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THE CURRICULUM OF THE COLLEGE OF AGRICULTURE

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CONTENTS.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, December 24, 1920.

SIR: The oldest of the colleges of agriculture in the United States is little more than 50 years old. Most of them have been established since 1870. Until the agricultural experiment stations had been in operation more than a decade—that is, until well within the present century—the courses of study in these colleges were meager and indefinite. Within the last 15 years their growth has been phenomenal in extent, variety, and definiteness. There is, I believe, nothing else in the college world to equal it.

Since the general purposes of all the 67 colleges of agriculture are the same, each of them can be helped by a knowledge of what the others are doing, and such a comparative account of them as is contained in this study by Mr. Carl R. Woodward, of Rutgers College, New Jersey, becomes both interesting and valuable. I am, therefore, submitting this manuscript for publication as a bulletin of the Bureau of Education.

Respectfully submitted.

The SECRETARY OF THE INTERIOR.

P. P. CLAXTON, *Commissioner.*

THE CURRICULUM OF THE COLLEGE OF AGRICULTURE.

I. INTRODUCTION.[1]

PURPOSE OF THE STUDY.

The last two decades have seen a rapid expansion of the State colleges of agriculture in the United States. The enrollment has increased rapidly, and this has meant a rapid development in the means for offering resident instruction. The courses of study have been passing through a process of evolution coincident with this growth. In general, it is largely true that the present-day curriculum of the agricultural college is an outgrowth of the old academic college course, resulting from a grafting of agricultural instruction on the old stock. Whether any one of our colleges of agriculture was founded as such, or was created as a new department in an institution already existing, it must be admitted that almost without exception the present-day curriculum has not been worked out in a definite, clear-cut way on the basis of certain fundamental principles that underlie education in agriculture.

Certain marked tendencies have been evident. Old academic subjects one by one have been dropped by the wayside. More agricultural subjects have been included. Greater freedom of election has been allowed. New and highly specialized technical courses have been added. Greater opportunity for specialization has been provided. More emphasis has been placed on laboratory work. Farm practice has been made a requirement in many institutions. Two-year courses, winter short courses, summer courses, extension courses, and graduate courses have come to occupy important places in the college.

All this is evidence of development. And where there is rapid development, there is sometimes danger of getting away from what is best. Quality is often sacrificed for expediency. A study of the catalogs of the colleges of agriculture will reveal a constant modification of the courses offered. Evidently, we have been aiming to establish the ideal course in agriculture, but have not been certain just what it is. In other words, the curriculum of the agricultural college has not passed entirely through the experimental stage.

[1] The writer wishes to acknowledge the constructive criticism and suggestions received during the course of the study from the following: Dr. J. G. Lipman, Dr. C. H. Elliott, Prof. A. K. Getman, Prof. H. O. Sampson, Prof. F. O. Hetzar, and Dr. T. J. Headlee, of the Rutgers College faculty, and Dr. C. D. Jarvis, of the U. S. Bureau of Education. This paper was completed June 1, 1919.

This paper presents a study of the four-year course in agriculture leading to the degree of bachelor of science in the land-grant colleges of the 48 States of the United States. The study was undertaken in the effort to determine some of the fundamental principles on which the four-year course should be based. In the course of the work a number of other facts developed that should be of value in the administration of an agricultural college curriculum. It was hoped that an intensive study would throw some light on the following questions:

1. What subjects should be required of all students in the four-year course in agriculture?
2. What place should each of these occupy in the course?
3. What should be the proportion of time devoted to the different types of work in the course?
4. How much freedom of choice of subjects should be allowed?
5. What is the best method of providing for specialization?
6. What relation should farm practice have to the requirements for graduation?
7. What are the weakest features at present in the average four-year course?
8. How may the efficiency of a course be measured?
9. How and to what extent may these principles be applied in the reorganization of a curriculum in agriculture?

No attempt was made to study any courses other than the regular four-year course leading to the bachelor's degree.

PREVIOUS STUDIES.

