularity of certain curricula as shown by the number of graduates implies certain trends of demands by society for agriculturally educated personnel. The animal husbandry and forestry curricula have provided more than one-third of the graduates during this 21-year period, although the proportionate number in each of these curricula has become smaller since World War II. The agricultural education curriculum, the third largest, has been increasing its proportion of graduates since the early years of the 21-year period. The farm operations curriculum had its first graduate in 1945, since which time there have been 196 graduates, 112 of whom received degrees during 1951 and 1952.

Addresses for these 4,483 graduates were solicited from department files, from alumni records and by personal interviews with selected faculty members. It was necessary to eliminate from this list those who were known deceased, and those who were living outside of the continental United States without a currently available address. After the questionnaires were mailed, many were returned marked "address unknown". A search was made for a more recent address or, if that was not obtainable, the address at time of college matriculation or graduation was used. A remailing was then made in the hope of obtaining as many completed questionnaires as possible.

At the end of one month approximately two thousand replies had been received. At that time a follow-up letter, a return enveloped, and a questionnaire were sent to the nonrespondents. At the end of the second month, another thousand returns had been received. A third follow-up with a postal card resulted in approximately five hundred additional returns.

By the end of the third month, 4,199 questionnaires had been found deliverable, and completed questionnaires were returned by 3,629 graduates. Of this number, 3,593 returns were usable in this study. The percentage of returns of deliverable questionnaires was 85.6 per cent and varied little from one curriculum to another as shown in Table 8.

Table 8

## Questionnaire Returns by Curricula

Curriculum	Graduates	Questionnaires		% Returns of deliverable
		Deliverable	Usable returns	
Agricultural Economics	244	221	202	91.4
Agricultural Education	551	524	459	87.6
Agricultural Engineering	348	327	307	93.9
Agronomy	476	452	382	84.5
Animal Husbandry	847	802	682	85.0
Dairy Husbandry	125	120	109	90.8
Dairy Industry	409	360	284	78.9
Farm Operations	196	189	168	88.9
Forestry	763	720	592	82.2
Horticulture	138	130	124	95.4
Landscape Architecture	199	177	152	85.9
Poultry Husbandry	83	77	49	63.6
Agricultural Journalism	104	97	83	85.6
Total	4483	4199	3593	85.6

The returned questionnaires show that the Division of Agriculture had drawn students from many states and foreign countries. It was not unexpected, on the other hand, to note that 2,695 graduates were living in Iowa at the time they first entered college. Thus three in every four graduates were residents of Iowa at the time of college matriculation. An analysis, year by year from 1932 to 1952, failed to indicate any upward or downward

trend during the 21-year period studied.

The ratio of state to out-of-state students which would prevail in a tax-supported state institution is beyond the scope of this study. Certainly it would be unfortunate for the agricultural industry if no reciprocity in student attendance existed. On the other hand, it might be possible to carry nonprovincialism to the other extreme in which the farming interest of the state might suffer. It may also be that a leading agricultural state, such as Iowa, may owe an obligation to other states in regard to education in agriculture because of the vast agricultural capacity with which it has been endowed. Regardless of what the desirable state to out-of-state student ratio may be, the three to one ratio found at Iowa State College in this study had varied little from one year to another during the 1932-1952 period.

Of the 898 graduates who were out-of-state students at the time of college entrance, 22 were from outside the continental limits of the United States. Those from surrounding states predominated: Illinois with 269; Minnesota, 71; Missouri, 66; Wisconsin, 59; and Nebraska, 57.

Of the graduates who returned questionnaires, 24, or less than one per cent, came from outside the continental United States. It should be pointed out that a current mailing address was not available for many foreign students. The small number of foreign students here reported is without question an underestimate of the responsibility undertaken for such students at Iowa State College.

The 2,695 graduates who lived in Iowa at the time of college entrance varied widely among the 99 Iowa counties, with the largest number, 187,

coming from Story County in which Iowa State College is located. The number from each county is shown in the outline map, Figure 1.

Although beyond the scope of this study, the factors contributing to the drawing power of Iowa State College for students in agriculture poses an interesting problem for future research. The relative importance of the following factors could be estimated: (1) distance of county from Ames, (2) number of farm youth or number of farms in the county, (3) availability of college within home county, (4) county farm standard of living and (5) value of farm land. No doubt many other factors related to drawing power could be postulated.

The major purpose of the Division of Agriculture is to serve the agricultural industry. As the nonfarming aspects of the agricultural industry expand, it becomes more and more apparent that many students will enroll who are not farm boys.

For purposes of this study, analyses were made with respect to place of residence by classifying type of community as farm, town, city. This classification conforms to that followed in the census of farm, rural, nonfarm and urban. A city, as here defined, is an incorporated community with a population of 2,500 or more persons and a town is one such incorporation with fewer than 2,500 persons. Information was assembled concerning residence at (1) college entrance, (2) first position and (3) present position. The questionnaire placed the responsibility for classification upon the respondent. The word farm was not described in the questionnaire and the adverb immediately was purposely omitted from the item concerning the residence before college entrance. As shown in Table 9, 62 per cent

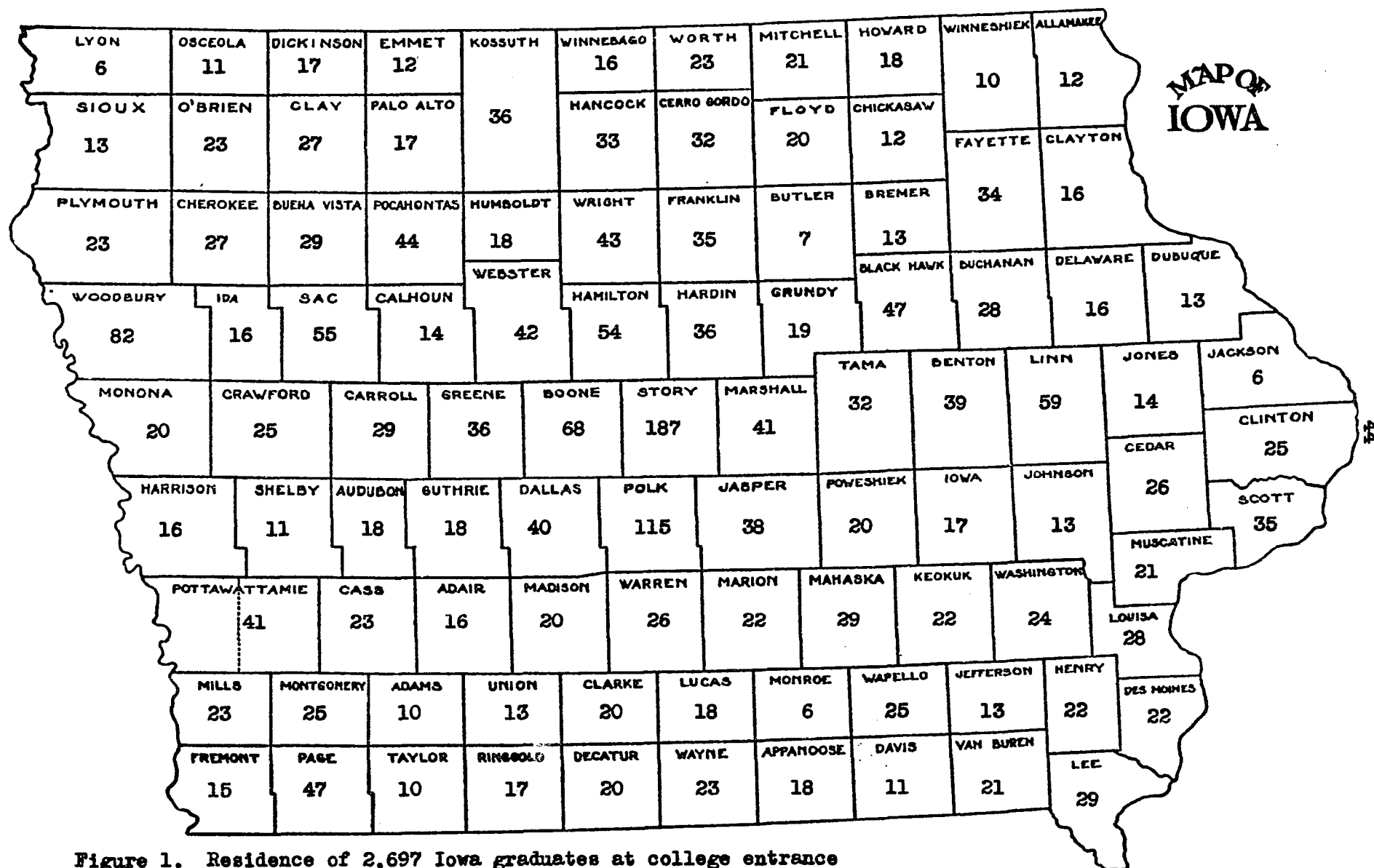




Table 9  
Residence of Graduates  
(Percentages)

Residence	Farm	Town	City	Military
College entrance	62	12	26	0
First position	14	28	54	4
Present position	20	18	56	6

of the 3,593 graduates reported farm residence, 12 per cent reported town residence and 26 per cent city residence prior to college entrance.

When these graduates were classified with respect to year of graduation, not here shown, a small decrease was noted in the percentage of graduates reporting farm rearing. The decrease of 4 per cent for this 21-year period is not so great as the decrease in Iowa farm population. The 1930 census shows Iowa's farm population to be 39 per cent of the total state population whereas the 1950 census shows 30 per cent living on farms. The percentage of graduates from towns and cities increased during the 21-year period. These percentages may be slightly biased by the number of married veterans who established residence in towns or cities prior to entering college. There may have been a sufficient number of such cases to offset the apparent decrease in the percentage of farm-reared students during the 1947-52 period.

The residences at the time of the first and present position were also solicited with the provision that if first position was in military service it should be ignored and the ensuing position reported. Because some recent graduates have been continuously in service since graduation, the first position in certain cases has been classified as military. The percentages classified as military, shown in Table 9, should not be interpreted as the percentage of the graduates who have been in military service at some time in their careers.

Of the farm boys who graduated in agriculture at Iowa State College, as shown in Table 9, one in every four returned directly to the farm upon graduation, although at present approximately one in every three is farming. This migration effect of a college education in agriculture under no

Table 10  
Residence of Graduates by Curriculum  
(Percentages)

Curriculum	Farm			Town			City			Military		
	B	F	P	B	F	P	B	F	P	B	F	P
Ag. Economics (202)	73	18	26	9	19	10	18	59	60	0	4	4
Ag. Education (459)	86	4	14	8	61	36	6	31	44	0	4	6
Ag. Engineering(307)	79	7	13	7	17	11	14	73	70	0	3	6
Agronomy (382)	78	15	23	8	27	20	14	54	51	0	4	6
Animal Husb. (682)	79	28	40	5	20	13	16	48	42	0	4	5
Dairy Husb. (109)	84	31	37	4	18	12	13	48	45	0	3	6
Dairy Industry (284)	37	3	8	22	14	13	41	82	76	0	1	3
Farm Operations(168)	74	42	37	8	16	15	19	27	31	0	15	17
Forestry (592)	24	5	5	23	39	25	53	51	62	0	5	8
Horticulture (124)	36	11	15	18	20	18	46	66	64	0	3	3
Land. Arch. (152)	27	4	7	13	14	3	60	80	87	0	2	3
Poultry Husb. (49)	33	18	25	31	29	22	37	49	47	0	4	6
Ag. Journalism (83)	59	0	0	17	17	6	24	72	78	0	11	16

Note: B - Before college, F - First position, P - Present position

circumstances should be considered an indictment of Iowa State College. It cannot be overemphasized that the agricultural industry is much broader than farming. Furthermore, the number of farm boys reaching maturity annually is much larger than the number of opportunities for farming resulting from death and retirement of farm operators. Certainly one major responsibility of Iowa State College consists of educating farm boys for the wide variety of vocational opportunities in the agricultural industry other than farming.

The residence of graduates varies from one curriculum to another as shown in Table 10. The proportion of farm-reared graduates varied from a low of 24 per cent in forestry to a high of 86 per cent in agricultural education. The curriculum in agricultural education almost demands farm background as a prerequisite. The migration from the farm is almost unanimous for graduates of this curriculum. Only one in every 25 graduates returned to the farm immediately after graduation although one in every seven graduates was living on a farm in 1952.

Perhaps the most interesting observation which can be made from Table 10 is the tendency to migrate to the farm from first to present position. In none of thirteen curricula was this migration tendency reversed. One possible explanation for this migration tendency may be traced to economic considerations. The initial financial outlay required to begin farming forces some graduates to delay entrance into farming for a few years until some capital can be accumulated.

## VII. PROGRESS TOWARD GRADUATION

Normal progress toward a college degree is usually thought of as matriculation in a chosen curriculum and subsequent graduation four years later from that same curriculum. There are some students who follow this pattern. On the other hand, many students, perhaps a majority, depart from this pattern. Several groups of students may be identified on this basis.

Some students who enter as freshmen in the Division of Agriculture never receive a baccalaureate degree from Iowa State College. This attrition group poses a distinct challenge which is currently receiving considerable attention at Iowa State College. Important though this attrition may be, it is beyond the scope of this study.

Some students who graduate from curricula in the Division of Agriculture transferred to Iowa State College from some other institution of higher education. Of the 3,593 graduates in this study, 1,165 persons, approximately one of every three, entered the Division of Agriculture after previous college work elsewhere. In the 21-year period the percentage has been increasing slightly which may have resulted from military assignment of students in higher education during World War II.

The list of graduates from the Division of Agriculture has been increased by transfers to agriculture from other divisions. Of the 3,593 graduates, 657 persons, or approximately one in every five has transferred to an agricultural curriculum from some other division at Iowa State Col-

lege. Approximately two in every three such transfers were from the Division of Engineering.

The large group of transfer students should not necessarily be interpreted to mean an inadequacy of the counseling at the secondary school level. Presumably, orientation into life activity should be continued into the college level. The vicariously acquired concept of the glamour of the engineering or medical profession, in certain cases, may become realistically evaluated after preliminary experience with curricula designed for these professional careers.

Some students who first enter the Division of Agriculture change from one curriculum to another. Here again such transfer within the Division of Agriculture should not necessarily be construed as unfortunate. In most cases, the change probably results from changes of student interests accruing from educational experience within the agricultural program at Iowa State College. The counseling service, no doubt, has been called into play in deciding changes from one curriculum to another.

In addition to curriculum changes which involved, in some cases, a loss in time required for graduation, many students have had their college education interrupted by work, military service and other reasons as shown in Table 11. Interruptions in college education resulting from military service were few in number prior to the graduating class of 1946, but since that time approximately two of every three students have had their college programs interrupted by military service.

Interruptions due to work, presumably in most cases resulting from lack of necessary financial resources, have been less numerous among recent graduates. The provision for financial assistance to veterans, no

doubt, has made possible continued education without the necessity of temporarily withdrawing in order to recoup financial resources.

If it is possible to postulate that the normal program of college education in agriculture consists of four years of uninterrupted education, without change of institutions or of curricula, the normal program has not

Table 11  
Interruptions in College Program

Period	N	Per cent not interrupted	Per cent interrupted by		
			Work	Military	Other
Depression 1932-1936	445	36	56		8
Pre-war 1937-1941	754	38	55		7
War 1942-1946	386	47	45	8	3
Post-war 1947-1952	2008	23	30	64	1
Total	3593	30	40	37	3

frequently occurred. Of the 3,593 graduates here studied, there were only 553 who entered a curriculum in agriculture at Iowa State College and four years later graduated from that same curriculum without interruption from work or military service. The postulated normal program of education in agriculture has been followed by approximately one in every seven graduates in agriculture at Iowa State College. Although the departure from a normal program has been more prevalent among recent graduates,

by no means has it been confined to such graduates. The percentages of graduates who followed the postulated normal education program for (1) the depression years (1932-1936) was 19 per cent, (2) the pre-war years (1937-1941) was 20 per cent, (3) the war years was 22 per cent and (4) the post-war years was 11.5 per cent.

No claim is here made that the postulated normal program is desirable. It may well be that graduates not following the normal program have profited by values accruing from greater maturity, from military service and from early-encountered college orientation.

The attainment of a baccalaureate degree is generally considered the end of formal college education. There are some graduates who continue in professional schools such as law, medicine, and veterinary medicine and others who continue in graduate schools seeking either master's or doctor's degrees or both.

Of the 3,593 graduates in this study, eleven individuals later received Doctor of Veterinary Medicine degrees and 392 others later received one or more earned graduate degrees, usually the M.S. or the Ph.D. degree. In the tabulation of the data, honorary degrees were so small in number that they were disregarded.

Of the 392 graduates who later received graduate degrees, 321 individuals received master's but not Ph.D. degrees and 71 have received the Ph.D. degree. The number of earned graduate degrees by year in which the baccalaureate degree was obtained is shown in Table 12. No apparent trend in the proportion of graduates who continue for advanced degrees can be noted in the 21-year period except some little decline in the last three



or four graduation classes for which insufficient time has elapsed for meeting the requirements for higher degrees.

Of the 3,593 graduates, as seen from Table 12, approximately one in every nine later received one or more earned graduate degrees, with one in every six prior to 1950. When classified by residence at time of col-

Table 12

## Earned Graduate Degrees by Year

Year	B.S. only	M.S. only	Ph.D.
1932	65	9	3
1933	79	12	4
1934	73	14	3
1935	75	14	5
1936	73	15	1
1937	36	4	2
1938	147	17	5
1939	169	13	7
1940	156	17	6
1941	135	21	3
1942	135	13	5
1943	109	19	8
1944	27	2	0
1945	16	3	1
1946	39	8	1
1947	144	20	8
1948	204	25	4
1949	300	42	3
1950	459	17	0
1951	399	16	0
1952	361	6	0
Total	3201	321	71

lege entrance, the same ratio occurred for both farm and non-farm reared individuals. For the 392 who hold graduate degrees, there appeared to be a larger proportion acquiring such degrees at Iowa State College among farm reared than among non-farm reared individuals as shown in Table 14.

Chi square was found to be 0.75 which is nonsignificant. Evidence here assembled failed to disprove the hypothesis that graduate education at Iowa State College or elsewhere is independent of farm or non-farm rearing.

The 3,593 individuals were classified with respect to their undergraduate curricula, as shown in Table 14. The percentage holding graduate

Table 13

Farm Rearing of Individuals Holding Graduate Degrees from  
Iowa State College and Other Institutions

Institution	Farm reared	Non-farm reared	Total
Iowa State College	126	73	199
Other	115	78	193
Total	241	151	392

degrees was highest for agricultural economics and lowest for farm operations. The small number from the farm operations curriculum holding graduate degrees is not unexpected in view of the short time this curriculum has been established and the general objectives for which this curriculum has been designed.

Among those holding the Ph.D. degree, two in every three have completed one of four undergraduate curricula, i.e., agricultural economics, agricultural education, agronomy or animal husbandry. Among those holding the M.S. degree only, the proportion obtaining such a degree from Iowa State College varies depending upon the undergraduate curriculum completed. The highest proportions receiving the M.S. degree from Iowa State College

were in agricultural education, agricultural engineering and agronomy.

In the foregoing interpretations, it should be noted that the 170 M.S. degrees and 29 Ph.D. degrees granted by Iowa State College yield little or no information concerning the total number of graduate degrees granted in agriculture at Iowa State College during this 21-year period

Table 14

## Earned Graduate Degrees by Undergraduate Curriculum

Curriculum	Graduate degree						No graduate degree	
	Ph.D.		M.S. only		Total		degree	
	I.S.C.	Other	I.S.C.	Other	N	%	N	%
Ag. Econ.	6	3	14	20	43	31	159	79
Ag. Educ.	5	4	29	9	47	10	412	90
Ag. Eng.	2	0	31	12	45	15	262	85
Agronomy	4	7	22	7	40	10	342	90
Animal Husbandry	4	13	21	25	63	9	619	91
Dairy Husbandry	1	4	3	7	15	14	94	86
Dairy Industry	1	1	5	16	23	8	261	92
Farm Oper.	0	0	2	2	4	2	164	98
Forestry	5	3	29	36	73	12	519	88
Horticulture	1	5	3	10	19	15	105	85
Land. Arch.	0	0	4	2	6	4	146	96
Poultry Husb.	0	1	1	2	4	8	45	92
Ag. Journalism	0	1	6	3	10	2	73	88
Total	29	42	170	151	392	11	3201	89

or any other period. The present study includes only those individuals who received the bachelor of science degree in agriculture from Iowa State College from 1932 to 1952 inclusive. Individuals receiving graduate degrees in agriculture were not included in this study if the baccalaureate degree was obtained elsewhere or if the bachelor's degree was received at Iowa State College prior to 1932.

## VIII. OCCUPATION OF GRADUATES

Satisfactory post-college occupational adjustment is a major consideration in evaluating a college education. Selection of an occupation, satisfying to the individual and contributing toward maximum social well-being, is of vital interest to students and faculty in institutions of higher education.

Each of the 3,593 graduates was asked to state his occupation, both present and first after graduating. When the returns were received, the classification of reported occupations needed to be tabulated. Since mechanical tabulation was thought necessary in this study, no more than two columns on the card were believed justified. The occupations were then divided into ten major occupational categories which were in turn further classified into not more than ten occupations, as shown in Table 15. The classification here chosen represents an attempt to summarize the occupations in which graduates engage for the entire division regardless of suitability for any single curriculum. The small numbers of cases in the last four categories, i.e., farm services, nonfarm services, nonprofit organizations, and others, suggest that they be combined into a single category designated as others. Subsequent analysis has followed this procedure although occupational heterogeneity of this category renders interpretation vague if not impossible.

No apology is made for the general occupation classification here chosen. Perhaps, if the analyses were to be made again the classification would be:

Table 15

## Present Occupation of Graduates

Occupation	N	Occupation	N
Education (470)		Commercial agriculture concerns (968)	
High school voc. ag.	179	Plant manager (in field)	256
Other high school teacher	16	Plant manager (other field)	2
Veterans classes	123	Production (in field)	206
College agriculture	108	Loans, insurance, appraisal	40
College others	5	Sales	244
College administration	4	Buyer	36
Research	30	Adv. and Journ., Radio, TV	78
Education-county, state, fed.	5	Area supervisor	23
		Research	74
		Others	9
Extension (175)		Commercial non-ag. concerns (123)	
Federal extension service	1	Management	9
State extension service	65	Engineering	30
County extension director	76	Production	3
County youth assistant or assistant county director	33	Insurance or loan	19
		Sales	19
Government services (470)		Buyer	3
U.S.D.A.	38	Adv. and Journ., Radio, TV	21
S.C.S.	107	Research	3
F.H.A.	27	Others	16
R.E.A.	1		
Point Four or other foreign service	7	Miscellaneous small business (205)	
Agriculture official (state)	55	Agriculture retail	4
Non-agric. official (state)	12	Agriculture wholesale	3
U.S. Forest Service, other forest agency, adm. and research	159	Flower shop, nursery, greenhouse	20
City or county employee	38	Implement dealer	23
Others	26	Other store	12
		Banking	15
Productive agriculture (702)		Land appraisal	4
Farming or ranching	542	Feed, seed, fertilizer, lumber store, elevator	28
Farm or range management	120	Landscape architecture	33
Nursery	20	Others	63
Greenhouse	5	Farm services (10)	
Commercial seed	1	Farm loan services, appraisal	1
Orchard	6	Veterinarian	8
Poultry enterprise	7	Other farm service organizations	1
Others	1		

Table 15  
(Continued)

Occupation	N	Occupation	N
Non-farm services (22)		Others (391)	
Non-agriculture services	1	Graduate student	88
Milk inspector	21	Unemployed	2
		M.D.	1
Non-profit organization (57)		Minister	9
Farm Bureau official	33	Disabled or retired	3
Farmers Union official	1	Housewife	21
Cooperatives official	1	Military	267
Dairy Association official	9		
Poultry Association official	3		
Beef Association official	1		
Other association official	3		
Misc. Non-profit organization	6		

1. College teaching (147)
2. Other school teaching (318)
3. Extension work (175)
4. Farming (702)
5. Small business (205)
6. Management (267)
7. Sales and buying (302)
8. U. S. Forestry Service (159)
9. Other government service (311)
10. Others (1,007)

where the number of cases is shown within the parentheses. This latter classification is open to question because of the large number of cases classified as others. Regardless of which of the two foregoing classifications should be used, evaluation of any given curriculum in terms of occupations is unsatisfactory.