The fact that few studies have been recorded in which the four-year course has been considered from this standpoint was an additional incentive for the writer to take up the problem. When the work was begun, in December, 1917, preliminary papers had been published by F. B. Jenks[2] and C. D. Jarvis[3] in the Proceedings of the Association of American Agricultural Colleges and Experiment Stations. The committee on instruction in agriculture of this association, in their several reports, had made some valuable contributions to the subject. While this study was in progress, by far the most complete treatise yet in print was published by Dr. Jarvis[4] as a bulletin of the United States Bureau of Education. Some of the data reported in the present paper are covered in part in that bulletin. However, Dr. Jarvis has taken up some phases of the study, such as organization and entrance requirements, which are not considered

[2] Jenks, F. B., 1912, Agricultural Courses in the Land-Grant Colleges. *In* Proc. 26th An. Conv. Assn. Amer. Agr. Coll. Exp. Sta., pp. 108–112.

[3] Jarvis, C. D., 1917, A Study of the Requirements for Graduation in Agriculture. *In* Proc. 31st An. Conv. Assn. Amer. Agr. Coll. Exp. Sta., pp. 190–206.

[4] Jarvis, C. D., 1918, American Agricultural Colleges, U. S. Bu. Ed., Bul. 29, 1918.

here, and the present paper covers a number of topics not discussed by Dr. Jarvis. Furthermore, where the same subjects are covered in both, they are studied from a different point of view in most instances; so there is little actual duplication. The writer has found Dr. Jarvis's work of great value in completing the study, and will refer to it occasionally in the course of this paper.

II. PROCEDURE.

The data were compiled chiefly from two sources, the catalogs of the colleges and a questionnaire sent to the deans of the respective colleges. The catalogs used contained the announcements for the college year 1917–18.[5] The courses outlined would therefore represent approximately what the colleges were offering before reorganization was effected during the present year (1918–19) to provide for the Students' Army Training Corps. The questionnaire was sent out the first part of April, 1919, and hence the replies represent the very recent opinion of the men in the agricultural colleges who have been closely concerned with curriculum problems, in most instances for a number of years, and who have had the additional advantage of observing the college at work during the war period. Furthermore, they should reflect whatever effect the war-time demands have had on American agriculture, as well as need for reorganization in this reconstruction period. The summary of the questionnaire should represent a step in advance when compared with the summary of the catalog data.

The data compiled from the catalogs will be considered first, and the results compared with the summary of the questionnaires in the last part of the paper.

It should be noted here that the summarized data for the colleges were not submitted to the respective deans for their indorsement. While in many respects this would have been desirable, it was thought that in view of the difficulty of defining the method of classification in such a way that it would be accurately followed by all in checking over our figures, it might not be advisable. In calculating the distribution of time among the different types of work, for example, different individuals might place the same subject in different classes, and this would give rise to inaccuracies, and lessen the value of the data for comparative purposes. On the other hand, in the preparation of the data as here presented, a careful effort was made to follow the same standards of comparison throughout. The writer fully appreciates, however, that the absence of confirmation of the data

[5] There was one exception to this. When the study was begun the announcements of Clemson College, South Carolina, for 1917-18 were not available; so those for 1916-17 were used. Because of delay in publishing this study, certain of the data will be somewhat out of date by the time it appears in print. The reader should give this due consideration in interpreting the material presented.

by representatives of the colleges themselves might permit some errors to go undiscovered.

Reducing the data from the catalogs to a form suitable for comparative study involved a vast amount of tabulation. The methods followed will be described in connection with the discussion of the different topics.

III. REQUIRED WORK.

A study was first made of the subjects which are required of all students in each college, enrolled in the four-year course in agriculture, regardless of the special lines of work they may take up in the third or fourth years. First of all, what subjects are required? Second, in what year are they given? Third, how much time is devoted to each? From the answers to these questions we should be able to determine something indicating the relative importance of different subjects, as well as the sequence in which they should be offered.

To put these data in usable form, a large table was prepared showing the name of each subject required of all students in each college, the year in which it was given, the number of terms or semesters, and the number of credit hours per week. The data were recorded for 47 colleges. Utah Agricultural College was not included because it has a group elective system for all four years, making it impossible to record definitely any required subjects.