Graduates in the eight general occupational groups were classified according to the curriculum from which they had graduated, as shown in Table 16. Some changes were noted between beginning and present occupation. This tendency to change occupation no doubt is underestimated because many individuals have been so recently graduated that they have had little opportunity to change from one occupation to another.

Several shifts between first and present occupation are clearly evident even though many persons are recent graduates. Perhaps the most striking of these shifts can be seen in the number engaged in farming. Of the 3,593 graduates, 483 individuals returned to the farm directly upon graduation from college but by 1952, 702 graduates were farming. This migration tendency, as previously indicated, may have resulted from inadequate capital for immediate induction into farming. Although no evidence has here been assembled, it is a suggested postulation that many of the 219 graduates were delayed in entering farming until sufficient capital was accumulated.

Table 16

## First and Present Occupation by Curriculum

Occupation		N	Ag. Econ. (202)	Ag. Ed. (459)	Ag. Engr. (307)	Agron. (382)	A.H. (682)	D.H. (109)	D.I. (284)	F.Op. (168)	For. (592)	Hort. (124)	L.A. (152)	P.H. (49)	Ag. Journ. (83)
Education	1st	643	34	357	27	62	88	12	11	23	16	5	1	5	2
	Now	470	29	208	22	46	81	14	11	14	23	11	4	4	3
Extension	1st	313	17	19	9	46	149	28	3	7	8	9	0	5	13
	Now	175	11	23	9	25	62	15	4	5	4	5	0	2	10
Government service	1st	584	30	2	61	63	29	5	2	7	299	4	79	2	1
	Now	470	18	13	43	63	28	4	5	8	221	2	62	2	1
Productive agriculture	1st	483	40	15	16	61	195	24	7	76	6	26	10	7	0
	Now	702	61	62	36	88	262	33	19	76	22	20	12	11	0
Commercial agriculture	1st	1057	56	22	169	101	137	18	222	14	198	47	7	21	45
	Now	968	46	50	146	96	118	17	192	14	192	34	7	17	39
Commercial non-agric.	1st	88	4	7	10	6	11	2	2	3	23	3	4	0	13
	Now	123	1	9	11	7	22	3	6	4	34	6	7	2	11
Small business	1st	96	5	1	4	4	14	0	2	1	10	12	41	2	0
	Now	205	15	14	14	9	28	0	15	3	38	21	41	4	3
Others	1st	329	16	36	11	39	59	20	35	37	32	18	10	7	9
	Now	480	21	80	26	48	81	23	32	44	58	25	19	7	16



Another noticeable shift from first to present position was among graduates who were engaged in small business. On the other hand, certain initial occupations seem to serve as stepping stones to later occupations. In this respect, the migration from education, extension and government service is particularly noticeable. This migration tendency away from occupations in which security risk is a minimum needs careful study by economists as well as by individuals in higher education.

Each of the thirteen curricula in the Division of Agriculture at Iowa State College has been designed to provide the necessary education for initial induction into one or more occupations. The general occupational classification here used becomes impotent for use with any given curriculum. A graduate of the forestry curriculum would not likely be later employed as a livestock buyer or as a creamery manager. Each curriculum, no doubt, has been developed to provide for certain specific occupational competencies. The general occupational classification, suitable though it may be for the entire Division of Agriculture, is unsatisfactory for any evaluation of a single curriculum.

Faculty members familiar with the faucets of occupational endeavor for each of the curricula were asked to assist in designing an occupational classification unique to that curriculum. The discussion of occupations will be focused around the curricula. Interpretation of separate curriculum occupational classification will demand constant reference to information shown in Tables 15 and 16.

### A. Agricultural Economics Curriculum

The 202 responding graduates of the agricultural economics curriculum were engaged in many different occupational pursuits in 1952, as shown in Table 17. Approximately one graduate in every five was farming although approximately one-half of that ratio had been farming immediately after

Table 17

#### Occupation of Graduates from Agricultural Economics Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Education	34	16.8	29	14.4
Extension	17	8.4	11	5.4
Farming	21	10.4	43	21.3
Farm management	20	9.9	20	9.9
Bank, appraiser, etc.	26	12.9	21	10.4
Government service	29	14.4	17	8.4
Service organization	1	0.5	3	1.5
Industry	34	16.8	30	14.9
Business	6	3.0	11	5.4
Others	14	6.9	17	8.4
Total	202	100.0	202	100.0

graduation. It is surprising to note that only 17 of the 202 graduates of this curriculum were in government service in 1952.

### B. Agricultural Education Curriculum

The agricultural education curriculum has been designed for the preparation of teachers of vocational agriculture. Immediately after gradua-

tion 300 of the 459 individuals completing this curriculum became teachers of vocational agriculture, as shown in Table 18. However, in 1952 only 167 were teaching in such positions. This high occupational mortality seems unduly large when it is noted that more than one-half of the graduates of this curriculum received degrees during the last four years of

Table 18

## Occupation of Graduates from Agricultural Education Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
High school vocational agriculture	300	65.4	167	36.4
Other high school	7	1.5	10	2.2
Veterans classes	45	9.3	20	4.3
College teaching	7	1.5	14	3.0
Agricultural organizations	3	0.7	21	4.6
Extension or experiment station	18	3.9	21	4.6
Farming	14	3.0	61	13.3
Government	5	1.1	13	2.8
Business or industry	28	6.1	72	15.7
Others	32	7.0	60	13.1
Total	459	100.0	459	100.0

the 21-year period studied. Perhaps some possible reasons for this high mortality may be suggested in analyses dealing with income, appearing later in this thesis. The shift from first to present position in farming may represent an accumulation of capital either in the form of cash or credit from experience in the teaching of vocational agriculture.

Of the 3,593 responding graduates, 117 were in college work in 1952. Only 14 of these individuals were in agricultural education, no more than

the proportion found among the graduates in the entire Division of Agriculture. In one respect at least it is surprising to have found fourteen college teachers whose undergraduate curriculum was agricultural education. Most college teachers receive institutional subsidies when taking graduate work required for placement in college positions. These subsidies are granted to graduate assistants, research fellows, and instructors. Thirteen per cent of the graduates in the Division of Agriculture have followed the agriculture education curriculum. The percentage of subsidies channelled to agricultural education graduate students has been far below the practice in the Division of Agriculture. Among the fourteen college teachers whose undergraduate curriculum was agricultural education, although information was not obtainable from the questionnaire, at least one-half of the fourteen college teachers have been subsidized by Iowa State College. In most cases these subsidies have been channelled through other budgets than the department responsible for the undergraduate agricultural education curriculum. In most cases subsidies which have been granted to graduates of this curriculum have been in the Psychology, Agricultural Engineering and Agronomy Departments. Such outside subsidies, useful though they may be from a student's financial situation, should receive careful consideration from the standpoint of a student's professional competence.

### C. Agricultural Engineering Curriculum

Graduates of the agricultural engineering curriculum were in a variety of occupations in 1952, with positions in the farm equipment industry

prevailing. About one in every ten graduates was classified in education in 1952, as shown in Table 19. Approximately one in every eighteen graduates entered farming directly upon college graduation although one in nine graduates was farming in 1952. This tendency to shift to farming is

Table 19

## Occupation of Graduates from Agricultural Engineering Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Education	36	11.7	31	10.1
Farm equipment industry	130	42.3	119	38.8
Farm structures	16	5.2	17	5.5
Soil and water conservation	50	16.3	38	12.4
Farm operation or management	17	5.5	33	10.7
Rural electrification	10	3.3	7	2.3
U.S.D.A. (not including S.C.S.)	7	2.3	3	1.0
Industry related to agriculture	14	4.6	10	3.3
Business	9	2.9	16	5.2
Others	18	5.9	33	10.7
Total	307	100.0	307	100.0

not unique to the agricultural engineering curriculum but prevails in the other twelve curricula studied.

## D. Agronomy Curriculum

The 382 responding graduates of the agronomy curriculum were widely distributed among a variety of occupations as shown in Table 20. Farming represented a plurality although government service, education and industry were not far removed in frequency of occurrence.

It was interesting to note that this curriculum provided more extension personnel than agricultural education although the total number of graduates was smaller. The number of graduates in education, approximately one in every eight, most of whom were engaged at the college level was much higher than the average for the entire Division of Agriculture.

Table 20

## Occupation of Graduates from Agronomy Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Education	64	16.7	45	11.8
Farming (operator)	39	10.2	67	17.5
Farming (manager)	19	5.0	20	5.2
Government service	65	17.0	64	16.7
Bank, appraiser, etc.	14	3.7	16	4.2
Extension	45	11.8	26	6.8
Hybrid seed corn company	42	11.0	32	8.4
Industry	53	13.9	56	14.7
Business	5	1.3	9	2.4
Other	36	9.4	47	12.3
Total	382	100.0	382	100.0

Perhaps this finding is a function of the amount of available graduate student subsidy. The shift toward farming and away from extension work, as shown in Table 20, was not greatly dissimilar to that prevailing throughout the Division of Agriculture.

#### E. Animal Husbandry Curriculum

There have been, during the 21-year period, more graduates at Iowa State College from the animal husbandry curriculum than from any one of the other twelve curricula. Although the occupational distribution in 1952 was diversified, more than one in every three was engaged in farming. Of particular interest is the contribution of this curriculum for immediate induction into the extension service and the subsequent shift from this work to other occupations by 1952. In spite of this drastic shift the proportionate number in extension work in 1952 was exceeded only by graduates of the dairy husbandry and agricultural journalism curricula.

#### F. Dairy Husbandry Curriculum

Of the 109 responding graduates in dairy husbandry, the greatest single occupational outlet upon graduation was in extension service as shown in Table 22. However, by 1952 a shift was noted away from extension service and toward farming. The occupational distribution for graduates of this curriculum was similar to that for graduates of the animal husbandry curriculum.

#### G. Dairy Industry Curriculum

Of the 284 responding graduates in dairy industry, as shown in Table 23, the majority were working in some capacity in dairy plants, with 107 serving as managers or directors. Relatively few graduates were engaged in educational work either teaching or extension and only one in every

Table 21

## Occupation of Graduates from Animal Husbandry Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Farming (owner, operator, or manager)	194	28.4	259	38.0
Teaching	89	13.1	83	12.2
Extension	150	22.0	65	9.5
Meat packing or related industry	82	12.0	55	8.1
Breed organizations	9	1.3	9	1.3
Journalism or radio	13	1.9	14	2.0
Government service	24	3.5	25	3.7
Feed industry	25	3.7	27	4.0
Business	44	6.5	69	10.1
Other	52	7.6	76	11.1
Total	682	100.0	682	100.0

Table 22

## Occupation of Graduates from Dairy Husbandry Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Farming	20	18.3	30	27.5
Farm management	5	4.6	5	4.6
Education	14	12.8	13	11.9
Extension	26	23.9	16	14.7
Government service	5	4.6	4	3.7
Breed or service organization	6	5.5	6	5.5
Artificial insemination, dairy inspector	5	4.6	4	3.7
Business or industry	20	18.3	18	16.5
Armed forces	5	4.6	10	9.2
Other	3	2.8	3	2.7
Total	109	100.0	109	100.0



ten was farming. There was a minimum of overlapping in occupational pattern with other curricula.

#### H. Farm Operations Curriculum

Of the 168 responding graduates in this curriculum, more than half were graduates of 1951 and 1952. The first graduate of this curriculum was in 1945. The recency of graduation accounts for the similarity in occupational pattern of first positions and of 1952 positions as shown in Table 24. It is not surprising to note a high proportion, almost one in every five, in military service. More confidence could be placed in the occupational pattern for this curriculum if analyzed five or ten years hence when occupational pattern becomes more stable and when those in military service return to civilian life. Farming predominated as the occupational outlet for this curriculum with more than half of the graduates not in military service operating or managing farms.

#### I. Forestry Curriculum

In the 21-year period, there have been more graduates from this curriculum than from any other except from animal husbandry. The occupational pattern for forestry graduates differed from that shown for other curricula. For all practical purposes, graduates in forestry have not gone into farming.

The greatest single occupational outlet for forestry was in the federal forest service. Of the 592 responding graduates, 222 were in such service immediately after graduation and 156 were in such service in 1952.