It is unnecessary to reproduce this table here, as it is very unwieldly, but the method of tabulation is illustrated by a small portion of the table, shown below. The arabic figures in each subject column represent the number of credit hours per week in the term or semester indicated in the second column. The small numeral to the right of and above each of these figures represents the year in which the subject is required.

The method of tabulating the data taken from the college catalogs is as follows:

Credit hours per week in the term or semester.

College.	Term or semester.	English.	Public speaking.	Inorganic chemistry.	Qualitative chemistry.	Quantitative chemistry.	Organic chemistry.	Agricultural chemistry.	Field crops.	Fruit growing.	Dairy husbandry.	Farm management, etc.; covering a total of 74 subjects.
Alabama	First	3[1] *5[2]	3[1]	4[1]	.....	*3[2]	5[2]	.....	.....	.....	3[3]	.....
	Second	5[1]3[2]	.....	4[1]	.....	*3[2]	5[2]	.....	.....	.....	2[3]	.....
	Third	5[1]*3[2]	.....	4[1]	.....	*3[2]	.....	6[3]	3[3]	2[3] 4[2]	.....	.....
Arkansas	First	3[3]	.....	4[1]	2[2]	.....	3[2]	.....	.....	.....	.....	.....
	Second	3[3]	.....	4[1]	.....	2[2]	.....	3[2]	4[1]	.....	3[2]	.....

*Optional.

In all, 76 subjects were included in the tabulation. On account of different terminology used in different colleges, a certain standardization was found necessary as the work proceeded, and in some instances it was necessary to group a number of closely related subjects under a single head. The subjects as given in the catalogs are here shown, with the grouping of the special subjects and those of different terminology:

1. English (literature, composition; rhetoric).
2. Public speaking (argumentation; public discourse).
3. Agricultural journalism (journalism).
4. Modern language (French, Spanish; German, Italian).
5. Psychology.
6. Agricultural education.
7. History.
8. General economics (political economy).
9. Rural economics (rural economy; rural institutions).
10. Political science (law, civics, American Government).
11. Sociology (social science).
12. Industrial geography.
13. Physical training (physical education, gymnastics; gymnasium).
14. Hygiene.
15. Military science (drill, tactics, theory).
16. Algebra.
17. Geometry (solid, analytical).
18. Trigonometry.
19. Agricultural mathematics.
20. Physics (agricultural).
21. Geology (physiography).
22. Climatology.
23. Chemistry, inorganic (general chemistry).
24. Chemistry, qualitative.
25. Chemistry, quantitative.
26. Chemistry, organic.
27. Chemistry, agricultural (soil chemistry; agricultural analysis).
28. Biochemistry.
29. Biology.
30. Breeding (genetics, plant and animal breeding; principles of breeding).
31. Physiology (anatomy and physiology).
32. Zoology (vertebrate zoology, general zoology; invertebrate zoology).
33. Bacteriology.
34. Microbiology (agricultural microbiology).
35. Entomology (economic entomology; insecticides).
36. Botany, general (plant anatomy; plant histology).
37. Botany, agricultural.
38. Plant physiology.
39. Plant pathology.
40. Soils (soil technology; soil management).
41. Soil physics.
42. Fertilizers and manures.
43. Field crops (agronomy; cotton, seeds).
44. Grain crops (corn).
45. Forage crops (grasses, forage crops, and weeds).

46. Fruit growing (horticulture; viticulture).
47. Pomology.
48. Olericulture (vegetable gardening; market gardening).
49. Plant propagation.
50. Forestry.
51. Landscape horticulture (landscape art; landscape gardening).
52. Animal industry (types of live stock; types and breeds, live stock; live-stock judging, live-stock management).
53. Feeding and nutrition (feeds and feeding; nutrition).
54. Veterinary science (animal diseases; veterinary medicine).
55. Dairy husbandry (dairy industry, milk; dairying, dairy production, dairy management).
56. Poultry husbandry.
57. Farm management (farm management and organization).
58. Farm accounts.
59. Farm study.
60. Surveying (civil engineering).
61. Rural engineering (sewage disposal, water supplies; rural sanitation).
62. Irrigation and drainage.
63. Drawing (freehand drawing, drafting; mechanical drawing).
64. Shopwork (woodwork, mechanic arts; forge).
65. Farm mechanics (farm machinery, farm motors; field machinery).
66. Farm buildings (rural architecture).
67. Library work.
68. Extension.
69. Natural history of farm.
70. Freshmen lectures.
71. Farm practices.
72. General agronomy.
73. General agriculture.
74. Agricultural experimentation.
75. Seminar.
76. Thesis.

Subjects offered strictly as optionals also were recorded. An optional subject may be defined in this connection as one which may be selected from a small group, usually of two, three, and seldom over four, subjects. Special subjects offered as a part of a departmental course in the junior or senior years are not considered as optionals, or where subjects are offered as majors or minors in which there is considerable freedom of choice. In cases where specialization begins in the second year, subjects in certain groups not required for all students are classed as optionals.

In making the first tabulation, the optionals were recorded along with the required subjects, and were designated with an asterisk (*). When the table was completed, they were transferred to a separate table, showing optional work alone.

The purpose of including optional subjects in the study was to determine what place these have in the curriculum. Certainly optional work should not be classed with free electives. There is a degree of requirement about optionals that associates them closely

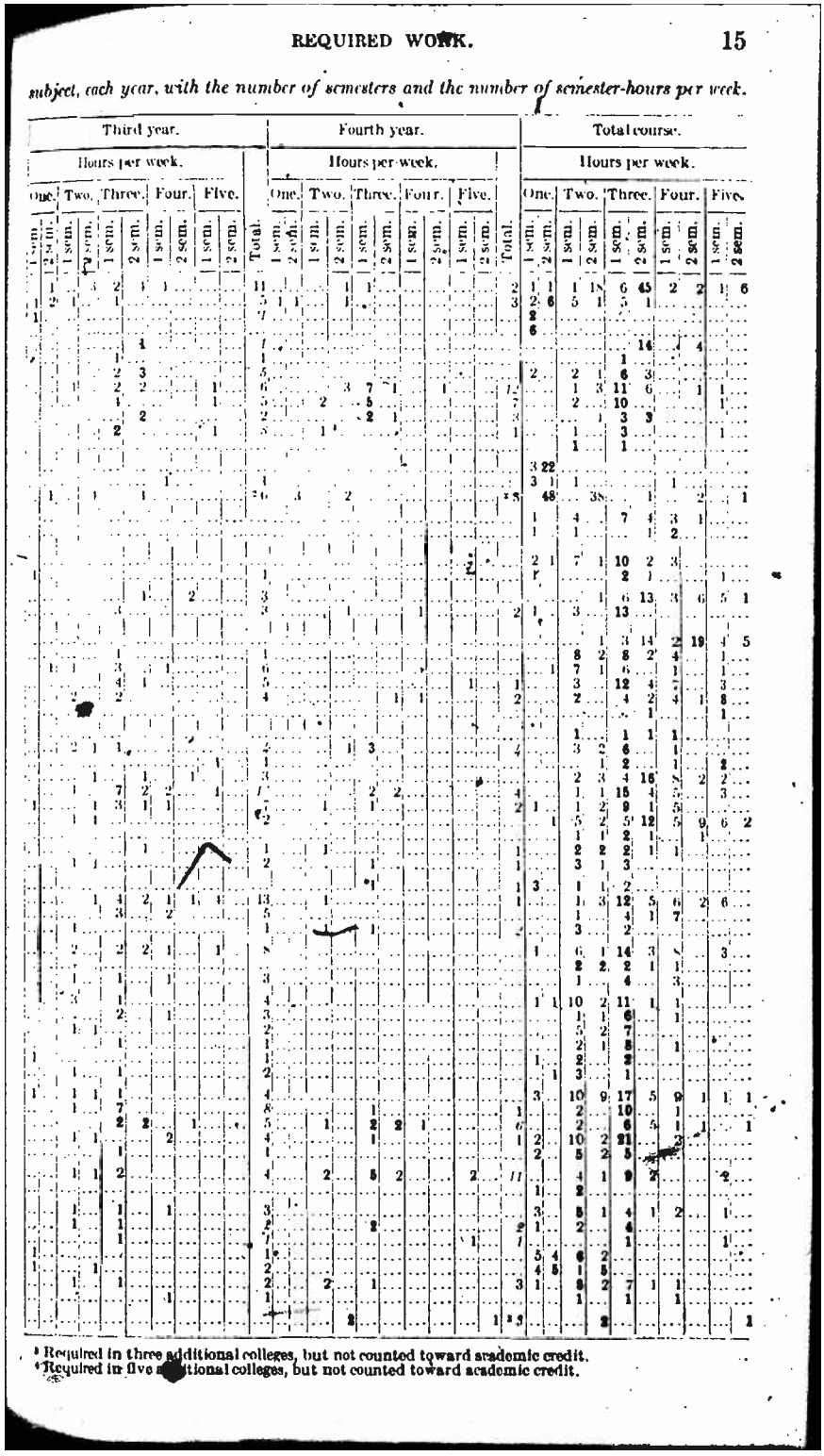
with required subjects, and the relative standing of the different subjects with respect to importance can be concluded more accurately by considering the extent to which they are offered as optionals along with the degree to which they are required. From the data recorded, Tables 1 and 2 were prepared. Table 1 shows the number of colleges requiring each subject in any given year, for either one or two semesters, for any given number of hours per week. Table 2 shows the same for optional work. The total number of colleges requiring the work in each of the four years also is shown. The summary column shows the total number of colleges requiring work in each subject any time during the course for any given number of hours per week.