Table 23

## Occupation of Graduates from Dairy Industry Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
College teaching	6	2.1	13	4.6
Research, state and commercial	9	3.2	8	2.8
Extension	5	1.8	6	2.1
Inspectors, city, state, federal	27	9.5	24	8.5
Sales work	24	8.5	23	8.1
Owners of dairy plants	7	2.5	18	6.3
Manager or director of dairy plant	64	22.5	107	37.6
Other positions in dairy plant	97	34.1	29	10.2
Farming	31	10.9	24	8.5
Others	14	4.9	32	11.3
Total	284	100.0	284	100.0

Table 24

## Occupation of Graduates from Farm Operation Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Education	22	13.1	13	7.7
Farming (operator)	59	35.1	59	35.1
Farm (manager)	15	8.9	16	9.5
Government services (not military)	7	4.2	7	4.2
Bank, appraiser, etc.	2	1.2	3	1.8
Education (extension)	9	5.3	7	4.2
Armed forces	27	16.1	31	18.5
Industry	19	11.3	20	11.9
Non-profit organization	3	1.8	3	1.8
Graduate students	5	3.0	9	5.3
Total	168	100.0	168	100.0

This shift away from federal forest service toward positions in private industry dealing with forest management or forest products is apparent from an inspection of Table 25.

#### J. Horticulture Curriculum

From the standpoint of number of graduates this curriculum is among the smallest. Of the 124 replying graduates, the majority were in occupations for which the curriculum has been designed, as shown in Table 26. Approximately one in every nine graduates in 1952 was in teaching, extension or research.

#### K. Landscape Architecture Curriculum

The two largest outlets for graduates in landscape architecture were city and regional planning and private practice. Immediately after graduation 34 individuals entered park and recreational planning but by 1952 only 17 were so employed. This shift from park and recreational planning was toward varied occupations classified as others which are not directly related to the usual occupations for which this curriculum has been designed. The occupational distribution is shown in Table 27.

#### L. Poultry Husbandry Curriculum

Most graduates in poultry husbandry entered occupations for which the curriculum has been designed, as shown in Table 28. A shift was noted by 1952 toward farming. Care must be taken in interpreting occupational

Table 25  
Occupation of Graduates from Forestry Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Public service	(311)	(52.5)	(238)	(40.2)
Education (including extension)	23	3.9	27	4.6
Forest service (federal)	222	37.5	156	26.4
Forestry and conservation (state-county-municipal)	62	10.5	50	8.4
Federal agencies other than Forest Service	4	0.7	5	0.8
Private industry	(200)	(33.8)	(209)	(35.3)
Forest management positions	35	5.9	51	8.6
Harvesting and manufacturing of forest products	114	19.2	93	15.7
Wholesale or retail of forest products	51	8.6	65	11.0
Non-forestry	(81)	(13.7)	(145)	(24.5)
Farming	6	1.0	17	2.9
Engineering	20	3.4	26	4.4
Other	55	9.3	102	17.2
Total	592	100.0	592	100.0

Table 26

## Occupation of Graduates from Horticulture Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Orchardist (owner, operator)	9	7.3	8	6.5
Nursery (owner, operator)	8	6.5	10	8.1
Greenhouse or florist	22	17.7	20	16.1
Farming (including vegetable)	10	8.1	6	4.8
Extension or research	11	8.9	7	5.6
High school or college teaching	3	2.4	8	6.5
Industry - horticulture	33	26.6	19	15.3
Industry - not horticulture	6	4.8	11	8.9
Own business - not horticulture	3	2.4	8	6.5
Others	19	15.3	27	21.7
Total	124	100.0	124	100.0

Table 27

## Occupation of Graduates from Landscape Architecture Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Education	2	1.3	5	3.3
City planning and regional planning	44	28.9	45	29.6
Parks and recreational planning	34	22.4	17	11.2
Private practices (in field)	43	28.3	40	26.3
With nurseries	2	1.3	0	00.0
Highway improvement planning	8	5.3	2	1.3
Business (allied)	7	4.6	18	11.8
Sales	0	0.0	1	.7
Others	12	7.9	24	15.8
Total	152	100.0	152	100.0

Table 28

## Occupation of Graduates from Poultry Husbandry Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Education	5	10.2	4	8.2
Extension	7	14.3	4	8.2
Poultry production	1	2.0	2	4.1
Hatchery	12	24.5	10	20.4
Farming	7	14.3	11	22.4
Poultry processing	4	8.2	2	4.1
Service organizations	5	10.2	4	8.2
Industry	5	10.2	6	12.2
Business	0	00.0	1	2.0
Others	3	6.1	5	10.2
Total	49	100.0	49	100.0

Table 29

## Occupation of Graduates from Agricultural Journalism Curriculum

Occupation	<u>First position</u>		<u>Present position</u>	
	N	%	N	%
Teaching	2	2.4	3	3.6
Advertising	16	19.3	18	21.7
Magazine (other than advertising)	12	14.5	14	16.9
Radio (other than advertising)	5	6.0	4	4.8
Television (other than advertising)	2	2.4	1	1.2
Newspapers (other than advertising)	20	24.1	10	12.0
Information - industry	2	2.4	4	4.8
Information - government	14	16.9	11	13.3
Business	1	1.2	3	3.6
Others	9	10.8	15	18.1
Total	83	100.0	83	100.0

pattern for this group since there were but 49 graduates for whom occupations were available.

#### M. Agricultural Journalism Curriculum

Graduates in agricultural journalism with few exceptions have been employed in occupations for which the curriculum has been designed, as shown in Table 29. Advertising was most frequently reported. Graduates, in general, are concerned with one or more of the media of communications. A shift away from newspaper work is noted between the first and 1952 occupation.

## IX. INCOME OF GRADUATES

All institutions of higher education are challenged by the justification for the programs of education which they provide. Standards for evaluation of the effectiveness of such institutions are not easily found. Even when such standards have been identified, the relative weight to be assigned to each standard cannot be guaranteed either by statistical computation or by consensus of competent authorities. Certain standards of evaluation, traditionally considered in evaluating colleges and universities by accrediting bodies, are difficult to defend. Some of the more common standards are: (1) percentage of faculty holding the Ph.D. degree, (2) contributions to scholarly periodicals, yearbooks, research bulletins and textbooks, (3) library facilities, (4) amount of endowment, et cetera. No doubt each of these evidences may be related to institutional effectiveness but none can be considered to directly evaluate such effectiveness.

During the past three decades emphasis on evaluation has shifted from what an institution offers to the kind of product the institution delivers. This transition has not made less acute the problem of ascertaining institution effectiveness. Differences in points of view will still exist depending upon whether evaluation is made with respect to all students entering a program or to those who have received a baccalaureate degree. This study has been limited to an evaluation based upon those who received a bachelor of science degree, ignoring the effectiveness or lack of effectiveness in terms of student attrition or in terms of student election of a terminal curriculum not primarily designed for the degree-bound student.



The limitation in this study to individuals who were granted bachelor of science degrees was made in the interest of feasibility and economy. This limitation should not be interpreted to mean that former students who were not graduated are unimportant in any complete evaluation of effectiveness of higher education. Studies dealing with students electing nondegree curricula and those who drop out of school might well be two companion studies to the one here reported.

This study, as previously indicated, is limited to students who received the baccalaureate degree upon successful completion of any of thirteen agricultural curricula at Iowa State College in the period from 1932 to 1952, inclusive. Evaluation in terms of such graduates immediately posed the question of objectives of agricultural college training. Do the same objectives prevail when formulated by the student, by the college faculty, by the college administrative officers, or by the lay public? It is probable that considerable differences in opinion may exist among these groups concerning the relative importance of various objectives. An agreement could probably be reached on the frame of reference that the college education of an individual should contribute to himself and to society.

No effort has been made in this study to ascertain the effectiveness of a college education in terms of benefits to society unless such effectiveness is reflected in rewards to individuals. This limitation should not be construed to minimize the responsibility of the college graduate to society. Rewards to the individual may accrue in the form of salary, scenery and satisfaction. The first of these, apparently, is the most important to the college student whereas the graying college professor

will likely think in terms of the biblical expression, "faith, hope and charity, but the greatest of these is charity". It is beyond the purpose of this study to attempt to evaluate the weight that should be given to each of these three aspects of rewards to the individual.

This study was limited to economic returns to the graduates. Many graduates receive income from their major job and also from other sources. Only the former was used for purposes of this study. The questionnaire included items concerning income from major job and income from other sources. By such procedure it was thought that response to the former would tend to minimize the reporting of income from investments as income from major job. The annual income information, later to be presented, has been defined as income from major job.

Of the 3,593 graduates who returned questionnaires, 3,115 graduates (87 per cent) furnished income information. The total income was \$16,413,000 with a mean of \$5,269 and a median of \$4,586. There were many more graduates of recent years than of early years during the 21-year period. More than one-half of the graduates received the bachelor of science degree since World War II. Many of the recent graduates were in graduate schools at the time the data were collected. Of the 3,115 graduates reporting 1952 incomes, 111 graduates earned less than \$2,500 which in many cases represented income from fellowships and part time teaching assignments accompanying further education toward advanced degrees. The mean income, likewise, may be misleading unless interpreted in the light of the disproportionate number of graduates since World War II who are in the process of occupational establishment.

### A. Income and Year of Graduation

It is common knowledge that the average income of college graduates in any given year is a function of the number of years since graduation. In this study, as shown in Table 30, the mean income varied from \$3,651 for the first year after graduation, i.e., 1952, to \$8,003 for the sixteenth year after graduation, i.e., 1937. When the mean incomes were plotted by year of graduation an upward trend in income was apparent depending upon the number of years since graduation. Inspection of the graph suggested a straight line trend, i.e., income increases a constant amount from one year to the next regardless of the number of years since graduation.

A straight line trend as indicated by the equation of a straight line,

$$Y = aX + C,$$

was found from the weighted mean income by number of years since graduation by the method of least squares. The resulting equation was

$$Y = 202.5907X + 3582.46$$

where Y is the predicted mean income and X is the number of years since graduation. This equation, indicating a mean annual increment of \$202.59 for each year since graduation, was solved for one to twenty-one years since graduation, yielding predicted mean incomes shown in Table 30.

A comparison of these predicted earned income means with actual means within the 21-year period suggests that a linear relationship is a reasonably satisfactory assumption. It can be seen, however, that this linear equation by interpolation within the 21-year period tends to overestimate for recent and early graduates and to underestimate for those graduating

Table 30

Actual and Predicted Mean Income on 1952 Standards  
and Number of Years Since Graduation

Years since graduation	Year graduated	N	Actual mean income	Mean income predicted by equation	
				Linear	Quadratic
1	1952	233	\$3651	\$3785	\$3594
2	1951	329	3849	3988	3878
3	1950	428	4168	4190	4152
4	1949	316	4418	4393	4416
5	1948	212	4646	4595	4671
6	1947	160	5236	4798	4916
7	1946	45	5140	5001	5152
8	1945	15	4900	5203	5377
9	1944	24	5275	5406	5593
10	1943	124	5183	5608	5800
11	1942	140	5938	5811	5996
12	1941	145	5853	6014	6184
13	1940	161	5851	6216	6361
14	1939	179	6586	6419	6529
15	1938	162	7432	6621	6687
16	1937	37	8003	6824	6835
17	1936	79	7980	7027	6974
18	1935	89	7280	7229	7103
19	1934	77	6594	7432	7222
20	1933	86	7566	7634	7332
21	1932	74	6508	7835	7432
30				9863	7897
35				10673	7717
40				11686	7495

during the middle years included in this study. This linear equation appears entirely inappropriate for purposes of extrapolation beyond twenty-one years. It is scarcely conceivable that the mean income, as here defined, would approximate \$11,686, as shown in Table 30, for graduates of 1913 who were graduated forty years ago.

It also seems likely that the greater demand for younger men for salaried positions would suggest the annual mean income increment would not be a constant \$202.59 but would be greater than this amount for recent graduates and would become successively smaller until the annual increment would become zero, followed by negative values. If there is merit in this point of view, a quadratic rather than a linear equation is indicated.

A quadratic equation as indicated by  $Y = a_1X^2 + a_2X + C$  was found by the method of least squares from the weighted mean earned income and number of years since graduation. The resulting equation was

$$Y = -4.8353 X^2 + 298.2733X + 3300.55 .$$

This equation was solved for various numbers of years since graduation and the predicted mean incomes are shown in the last column of Table 30. With the 21-year period the annual increments are unequal, varying from \$284 between the first and second years to \$100 between twentieth and twenty-first years.