TABLE 1.—*Distribution of required subjects, showing number of colleges requiring each*

Required subjects.	First year.												Second year.									
	Hours per week.												Hours per week.									
	One.		Two.		Three.		Four.		Five.		Total.		One.		Two.		Three.		Four.		Five.	
	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.			1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	Total.
English																						
Public speaking		2	1		1																	
Agricultural journalism																						
Library work	5																					
Modern language						8		3														
Psychology																						
History			1	1	3																	
Economics					1	1																
Rural economics																						
Law (political science)																						
Sociology																						
Industrial geography			1																			
Physical training	1	15																				
Hygiene	3		1																			
Military science		23		16				1		1				21		16				1		1
Algebra			3		7	4	3	1														
Geometry (solid, analytical)			1			1	2								1							
Trigonometry		1	6	1	10	1	2															
Agricultural mathematics					2	1			1				2		1		1	1				
Physics					4	1		1	3													
Geology	1		1		2										1		2	8	3	3	2	1
Chemistry:																						
Inorganic				7	3	13	2	15	4	2					2		8					
Qualitative			3	2	3		3		1									1		3		3
Quantitative															5		1	2	1			
Organic					1										6	1	3			1		
Agricultural					1										3		7	3	7		2	
Biochemistry																	1	1	3	1	6	
Biology					1	1												1			1	
Breeding															1				1			
Physiology															1		2		1			
Zoology			1	1		6	3		1						1		1		4		1	
Bacteriology							1		1						1		1	9		1	1	
Entomology					1										1				2			
Botany (general)		1	2	1	1	11	1	6	3	2					2		1	4	4			
Botany (agricultural)			1		1	1		1									1	1	1	3	3	
Plant physiology					1										1			1				
Plant pathology				1											1	2		1				
General agriculture	3		1	1	1										1		2					
Soils							1															
Soil physics																2	8	3	1	1	2	
Fertilizers and manures															1		1	1	5			
Field crops	1		3	1	7		5		1						1		2	1	2		1	
Grain crops			1	1		1									1	1	2		1			
Forage crops																	3		2			
Fruit growing	1		2	2	4								1		5		6	1	1			
Pomology															1	1	4					
Olericulture			2		2										2	1	5					
Plant propagation			1	1	2										1		5		1			
Forestry			1		1										1		1					
Landscape horticulture																						
Animal industry	1		3	3	10	1	6	1	1	1			1		1	3	6	1	3		1	
Nutrition															1		2		1			
Veterinary science															1		2	1			1	
Dairy husbandry	2		4	1	5										5		8					
Poultry husbandry	1		2		1								1		3	2	3					
Farm management								1							1		2					
Farm accounts	1														2							
Surveying	2		1		1			1					1		3	1	3		1			
Rural engineering	1		1														1					
Irrigation																						
Drawing	4	4	6	2																		
Shopwork	2	8	1	4									1									
Farm mechanics	1		2	1	1	1																
Farm buildings			1		1										3	1	4					
Thesis																						

[1] Required in one additional college, but not counted toward academic credit.
[2] Required in two additional colleges, but not counted toward academic credit.

subject, each year, with the number of semesters and the number of semester-hours per week.



[a] Required in three additional colleges, but not counted toward academic credit.
[b] Required in five additional colleges, but not counted toward academic credit.

Additional subjects not tabulated in preceding table but required in one college.

Subjects.	Hours per week.	Number of semesters.	Year.
Extension	1	1	First.
Natural history of farm	1	1	Do.
Seminar	1	1	Do.
Agricultural experimentation	3	1	Fourth.
General agronomy	2	2	First.
Climatology	1	1	Second.
Farm practices	1	2	First.
Farm study	3	1	Fourth.
Greenhouse management	1	1	Do.
Agricultural education	3	1	Third.
Microbiology			First.
Freshmen lectures			

TABLE 2.—*Distribution of optional subjects, showing number of college units per week, subject to an optional each year, with the number of semesters and the number of semester hours per week.*

Subjects.	First year.										Second year.										Third year.										Fourth year.									
	Hours per week.										Hours per week.										Hours per week.										Hours per week.									
	One.		Two.		Three.		Four.		Five.		One.		Two.		Three.		Four.		Five.		One.		Two.		Three.		Four.		Five.		One.		Two.		Three.		Four.		Five.	
	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	Total.
English											1																												
Public speaking																																							
Agricultural journalism											1																												
Library work																																							
Modern language																					1																		
Psychology																					2																		
History																					1		1																
Economics																							1																
Rural economics																																							
Law (political science)																																							
Sociology																																							
Industrial geography																																							
Physical training																																							
Hygiene																																							
Military science																																							
Algebra																																							
Geometry (solid, analytical)																																							
Trigonometry																																							
Agricultural mathematics																																							
Physics																																							
Geology																																							
Chemistry:																																							
Inorganic																																							
Qualitative																																							
Quantitative																																							
Organic																																							
Agricultural																																							
Biochemistry																																							

TABLE 2.—*Distribution of optional subjects, showing number of colleges offering each subject as an optional each year, with the number of semesters and the number of semester hours per week*—Continued.

Subjects.	First year.										Second year.										Third year.										Fourth year.									
	Hours per week.										Hours per week.										Hours per week.										Hours per week.									
	One.		Two.		Three.		Four.		Five.		One.		Two.		Three.		Four.		Five.		One.		Two.		Three.		Four.		Five.		One.		Two.		Three.		Four.		Five.	
	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	Total.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	Total.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	Total.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	1 sem.	2 sem.	Total.
Biology						1					1		1								1										1									
Breeding															1						1										1		1							
Physiology													1		1		1				3										3									
Zoology						1					1		1		1		3		1		6										1									
Bacteriology																			1		1										1									
Entomology					1						1		1		1		1				3										3									
Botany (general)					1						1		1		1						2		1								3									
Botany (agricultural)					1						1										1										1									
Plant physiology						1					1				2		1				3										3									
Plant pathology															1						1						1				2									
General agriculture																															1									
Soils															1						1										1									
Soil physics																															1									
Fertilizers and manures																					1										1									
Field crops																					6										6									
Grain crops					1						1		1				1				2		1								1									
Forage crops															1						1										1									
Fruit growing													1				2				3		2								2									
Pomology																							1								1									
Olericulture					1						1		1								2										2									
Plant propagation													2								2										2									
Forestry											1																													
Landscape horticulture																																								
Animal industry													2	1	2		1				6										1									
Nutrition												1		1	2						4																			
Veterinary science														2	2						4										1		1							
Dairy husbandry														1	1		1				3		2		1						3									
Poultry husbandry												1									1																			