The choice of a quadratic rather than a linear equation seems justified by theory. In many situations no a priori knowledge permits such a decision. The usual procedure then followed is to test the significance

of the advantage of quadratic over linear regression.<sup>1</sup> Such a test was made yielding a t-value of 6.18 which is significant far beyond the 1 per cent level. Even for purposes of interpolation within the 21-year period, the quadratic is more satisfactory than the linear equation.

For purpose of extrapolation beyond the 21-year period, the quadratic yields more realistic estimates than the linear equation. An inspection of predicted mean incomes shown in Table 30 indicates that a maximum is reached between 30 years and 31 years after graduation. To determine the maximum mean annual earned income as indicated by the quadratic equation, the right-hand member of the equation was differentiated with respect to X and the first derivative set equal to zero. Upon solution, X was found to be 30.845 years. Thus the quadratic equation, here developed, suggests that the mean annual income reaches a maximum of \$7900 at 30 years and 10 months after graduation.

Within the 21-year period the quadratic and linear equation yielded two points of identical prediction. To determine these two points the expressions for quadratic and linear prediction were set equal to each other, i.e.,

$$202.5907X + 3582.46 = -4.8353X^2 + 298.2733X + 3300.55.$$

When this quadratic equation is solved, the two values of X are 3.6 years and 16.2 years. Thus, for men who have graduated either 3.6 or 16.2 years ago the quadratic and linear equations yield identical estimates of mean income. With years since graduation of less than 3.6 and more than 16.2,

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<sup>1</sup>This method and other statistical procedures used in predicting mean annual earned income are described in "Nonlinear Regression" in Wert, James E., Neidt, Charles O. and Ahmann, J. Stanley. Statistical Methods in Educational and Psychological Research. New York, Appleton-Century-Crofts. In press.

linear prediction is higher than the quadratic prediction. With years since graduation between 3.6 and 16.2, quadratic prediction is higher than linear prediction. When the foregoing formula is simplified, differentiated and the first derivative set equal to zero, the maximum discrepancy of higher prediction for quadratic than for the linear equation occurs at 9.9 years after graduation. For linear regression, the prediction is \$5588; and for quadratic regression, it is \$5780, a discrepancy of \$192 being noted at 9.9 years since graduation.

It should be noticed that all of the foregoing predictions are based upon mean rather than median annual incomes. Caution must be used in making interpretation in terms of the typical graduate. Except in unusual cases, the mean value is higher than the median. The discrepancy tends to become larger as the number of years since graduation increases. This discrepancy also varies depending upon the curriculum elected by the graduate and the occupation in which the graduate engages.

#### B. Income and Curriculum

Graduates, faculty and students are interested in financial returns reported by graduates of individual curricula. Several pertinent analyses can well be made. One such analysis is to indicate the number of graduates needed to include one graduate with an annual income in excess of \$10,000. There were 177 graduates reporting incomes greater than \$10,000. Of this number, 48 graduated from the animal husbandry curriculum. Only the poultry husbandry curriculum failed to provide any reported income above \$10,000 but there were only 38 from this curriculum providing income

information. The curricula have been arranged in the order of the relative frequency of \$10,000 or greater incomes. For the entire group, without curriculum classification, there was one \$10,000 or greater income for every 18 graduates. The number in parentheses following the curriculum indicates the number of graduates necessary to provide one graduate with an annual income of \$10,000 or more.

Agricultural Journalism (8)	Dairy Industry (15)
Agricultural Economics (11)	Agronomy (19)
Animal Husbandry (12)	Forestry (24)
Agricultural Engineering (13)	Agricultural Education (59)
Dairy Husbandry (13)	Farm Operations (60)
Horticulture (14)	Landscape Architecture (60)

A word of warning may be useful in the interpretation of this information. More than one-half of the graduates have received degrees since World War II. These recent graduates have had little opportunity to reach that stage of occupational establishment which will provide \$10,000 incomes. The probability of a graduate making at least \$10,000 at some time in his career, no doubt, is greater than suggested by the foregoing information for the various curricula.

Another analysis of salary by curriculum is shown in Table 31. A frequency distribution together with the median and mean incomes is shown. The median is the income above which and below which half of the cases lie. The lowest median income of \$4020 was for graduates of the farm operations curriculum and the highest of \$5090 was for graduates of the agricultural journalism curriculum. The median income was smaller than



Table 31  
Annual Earned Income for Graduates from Various Curricula

Curriculum	N reports	Less than 4000	4000- 4999	5000- 5999	6000- 6999	10,000 or more	Median	Mean
Ag. Economics	170	38	38	33	45	16	\$5040	\$5609
Ag. Education	412	47	259	63	36	7	4550	4679
Ag. Engineering	281	54	85	55	65	22	5000	5640
Agronomy	348	90	128	61	51	18	4490	5525
An. Husbandry	578	110	177	110	133	48	5000	5766
Dairy Husbandry	94	23	29	16	19	7	4560	5091
Dairy Industry	258	44	73	50	74	17	5050	5860
Farm Operations	120	56	43	12	7	2	4020	3827
Forestry	532	177	147	86	100	22	4430	5037
Horticulture	95	40	19	16	13	7	4150	5801
Land. Arch.	121	32	30	21	36	2	4620	5125
Poultry Husb.	38	11	17	7	3	0	4070	4116
Ag. Journalism	68	12	9	16	22	9	5090	6357
Total	3115	734	1034	546	604	177	\$4590	\$5269

the mean income except for the farm operations curriculum. The discrepancies between these two values vary depending upon the curriculum. It is apparent that the discrepancy became greater whenever the proportion with incomes above \$10,000 became greater. The mean income varied from \$4,116 for graduates in poultry husbandry to \$6,357 in agricultural journalism. A new curriculum, such as farm operations which has had only recent graduates, is penalized since it has been shown that income is a function of recency of graduation.

#### C. Income and Advanced Degrees

Of the 3,115 graduates who furnished information concerning income, there were 111 who reported incomes under \$2,500. Many of these individuals were in graduate schools and the reported incomes were derived from fellowships and part time teaching assignments. In an analysis of incomes when classified by advanced degrees, it seemed appropriate to eliminate these 111 graduates from the study. Of these 111 graduates there were two individuals who held the Ph.D. degree, 25 who held the M.S. but not the Ph.D. and 84 who held no graduate degree.

A frequency distribution of incomes is shown in Table 32 together with mean and median incomes for those graduates who held the Ph.D., the M.S. only and the B.S. only. For the entire group, the mean income was \$5,415 as contrasted to the mean income of \$5,269 before eliminating the 111 graduates with annual incomes of less than \$2,500. The financial advantage of graduate work seems apparent from an inspection of either the mean or median incomes. The interpretation may be made from the

medians that an M.S. degree provides a \$400 additional income and a Ph.D. degree a further \$800 increase in income. This interpretation must be made with caution since (1) a graduate with an M.S. degree has had one year less and with a Ph.D. degree has had at least three years less opportunity to become occupationally established than the graduate whose higher

Table 32  
Income and Advanced Degrees

Income	B.S. only N = 2675	M.S. only N = 265	Ph.D. N=64	All N=3004
Less than \$4000	584	37	2	623
4000 - 4999	970	78	6	1054
5000 - 5999	448	74	24	546
6000 - 6999	240	30	10	280
7000 - 7999	158	19	8	185
8000 - 8999	81	11	5	97
9000 - 9999	36	2	4	42
10,000 or more	158	14	5	177
Mean	\$5337	\$5676	\$6867	\$5415
Median	\$4600	\$5000	\$5800	\$4800

education terminated with the B.S. degree, and (2) the information was available only for the graduates who have been out of college as indicated in this group. The ultimate earning power of individuals with advanced degrees, undoubtedly, would be larger if information could be assembled for each individual when he had reached his peak income.

#### D. Occupational Differences in Income

Classification of graduates according to occupation yielded 13 or less distinct occupational groups with 90 or more cases in each group. For the purpose of analysis of occupational differences in income, all graduates not falling into one of these 13 categories were disregarded. The mean income for each of these occupational groups is shown in Table 33. The lowest mean income was reported by high school teachers of vocational agriculture whereas the highest mean income was reported by graduates classified in management, the difference being \$2686 annually.

For three of these occupational groups, incomes may be compared with other current reports of salaries. A recent study<sup>1</sup> indicated the 1953 salaries of vocational agriculture teachers by states. The lowest reported salary was \$2500 in Mississippi and in Rhode Island and the highest was \$7500 in California. The reported average for the United States was \$4153. The reported average for Iowa was \$4558, placing Iowa fifth in rank after Oregon, Washington, Minnesota, and Arizona. The reported range in Iowa was from \$3900 to \$5500.

In contrast to this Iowa average of \$4558, the study here reported indicated a mean of \$4498, a difference of \$60. It should be noted that the groups are not identical. The former includes most but not all of the 172 graduates in the latter, all graduates not teaching vocational agriculture in Iowa who graduated from Iowa State College prior to 1932, and

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<sup>1</sup>1953 Annual Salary Summary. Better Farming Methods. 25:36-38. May 1953.

all Iowa teachers of vocational agriculture who graduated from other institutions.

Salaries of county extension agents in Iowa, now called county extension directors, are shown in the same report.<sup>1</sup> The mean salary in the thirty-four states reporting was highest in California (\$7849) and lowest in Vermont (\$4077). The mean salary reported for Iowa was \$5293, ranking

Table 33

Mean Income and Predicted Beginning Income and Mean Annual  
Income Increment Assuming Linear Relationship

Occupation	N	Mean	Predicted	
			Beginning income	Annual Increment
High school voc. ag. teachers	172	\$4498	\$4423	\$ 20
College teachers	94	5375	4107	147
Extension workers	137	4982	4192	95
Federal agricultural agencies	168	4733	4500	27
Farming	417	5784	4032	196
Farm management	108	5656	4705	133
Management	237	7184	4020	316
Small business	176	7120	4979	216
Sales	220	5683	4271	280
Journalism	93	6434	4213	270
Production	179	4528	3864	143
Research	97	5310	3513	229
Federal forestry	156	4585	3520	127

thirteenth in the thirty-four states reporting. This mean salary is \$311 higher than that found in the present study. It should be noted, however, that the former mean was for county extension agents only whereas the latter included also county 4-H club agents and youth assistants.

The income of college teachers is shown in Table 33 to be \$5375 for

<sup>1</sup>Ibid.

the 94 individuals who were teaching in some field of agriculture after eliminating graduates who were holding college positions which were mainly research or administrative. This mean of \$5375 is \$875 above the 1950 median salary<sup>1</sup> of 28,022 full-time faculty members in 68 land grant colleges. Income information which was located for other occupational groups was not comparable to that for any of the other ten groups as classified in this study.

Evidence previously shown indicates clearly, that when all graduates are considered, income is a function of time since graduation. If the annual income increment is a constant, i.e., if a linear relationship exists between income and time since graduation, then the mean annual increment is \$202.59. Although considerable evidence has resulted from previous analyses that suggests a quadratic rather than a linear relationship, a preliminary analysis was made by assuming that the annual income increment was constant. Even when this assumption is made, the problem of whether this increment is similar from one occupation to another is one that should be based upon available evidence.

For preliminary analysis a linear equation was found for each occupation by the method of least squares. The equation for high school vocational agriculture was

$$Y = -20.456X + \$5486.80$$

where Y = predicted income

X = year of graduation minus 1900.

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<sup>1</sup>Farr, Maude. Faculty Salaries in Land-Grant Colleges and Universities. 1949-50. United States Office of Education, Circular No. 283. 1951. p. 3.

From this equation it is apparent that the annual income increment is between \$20 and \$21 for vocational agriculture teachers as contrasted to \$202.59 for all graduates included in this study. When 52 (for the year 1952) was substituted in the foregoing equation, the predicted mean income for the first year after graduation was \$4423 for high school teachers of vocational agriculture. In a similar way, annual income increments and predicted incomes were found, as shown in Table 33, for each occupation.

The annual increments varied from \$20 for teachers of vocational agriculture to \$316 for those graduates classified in management. The initial income upon graduation varied from a low of \$3513 for those engaged in research to a high of \$4979 for those in small business. It is particularly of interest to note that teachers of vocational agriculture, with the lowest mean income of the thirteen groups, were fourth from the top in beginning income.

An inspection of the information in Table 33 with respect to initial income and annual increment indicated clearly that each occupational group had to be analyzed separately. On the other hand, the assumption of a linear relationship between income and number of years since graduation has been disproved. Some technique for predicting mean income was needed which did not require these obviously untenable assumptions.

It was decided to base prediction on the assumptions that, for each of the occupational groups, like the entire unclassified group, (1) the linear and the quadratic equations yielded identical solutions at 3.6 and 16.2 years since graduation and (2) the mean maximum income occurred at 30.845 years after graduation. The quadratic equation for the unclassified group

$$Y = -4.8353X^2 + 298.2733X + 3300.65$$

needs to be modified to conform to the two foregoing assumptions to read

$$Y = a(-4.8353X^2 + 298.2733X) + 3300.65 + C$$

where the constants a and C adapt the equation to any occupational group. Under the first assumption, two mean incomes are known from the linear equation, i.e., at 3.6 and 16.2 years after graduation. Thus two simultaneous equations may be had:

$$Y_{3.6} = a(-4.8353X_{3.6}^2 + 298.2733X_{3.6}) + 3300.65 + C$$

$$Y_{16.2} = a(-4.8353X_{16.2}^2 + 298.2733X_{16.2}) + 3300.65 + C.$$

The necessary solution for each of the occupational groups is here shown for teachers of vocational agriculture only. The linear equation, previously shown for this group is

$$Y = -20.456X + 5486.80.$$

The X in this equation is the year of graduation minus 1900. Thus when the numbers of years since graduation are 3.6 and 16.2, the X-values are 49.4(53-3.6) and 36.8(53-16.2), respectively. Substituting the X-values, the predicted mean incomes are \$4476 and \$4734, respectively. Since the predicted mean values are identical for the linear and quadratic at these points

$$4476 = a[(-4.8353)(3.6)^2 + (298.2733)(3.6)] + 3300.65 + C$$

$$4734 = a[(-4.8353)(16.2)^2 + (298.2733)(16.2)] + 3300.65 + C.$$

When these equations are solved simultaneously

$$a = 0.10109$$

$$C = 1073.05.$$

The equation then for estimation was found to be



Table 34

Quadratic Predicted Mean Income on 1952 Standard for Certain  
Occupational Groups and Years Since Graduation

Occupation	Years since graduation				
	1	5	10	15	20
High school voc. ag. teacher	\$4403	\$4512	\$4626	\$4716	\$4781
College teachers	3969	4753	5575	6221	6690
Extension workers	4102	4609	5141	5558	5862
Federal agricultural agencies	4474	4619	4770	4894	4975
Farming	3847	4886	5977	6833	7456
Farm management	4600	5305	6044	6625	7047
Management	3721	5403	7165	8550	9558
Small business	4750	5897	7099	8043	8730
Sales	3708	5195	6754	7978	8869
Journalism	3958	5396	6902	8086	8948
Production	3729	4488	5284	5909	6364
Research	3297	4514	5789	6791	7520
Federal forestry	3400	4075	4784	5440	5745
All	\$3594	\$4671	\$5800	\$6687	\$7332

Table 35

Mean and Median Incomes Adjusted for Date of Graduation  
for Various Occupations

Occupation	Actual		Mean <sup>1</sup> years	Adjusted	
	Mean	Median		Mean	Median
High school voc. ag. teacher	\$4498	\$4532	4.67	\$4573	\$4607
College teachers	5457	5375	10.15	5189	5107
Extension workers	4982	5000	9.28	4891	4909
Federal agricultural agencies	4733	4588	9.58	4700	4555
Farming	5784	5196	9.96	5465	4877
Farm management	5656	5361	8.18	5676	5381
Management	7184	6141	11.00	6340	5297
Small business	7120	5878	11.05	6533	5291
Sales	5683	4986	7.12	6021	5324
Journalism	6434	6132	9.22	6193	5891
Production	4528	4428	5.65	4911	4811
Research	5310	4948	8.86	5189	4827
Federal forestry	4585	4604	9.38	4452	4471

<sup>1</sup>Mean number of years since graduation

$$Y = 0.10109(-4.8353X^2 + 298.2733X) + 3300.65 + 1073.05$$

or

$$Y = -0.4880X^2 + 30.1524X + 4373.70.$$

Upon substitution of number of years since graduation for values of X, predicted mean incomes may be obtained. Thus entries are shown for teachers of vocational agriculture in Table 34. In a similar manner, predicted mean salaries are shown for other occupational groups who have held bachelor of science degrees for 1, 5, 10, 15 and 20 years.

Of these thirteen occupations, farming, management and small business usually required some capital outlay which may be obtained by (1) gifts, (2) inheritance, (3) savings and (4) loans. Many students who graduate do not have access to such sources needed for capital outlay. Of the ten remaining occupational groups, farm management offered the greatest financial return immediately upon graduation and research work offered the least. At the end of 20 years, with the same ten occupational groups, sales and journalism vie for the top position and teachers of vocational agriculture and employees of federal agricultural agencies contend for the dubious distinction of smallest income.

Because many of the foregoing analyses have indicated that income is a function of time since graduation, Table 35 was constructed to adjust the median and mean income. This adjustment was made by using the linear formula, previously shown, for each occupation so that the mean number of years since graduation was 8.33 years. An inspection of this table reveals that interpretations of differences occurring in mean annual income among groups are subject to little revision if adjustments are made for group variations in elapsed time since graduation.

## X. SUMMARY

One of the major objectives of Iowa State College is to provide the education necessary for leadership in the agricultural industry. The major emphasis in this respect occurs in the Division of Agriculture. During the 21-year period ending with the 1951-1952 school year, 4,439 students in the Division of Agriculture were granted baccalaureate degrees. Of these graduates, 65 completed curricula which since have been discontinued. These graduates were not included in the study. There were an additional 239 graduates of the industrial education curriculum who were not included in the study because of the remote connection of this curriculum to agriculture. Included in the study were 348 graduates of the agricultural engineering curriculum jointly administered by the Division of Engineering and the Division of Agriculture. Thus there were 4,483 graduates of thirteen curricula for whom a follow-up study was designed.

A questionnaire was prepared and sent to these graduates. In all, 4,199 questionnaires were deliverable and 3,593 usable returns were received. Approximately three in every four graduates were residents of Iowa at the time they first entered college.

Farm-reared boys constituted 62 per cent of the graduates with one in every four returning to the farm directly after graduation. The proportion of farm-reared graduates varied from a low of 24 per cent in forestry to a high of 86 per cent in agricultural education.

Of the 3,593 graduates, 1,165 persons, approximately one in every three, entered the Division of Agriculture after previous college work

elsewhere. Approximately one in every five graduates transferred to an agricultural curriculum from some other division at Iowa State College.

The majority of the graduates had their college education interrupted by work or military service, or both. Of those individuals graduating since 1947, two in every three had their education interrupted by military service. Prior to this time military interruptions were few in number but approximately one-half reported work interruptions during their college careers.

There were 392 graduates who later received one or more earned graduate degrees, usually the master of science or doctor of philosophy degree. Of this number, 71 individuals had been granted the doctor of philosophy degree. This degree had not been received at the time of this study by any graduate of the last three years of the 21-year period. Because the graduates of these three years constitute about one-third of the total group and because the graduates have had insufficient time for obtaining this degree, the 71 of the 3,593 graduates who have obtained the doctorate is an underestimate of the proportion who will eventually receive this degree.

At the time of this study, 470 graduates, or 13 per cent, listed their present occupation as education, not including extension service. Of these 470 graduates, 179 individuals were teaching vocational agriculture in high school; 16 others were teaching veterans classes in agriculture; and the remaining 152 graduates, with few exceptions, were college staff members engaged in teaching or research, or both.

Graduates engaged in extension services were classified separately from other educational workers and numbered 175, or 5 per cent of all

graduates. Of these 175 graduates, county extension directors numbering 76 persons were followed by state extension service numbering 65 persons with county youth assistants and assistant county directors accounting for 33 persons. One graduate was employed in federal extension service.

There were 470 graduates, or 13 per cent, in government service, one-third of whom were in the United States forest service. This large number in forest service was not unexpected since the forestry curriculum, among the thirteen considered in this study, accounted for more graduates than any other curriculum except animal husbandry.

In 1952 there were 702 graduates, or approximately 20 per cent, who were engaged in farming. It has been previously noted that 62 per cent of the graduates had been farm-reared. This migratory effect of a college education in agriculture should not be viewed as unfortunate. The agricultural economy of this country would soon be bankrupt if all farm-reared boys were forced to return to farming. The demands for personnel in the agricultural industry, other than farming, have been so acute that agricultural colleges have recognized that maximum service to agriculture cannot be attained without stressing the opportunities for farm-reared youth in occupations other than farming in the total agricultural industry.

In 1952, enterprises other than farming provided occupational outlets for 1,296 graduates of whom 968 were in commercial agricultural enterprises, 123 in commercial nonagricultural enterprises and 205 in small business ventures.

The foregoing classifications of 1952 occupations account for all except 480 graduates who have been placed in a group designated as others. More than half (267) of these were in military service at the time of this

study. An additional 88 individuals were continuing education as graduate students. The remaining graduates were employed in nonprofit organizations, miscellaneous farm and nonfarm services and a small additional number in a variety of occupations which occurred so infrequently that further classification was impractical.

In addition to the 1952 occupations, the occupations immediately upon graduation were obtained. Several shifts between first and present occupation were clearly evident even though many persons were recent graduates. Perhaps the most striking of these shifts was noted in the number engaged in farming. Of the 3,593 graduates, 483 individuals returned to the farm directly upon graduation whereas 702 graduates were farming in 1952. This migration tendency may have resulted from inadequate capital for immediate entrance into farming. It is probable that many of the 219 graduates were delayed from entering farming until sufficient capital could be accumulated although no evidence was collected to support this contention.

A similar shift was noted among graduates who were engaged in small business. On the other hand, certain initial occupations seemed to serve as stepping stones to later occupations. In this respect the migration from education, extension and government service was particularly noticeable.

One method of evaluating the effectiveness of a college education consists of recording the earned income of graduates. Although such evaluation may leave much to be desired, it constitutes one facet of tangible evidence. Of the 3,593 graduates who returned questionnaires, 3,115 individuals furnished income information. Graduates were asked to

distinguish between income from major job and income from other sources such as investments, inheritance and other minor sources. Only the income from major job was analyzed. The total income for the 3,115 graduates was \$16,413,000 for 1952, with a mean of \$5269 and a median of \$4586.

More than one-half of the 3,593 graduates received the bachelor of science degree since World War II. Many of the recent graduates were in graduate school at the time the data were collected. Of the 3,115 graduates reporting 1952 incomes, 111 individuals earned less than \$2500 which in many cases represented income from fellowships and part time teaching assignments accompanying further education toward advanced degrees. For the remaining 3,004 graduates the mean income was \$5415 and the median income was \$4800 in 1952. The mean income must be interpreted in the light of the disproportionate number of graduates since World War II who were in the process of occupational establishment in 1952.

When the mean income was plotted by year of graduation, an upward trend in income was apparent depending upon the number of years since graduation. The equation for the straight line trend, found by the method of least squares, was  $Y = \$202.5907X + \$3582.46$ , where Y is the predicted mean income and X is the number of years since graduation. This linear equation tended to yield an overestimate for recent and early graduates and to yield an underestimate for graduates of the middle years of the 21-year period.

A quadratic was assumed to be a more realistic equation. The equation,  $Y = -4.8353X^2 + 298.2733X + 3300.55$ , was obtained by the method of least squares. When this equation was solved the mean annual income increments were unequal, varying from \$284 between the first and second years



to \$100 between the twentieth and twenty-first years. This equation suggests that the mean annual income will reach a maximum of \$7900 at 30 years and 10 months after graduation.

Graduates with master's degrees received \$400 greater annual income than those without such degrees. Graduates holding the doctorate received an additional \$800 annual income. The ultimate earning power of individuals with advanced degrees probably would be larger if information could be assembled for each individual when he had reached his peak income.

Among thirteen occupations, beginning income, based upon 1952 standards, was highest (\$4750) for graduates engaged in small business enterprises and lowest (\$3297) for those engaged in research work. Twenty years after graduation, the highest income (\$9558) can be expected in industrial management and the lowest (\$4781) in teaching vocational agriculture.

Responses to the items included in the questionnaire clearly revealed that the graduates in agriculture at Iowa State College have received the education needed for leadership in the agricultural industry.