Farm management											1
Farm accounts			1					1			
Surveying			1	1	1			3			
Rural engineering							1	1			
Irrigation			2					2			
Drawing					1	1		2			
Shopwork	1	1									
Farm mechanics	1	1	1	1	1			3	1	1	
Farm buildings			1					1			
Thesis											

In preparing these tables from the first tabulation, it was necessary to convert all data to a two-semester-per-year basis. Nine of the 47 colleges divide the college year into 3 terms; one has 1 term and the balance have 2 semesters of a half year each. As it was necessary to have a common basis for comparison, the work in the 3-term colleges as originally recorded was transposed to its equivalent in round

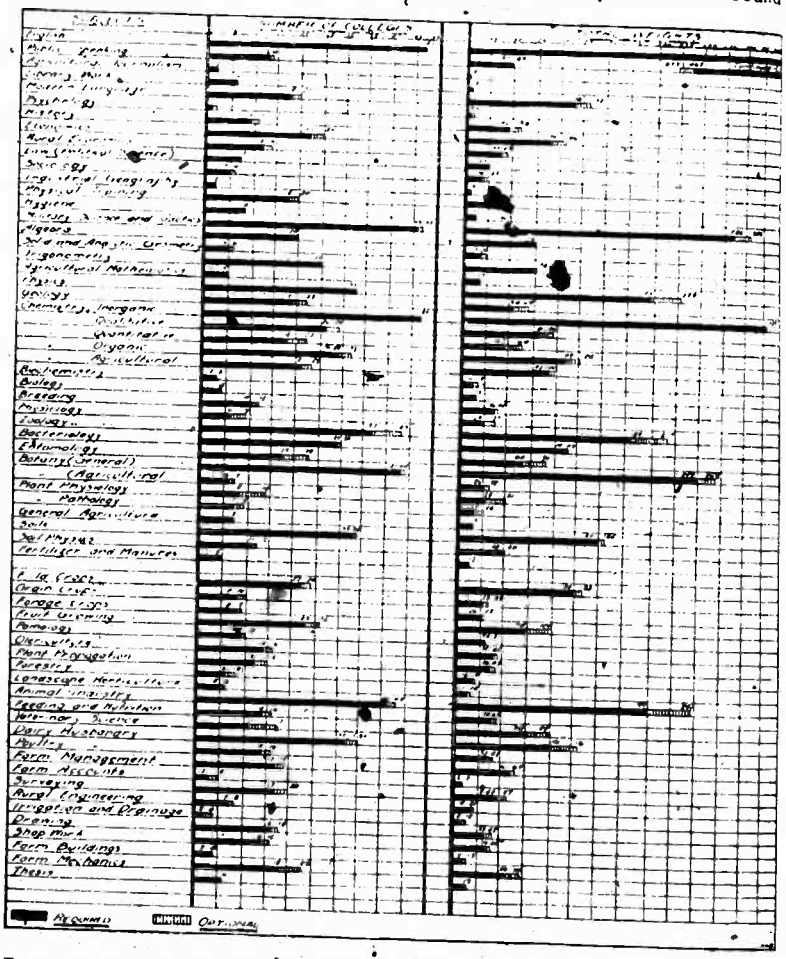


DIAGRAM 1.—*Number of colleges in which the respective subjects are required and the number in which they are offered as optionals.*

numbers in half-year semesters. Some approximation was necessary here, as it was thought desirable to use only whole numbers. So the number of hours per week was recorded at the nearest unit. Thus a term-hour is equivalent to two-thirds of a semester hour. If, for example, a college offered chemistry for 6 hours a week for one term, it would be entered as 4 hours a week for one semester.

The number of colleges requiring each subject at any time during the course was calculated and is shown in diagram 1 (left-hand column).