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XII. APPENDIX

IOWA STATE COLLEGE  
Ames, Iowa

Dear Graduates:

The faculty of the Division of Agriculture has a real interest in its graduates. We feel, and I am sure you will agree, that a knowledge of what our graduates are doing, in terms of location and occupational placement, will make the educational work done here more meaningful and will provide a basis for giving more adequate educational and vocational guidance to our present and future students.

During the period since graduation you have had a real opportunity to evaluate your college work in relation to your life goals. We believe your evaluation will provide a factual basis for various improvements in the present curriculum.

Studies similar to this one are in progress at several of the land-grant institutions. We welcome this opportunity to solicit your cooperation and feel sure your conscientious efforts in completing these questions will be of great value to us. We will appreciate it if you will return the form at your earliest convenience.

Sincerely yours,

*Floyd Andre*

Dean and Director  
Agriculture

Floyd Andre:aw

1. Name \_\_\_\_\_  
                     Last                      First                      M.I.                      Address

3. After high school graduation, was your schooling program interrupted, other than summer, prior to receiving a B.S. degree. No ☐ Yes ☐ If yes, for what reason(s). work ☐ military ☐ other ☐.

4. Graduate work (earned degrees)

<u>Degree</u>	<u>Major</u>	<u>Year Rec'd.</u>	<u>Institution</u>
Masters			
Ph.D.			

5. Positions held since B.S. degree received

<u>Position Title</u>	<u>Year</u> <u>Began</u>	<u>Specific Duties</u>	<u>Location</u> <u>(State only)</u>
1st* _____	_____	_____	_____
Present _____	_____	_____	_____

\*Disregard military service

6. Locations	On a Farm	In a Small Town (less than 2500)	In a City (2500 or more)
Where did you live before going to college? . . .			
Where did you live during your first position?			
Where do you live at the present time? . . .			

7. Home address at  
time of college entrance. \_\_\_\_\_  
Town County State

8. Did you transfer from another college to I.S.C.? No ☐ Yes ☐  
If yes, number of undergraduate quarters at I.S.C.? \_\_\_\_\_

9. While at T.S.C. did you transfer from another division into the Agriculture Division? No ☐ Yes ☐  
If yes, check which division. Engineering ☐ Science ☐

10. While in the Agriculture Division did you transfer from one curriculum to another? No ☐ Yes ☐  
If yes, from which curriculum?

11. In terms of your felt needs, how valuable was the help you received from your counselor?

(1) Great value <input type="checkbox"/>	(3) Some assistance <input type="checkbox"/>	(5) Not helpful at all <input type="checkbox"/>
(2) Quite helpful <input type="checkbox"/>	(4) Little assistance <input type="checkbox"/>	

12. Have you owned (or rented) farm land since graduation? No ☐ Yes ☐ If yes, give first year 19\_\_.

13. Have you operated a farm since graduation? No ☐ Yes ☐ If yes, number of years \_\_\_\_.

14. Have you owned a business (excluding a farm) since graduation? No ☐ Yes ☐ If yes, how many years \_\_\_\_\_

15. Have you ever held a position with the Agricultural Extension Service? No ☐ Yes ☐  
If yes, number of years \_\_\_\_\_.

16. In view of your college and post-college experiences, what changes would you recommend in the amount of work required in your curriculum in the following subject fields?

Course Areas	Increase Amount	Leave Unchanged	Decrease Amount
Communication Skills (English, Speech, etc.)			
Natural Sciences (Chemistry, Botany, etc.)			
Social Sciences (Economics, Government, etc.)			
Courses in major department			
Other courses in Division of Agriculture			

17. How would you classify yourself as to the number of college extracurricular activities you engaged in?  
 (1) More than average of your class ☐ (2) Average ☐ (3) Less than average ☐
18. How do you now value the time and effort which you spent on extracurricular activities while in college?  
 (1) Well spent and useful ☐ (3) Of little or no use ☐  
 (2) Of considerable use and value ☐ (4) As time wasted ☐
19. How do you now value the time and effort which you spent on course-work while in college?  
 (1) Well spent and useful ☐ (3) Of little or no use ☐  
 (2) Of considerable use and value ☐ (4) As time wasted ☐
20. Did your college course work challenge you to do your best? No ☐ Yes ☐
21. Will you estimate the approximate average (of the last two or three years) income from your major job?  
 (This information is for averages only. An individual's average WILL NOT BE DIVULGED TO ANYONE AT ANY TIME.) No ☐ Yes ☐ If yes, approximate annual income from major job \_\_\_\_\_.
22. Will you estimate the approximate average income from all other sources (excluding income from your major job)? No ☐ Yes ☐ If yes, approximate annual income from other sources \_\_\_\_\_.
23. What do you think of the emphasis placed by I.S.C.
- |                                    | Too Much | About Right | Too Little | Don't Know |
|------------------------------------|----------|-------------|------------|------------|
| A. At Present on:                  |          |             |            |            |
| a. Intercollegiate football        |          |             |            |            |
| b. Other intercollegiate athletics |          |             |            |            |
| B. While you were in college on:   |          |             |            |            |
| a. Intramural athletics            |          |             |            |            |
| b. Social activities               |          |             |            |            |
| c. Vespers                         |          |             |            |            |
| d. Religious activities            |          |             |            |            |
| e. Judging teams                   |          |             |            |            |
| f. Music                           |          |             |            |            |
| g. Departmental clubs              |          |             |            |            |
| h. Grades                          |          |             |            |            |
| i. Excuses for class absences      |          |             |            |            |
| j. Number of electives permitted   |          |             |            |            |
24. If I.S.C. were to provide additional scholarships, would you rather see the majority of them given to:  
 (1) Entering Freshmen ☐ (3) Juniors ☐ (5) Equally Divided ☐  
 (2) Sophomores ☐ (4) Seniors ☐
25. Would you favor federally-supported scholarships for worthy but needy high school graduates? No ☐ Yes ☐
26. From your experiences at I.S.C., what size class would you consider ideal for learning?  
 Lecture: 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 or more ☐  
 Recitation-discussion: 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 or more ☐  
 Laboratory: 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 or more ☐
27. While you were at I.S.C., to what degree were the following brought to your attention:
- |                                      | Favorable |            |          | Not    |             |
|--------------------------------------|-----------|------------|----------|--------|-------------|
|                                      | Strongly  | Moderately | Slightly | at all | Unfavorable |
| a. Opportunities in Extension        |           |            |          |        |             |
| b. Opportunities in college teaching |           |            |          |        |             |
| c. Opportunities in research         |           |            |          |        |             |
- If the above were brought to your attention, was it soon enough for you to arrange your college program in order to prepare for such work. No ☐ Yes ☐
28. Many colleges are now operating on a five-day week for classes, giving students week-ends free to study or return to their homes. This tends to reduce participation in Friday night and week-end activities. In your opinion, from the standpoint of students benefit only, should I.S.C. move in the direction of:  
 (1) Classes five days per week ☐  
 (2) Classes six days per week ☐  
 (3) Doesn't make any difference ☐

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IOWA STATE COLLEGE  
OF AGRICULTURE AND MECHANIC ARTS  
AMES, IOWA

DIVISION OF AGRICULTURE  
EXPERIMENT STATION • EXTENSION SERVICE

Dear Graduate:

YOUR opinion is needed!

A short time ago we sent a copy of the enclosed questionnaire to each of the graduates of this division (1932-1952). So far the response has been gratifying. However, either due to a wrong address on our part or possibly insufficient time on your part, we have not received your return.

The value of this study will be determined by the number of replies received. We are particularly anxious that your opinion be considered and evaluated in our summary.

If you have already returned your questionnaire, please disregard this letter.

We greatly appreciate your cooperation.

Sincerely yours,

*Floyd Andre*

Dean and Director  
Agriculture

Floyd Andre:aw



Table 36

## Income in 1952 for Graduates of Agricultural Economics Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Education	29	27	\$4796
Extension	11	10	5240
Farming	43	31	5355
Farm management	20	18	7089
Bank, appraiser, etc.	21	18	4861
Government service	17	17	5753
Service organizations	3	1	5500
Industry	30	27	5489
Small business	11	11	9445
Others	17	10	3520
All	202	170	5609

Table 37

## Income in 1952 for Graduates of Agricultural Education Curriculum

	Number		Mean income
	Total	Reporting income	
High school vocational ag. teachers	167	161	\$4475
Other high school	10	10	4300
Veterans classes	20	20	4400
College teaching	14	11	5336
Agricultural organizations	21	19	5211
Extension or experiment station	21	21	4762
Farming	61	56	4984
Government service	13	12	4758
Business or industry	72	69	5509
Others	60	33	3107
All	459	412	4679

Table 38

## Income in 1952 for Graduates of Agricultural Engineering Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Education	31	29	\$5010
Farm equipment industry	119	105	6074
Farm structures	17	17	5794
Soil and water conservation	38	38	4645
Farming	33	29	6945
Rural electrification	7	7	5129
U.S.D.A. (not including S.C.S.)	3	3	9000
Industry related to agriculture	10	10	6570
Business	16	15	5587
Others	33	28	4029
All	307	281	5640

Table 39

## Income in 1952 for Graduates of Agronomy Curriculum

Occupation	Number		Mean
	Total	Reporting income	
Education	46	44	\$4489
Farm operator	67	63	5575
Farm manager	20	18	4811
Government service	64	64	4355
Bank, appraisers, etc.	16	16	5050
Extension	26	25	4424
Hybrid seed corn company	32	29	4936
Industry	56	52	5003
Business	9	8	8275
Others	47	28	3154
Total	382	348	5525

Table 40

## Income in 1952 for Graduates of Animal Husbandry Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Farming	259	214	\$6042
Teaching	83	78	4926
Extension	65	65	4740
Meat packing (or related)	55	48	5817
Breed organization	9	8	6038
Journalism and radio	14	13	5969
Government service	25	24	4958
Feed industry	27	26	5854
Business	69	65	7911
Others	76	37	4241
Total	682	578	5766

Table 41

## Income in 1952 for Graduates of Dairy Husbandry Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Farming	30	27	\$5130
Farm management	5	5	5140
Education	13	12	3925
Extension	16	15	4833
Government service	4	3	6967
Breed or service organization	6	6	6967
Artificial insemination, dairy inspector	4	4	5125
Business or industry	18	16	5931
Armed forces	10	4	4175
Total	109	94	5091

Table 42

## Income in 1952 for Graduates of Dairy Industry Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
College teaching	13	12	\$4708
Research, state and commercial	8	7	3857
Extension	6	6	4783
Inspector (city, state, federal)	24	23	4461
Saleswork	23	23	7900
Owners of dairy plants	18	15	7200
Manager of dairy plant	107	101	6454
Other positions	29	22	4436
Farming	24	22	4836
Others	32	27	5611
Total	284	258	5860

Table 43

## Income in 1952 for Graduates of Farm Operations Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Education	13	12	\$4708
Farm operator	59	37	3930
Farm manager	16	14	4150
Government service	7	7	3714
Bank, appraisers, etc.	3	2	3700
Extension	7	6	3583
Armed forces	31	15	2920
Industry	20	16	4681
Non-profit organizations	3	3	4067
Others (including graduate students)	9	7	1786
Total	168	120	3827

Table 44  
Income in 1952 for Graduates of Forestry Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Public service	(238)	(232)	(\$4491)
Education	27	26	5081
Forest service (federal)	156	153	4584
Forestry and conservation	50	48	3812
Federal agencies, other than forest service	5	5	5080
Private industry	(209)	(193)	(5623)
Forest management	51	49	4931
Harvesting and manufacturing of forest products	93	84	5804
Wholesale or retail of forest products	65	60	5935
Non-forestry	(145)	(107)	(5160)
Farming	17	13	5285
Engineering	26	24	4588
Others	102	70	5333
Total	592	532	5037

Table 45

## Income in 1952 for Graduates of Horticulture Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Orchardist	8	7	\$5800
Nursery (owner or operator)	10	7	9171
Greenhouse or florist	20	15	4100
Farming (including vegetable)	6	3	13033
Extension	7	5	5657
High school or college teachers	8	7	5129
Industry (horticulture)	19	17	5729
Industry (non-horticulture)	11	10	4370
Own business (not horticulture)	8	7	13086
Others	27	15	2500
Total	124	95	5801

Table 46

## Income in 1952 for Graduates of Landscape Architecture Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Education	5	4	\$4275
City planning and regional planning	45	42	4879
Parks and recreational planning	17	15	5447
Private practice	40	33	4809
Highway improvement planning	2	2	5250
Business (allied)	18	13	6554
Sales	1	0	
Others	24	12	5167
Total	152	121	5125

Table 47

## Income in 1952 for Graduates of Agricultural Journalism Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Teaching	3	2	\$7150
Advertising	18	17	7229
Magazine	14	11	7382
Radio	4	4	6700
Television	1	0	
Newspapers	10	10	6230
Information (industry)	4	4	6300
Information (government)	11	11	6027
Business	3	2	4400
Others	15	7	3500
Total	83	68	6257

Table 48

## Income in 1952 for Graduates of Poultry Husbandry Curriculum

Occupation	Number		Mean income
	Total	Reporting income	
Education	4	3	\$5033
Extension	4	3	4600
Poultry production	2	2	3050
Hatchery	10	9	4022
Farming	11	9	4067
Poultry processing	2	2	5000
Service organization	4	4	4475
Industry	6	3	3867
Business	1	0	
Others	5	3	3033
Total	49	38	4116

Table 49

## Class Level Favored for Scholarships

Class level	N	Per cent
Freshmen	946	26
Sophomores	451	13
Juniors	446	12
Seniors	162	5
Equally divided	1179	33
Other combinations	307	8
No response	102	3

Table 50

Attitude Toward Federally-supported Scholarships  
by Time of Graduation

Year	N	<u>No response</u>		<u>Favor</u>		<u>Do not favor</u>	
		N	%	N	%	N	%
32-36	445	45	5	170	38	251	57
37-41	754	40	5	289	38	425	57
42-46	386	12	3	177	46	197	51
47-52	2008	103	5	1084	54	822	41
Total	3593	178	5	1720	48	1695	47



Table 51

## Attitude Toward Federally-supported Scholarships by Occupation

Occupation	N	No response		Favor		Do not favor	
		N	%	N	%	N	%
Education	470	27	6	286	61	157	33
Extension	175	6	3	85	49	84	48
Government service	470	28	6	222	47	220	47
Productive agriculture	702	28	4	319	45	355	51
Commercial agriculture	968	49	5	420	43	499	52
Commercial non-ag.	123	8	7	51	41	64	52
Small business	205	8	4	87	42	110	54
Agricultural services	32	2	6	16	50	14	44
Farm organizations	57	3	5	15	26	39	69
Others	391	19	5	219	56	153	39
Total	3593	178	5	1720	48	1695	47

Table 52

## Attitude Toward Federally-supported Scholarships by Mean Income

Response	N	Mean income
Failed to respond	147	\$5020
Favor	1507	4796
Do not favor	1461	5783

Table 53

Amount of Participation in Extracurricular Activities by Year  
(percentages)

Year	N*	Above average	Average	Below average	Mean rating**
1932-36	445	27	44	29	.98
1937-41	754	19	54	27	.92
1942-46	386	22	51	28	.94
1947-52	2008	20	45	35	.86
1932-52	3593	21	48	31	.89

\*Percentages are based on 99 per cent response.

\*\*Mean rating was found by assigning values: above average = 2,  
average = 1 and below average = 0.

Table 54

Amount of Participation in Extracurricular Activities by Curriculum  
(percentages)

Curriculum	N*	Above average	Average	Below average	Mean rating
Agricultural Economics	202	26	48	26	1.00
Agricultural Education	459	19	42	39	.79
Agricultural Engineering	307	20	48	33	.87
Agronomy	382	17	46	37	.80
Animal Husbandry	682	25	49	26	.99
Dairy Husbandry	109	21	62	17	1.05
Dairy Industry	284	19	49	32	.87
Farm Operation	168	21	42	37	.85
Forestry	592	14	49	37	.77
Horticulture	124	24	38	38	.86
Landscape Architecture	152	14	61	25	.89
Poultry Husbandry	49	22	65	12	1.10
Agricultural Journalism	83	71	24	5	1.66
Total	3593	21	48	31	.89

\*Percentages are based on 99 per cent response.

Table 55

Value of Time Spent in Extracurricular Activities by Year  
(percentages)

Years	N*	Well spent	Considerable use	Little use	Time wasted	Mean rating**
32-36	445	57	34	9	1	2.48
37-41	754	54	36	10	-	2.44
42-46	386	54	37	8	1	2.44
47-52	2008	50	37	12	1	2.36
Total	3514	52	36	11	1	2.39

\*Percentages are based on 98 per cent response.

\*\*Mean rating was found by assigning values: well spent = 3, considerable use = 2, little use = 1 and time wasted = 0.

Table 56

Value of Time Spent in Extracurricular Activities by Curriculum  
(percentages)

Curriculum	N*	Well spent	Considerable use	Little use	Time wasted	Mean rating
Ag. Economics	202	54	35	10	1	2.42
Ag. Education	459	50	36	13	1	2.35
Ag. Engineering	307	50	39	10	1	2.38
Agronomy	382	52	36	11	1	2.39
Animal Husbandry	682	55	37	8	1	2.37
Dairy Husbandry	109	61	33	6	1	2.55
Dairy Industry	284	51	38	10	1	2.39
Farm Operations	168	50	38	12	1	2.38
Forestry	592	48	35	17	1	2.31
Horticulture	124	48	37	15	0	2.33
Land. Arch.	152	46	42	12	0	2.34
Poultry Husbandry	49	57	36	6	0	2.49
Ag. Journalism	83	77	23	0	0	3.10
Total	3593	52	36	11	1	2.39

\*Percentages are based on 98 per cent response.

Table 57

Value of Time Spent in Extracurricular Activities by Occupation  
(percentages)

Occupation	N*	Well spent	Considerable use	Little use	Time wasted	Mean rating
Education	470	47	39	14	-	2.33
Extension	175	60	35	5	0	2.57
Government service	470	47	38	15	-	2.32
Productive ag.	702	51	39	10	-	2.41
Commercial ag.	968	56	32	11	1	2.43
Commercial non-ag.	123	53	32	14	1	2.37
Small business	205	52	37	10	1	2.40
Services	32	40	53	7	0	2.33
Non-profit organ.	57	55	32	11	2	2.40
Others	391	53	39	8	-	2.45
Total	3593	52	36	11	1	2.39

\*Percentages are based on 98 per cent response.

Table 58

Value of Counselor by Year  
(percentages)

Year	N*	Great value	Quite helpful	Some assist.	Little assist.	Not helpful at all	Mean rating
1932-36	445	16	30	30	16	8	2.30
1937-41	754	17	34	28	16	5	2.42
1942-46	386	16	30	34	16	4	2.36
1947-52	2008	13	33	35	15	4	2.38
Total	3593	15	32	33	16	4	2.38

\*Percentages are based on 99 per cent response.

Table 59

Value of Counselor and Curriculum  
(percentages)

Curriculum	N*	Great value	Quite helpful	Some assist.	Little assist.	Not helpful at all	Mean rating
Ag. Economics	202	16	26	36	17	5	2.31
Ag. Education	459	14	35	35	14	2	2.45
Ag. Engr.	307	7	28	37	22	6	2.08
Agronomy	382	20	38	29	11	2	2.63
Animal Husb.	682	14	35	34	13	4	2.42
Dairy Husb.	109	12	41	29	13	5	2.42
Dairy Ind.	284	20	29	28	16	7	2.39
Farm Oper.	168	17	41	31	9	2	2.62
Forestry	592	16	32	32	16	4	2.40
Horticulture	124	10	25	28	28	9	1.99
Land. Arch.	152	5	24	41	22	8	2.28
Poultry Husb.	49	14	33	33	18	2	2.39
Ag. Journ.	83	14	23	36	22	5	2.19
Total	3593	15	32	33	16	4	2.38

\*Percentages are based on 99 per cent response.

Table 60

Class Days Per Week by Years  
(percentages)

Years	N*	Days recommended		
		5	6	5 or 6
1932-36	445	23	63	14
1937-41	754	24	62	14
1942-46	386	26	61	13
1947-52	2008	33	52	15
Total	3593	29	56	15

\*Percentages are based on 99 per cent response.

Table 61

Class Days Per Week by Occupation  
(percentages)

Occupation	N*	Days recommended		
		5	6	5 or 6
Education	470	33	50	17
Extension	175	29	56	15
Government service	470	36	49	15
Productive agriculture	702	19	69	12
Commercial agriculture	968	30	55	15
Commercial non-agriculture	123	32	50	18
Small business	205	24	58	18
Services	32	16	75	9
Non-profit organizations	57	25	58	17
Others	391	38	50	12
Total	3593	29	56	15

\*Percentages are based on 99 per cent response.

Table 62

Days of Class Per Week by Income

Days	N	Mean income
5	886	\$4889
6	1779	5494
5 or 6	428	5026
Total	3093	5256

Table 63  
Recommended Changes in Emphasis on Subject Fields by Year  
(percentages)

Year	N	<u>Communications</u>			<u>Natural science</u>			<u>Social science</u>		
		+	0	-	+	0	-	+	0	-
1932-36	445	59	40	1	16	75	9	38	53	9
1937-41	754	57	41	2	14	72	14	35	56	9
1942-46	386	52	47	1	14	70	16	37	51	12
1947-52	2008	50	48	2	16	71	13	33	57	10
Total	3593	52	46	2	15	71	14	34	56	10

\* + = increase emphasis  
 0 = same emphasis  
 - = decrease emphasis.

Table 64

Recommended Changes in Emphasis on Subject Fields by Curriculum  
(percentages)

Curriculum	Communications			Natural science			Social science		
	+	0	-	+	0	-	+	0	-
Agricultural Economics (202)	60	37	3	9	74	17	30	65	5
Agricultural Education (459)	42	56	2	14	70	16	27	62	11
Agricultural Engineering (307)	54	46	0	11	82	7	33	56	11
Agronomy (382)	51	47	2	25	66	9	30	57	13
Animal Husbandry (682)	46	53	1	16	63	21	35	54	11
Dairy Husbandry (109)	51	46	3	13	71	16	28	61	11
Dairy Industry (284)	56	43	1	16	73	11	38	51	11
Farm Operations (168)	43	53	4	21	70	9	40	53	7
Forestry (592)	65	34	1	14	77	9	38	52	10
Horticulture (124)	56	42	2	27	64	9	32	58	10
Landscape Architecture (152)	60	39	1	9	78	13	45	50	5
Poultry Husbandry (49)	35	63	2	18	70	12	24	64	12
Agricultural Journalism (83)	66	33	1	6	58	36	60	36	4
Total (3593)	52	46	2	15	71	14	34	56	10



Table 65

Recommended Changes in Emphasis on Subject Fields by Occupation  
(percentages)

Occupation	N	Communications			Natural science			Social science		
		+	0	-	+	0	-	+	0	-
Education	470	43	57	0	23	63	14	26	61	13
Extension	175	59	39	2	14	70	16	34	50	6
Government service	470	60	39	1	15	76	9	35	54	11
Productive agriculture	702	39	57	4	14	69	17	33	55	12
Commercial agriculture	968	62	37	1	12	76	12	37	54	9
Commercial non-agriculture	123	54	45	1	15	67	18	45	48	7
Small business	205	54	44	2	10	75	15	40	53	7
Services	32	63	37	0	31	63	6	28	59	13
Non-profit organization	57	60	37	3	7	70	23	51	40	9
Others	391	50	49	11	21	68	11	32	58	9
Total	3593	52	46	2	15	71	14	34	56	10

Table 66

Recommended Changes in Emphasis on Subject Fields by Advanced Degree  
(percentages)

Level of education	N	Communications			Natural science			Social science		
		+	0	-	+	0	-	+	0	-
Advanced degree	392	62	37	1	26	63	11	33	54	13
B.S. degree only	3201	51	47	2	14	72	11	34	56	10

Table 67

Emphasis on Activities at Iowa State College  
(Percentage based on 96 per cent response)

Activity	Emphasis			
	Too much	About right	Too little	Don't know
Intercollegiate football*	5	59	26	10
Other intercollegiate athletics*	2	67	19	12
Intramural athletics	2	80	15	3
Social activities	5	79	14	2
Veishea	16	80	3	1
Religious activities	1	64	31	4
Judging teams	9	64	15	12
Music	1	55	26	18
Departmental clubs	3	68	24	5

\*Opinions concerning current emphasis on intercollegiate football and other intercollegiate athletics were requested. However, opinions concerning emphasis placed while graduate was in college were requested for all other activities.