The number of colleges requiring a subject is indicative of its relative importance, and this can be judged from the diagram. It was felt, however, that a more accurate measure of relative standing is desirable. The number of semesters a subject is given and the number of hours a week are factors which should be considered in determining the relative importance. Accordingly, a unit of measure was devised for this purpose, which for convenience may be designated as a "weight." A single unit, or "weight," for any given subject represents one college requiring it for one hour a week for one semester. The total number of weights, then, for any required subject represents the total number of credit-hours per week it is required for the total number of semesters in all of the colleges taken together. This was calculated from Table 1. To determine the number of weights for each subject, the number of colleges requiring it for a given number of credit-hours per week for one semester in any one year was multiplied by the number of hours a week. When given for two semesters, the product was multiplied by 2. The sum of the one-semester and the two-semester weights would give the number of weights for the year. This was done for each year and the total number of weights calculated by finding the sum of the weights for all four years.

The formula for calculating the weights may be represented thus:

Total of weights for any one subject equals--

First year

1 time: number of colleges requiring subject 1 hour per week 1 semester, *plus* 2 *times* number of colleges requiring subject 1 hour per week 2 semesters,

plus

2 times: number of colleges requiring subject 2 hours per week 1 semester, *plus* 2 *times* number of colleges requiring subject 2 hours per week 2 semesters,

plus

3 times: number of colleges requiring subject 3 hours per week 1 semester, *plus* 2 *times* number of colleges requiring subject 3 hours per week 2 semesters,

plus

4 times: number of colleges requiring subject 4 hours per week 1 semester, *plus* 2 *times* number of colleges requiring subject 4 hours per week 2 semesters,

plus

5 times: number of colleges requiring subject 5 hours per week 1 semester, *plus* 2 *times* number of colleges requiring subject 5 hours per week 2 semesters.

plus

Second year—Same formula as for first year.

plus

Third year—Same formula as for first year.

plus

Fourth year—Same formula as for first year.

The weights of the subjects, both required and optional, are given in Table 3, and shown graphically in diagram 1 (right-hand column).

By studying diagram 1, one gets a good idea of the relative standing of the different required subjects. Only two subjects were required in all 47 colleges—English and inorganic chemistry. The same could be said of military training except that it was optional with physical training in one college. Since our entry in the war, this has probably been changed. From the standpoint of the number of colleges, botany ranks next with 43, animal industry with 41, zoology with 37, physics and soils each with 33, and dairy husbandry with 32. Other subjects required in 24 or more colleges (a majority of those studied) in order are organic chemistry, bacteriology, qualitative chemistry, and trigonometry.

It is thus seen that three types of work are well represented in the majority of colleges. In the academic field we have English and trigonometry (military drill, also, may be included here for convenience, but more correctly may be considered in a class by itself). The fundamental sciences are represented by inorganic chemistry, qualitative chemistry, organic chemistry, physics, botany, zoology, and bacteriology. The three agricultural subjects appearing most often are soils, animal industry, and dairy husbandry.

It should be recognized that this diagram has certain limitations with respect to the group of agricultural subjects. Much of the work in agriculture is reserved for the last two years, and in many cases the subjects are offered as electives, optionals, or in special departmental groups. Hence they do not show up very prominently here, and this diagram is consequently not an accurate index of their place in the curriculum. Still, we are studying these data from the standpoint of *required* work, and the diagram does strikingly bring out one fact—relatively less of the agricultural subjects are *required*, and the student is given considerable latitude of choice in making his selection of agricultural work.

It appears to the writer that there is a degree of weakness in the tendency here exhibited. If the student needs a good foundation in certain academic subjects, and should have a good basic knowledge of certain sciences, which are accordingly required, why does he not need at least an introductory knowledge of the important branches of agriculture as a basis for specialization along any one of these branches? As a general principle, effort should be made to require an elementary course in each of the important branches of agriculture to give the student a broad view of the whole field in order that he may choose wisely the branch of agriculture in which later he will specialize.

TABLE 3.—*Summary of "weights" [1] of required and optional subjects.*

	Weights required.					Weights optional.					Number of colleges in which required.	Number of colleges offering as optional. [2]	Total colleges required and optional.	Total weights required and optional.
	First year.	Second year.	Third year.	Fourth year.	Total, 4 years.	First year.	Second year.	Third year.	Fourth year.	Total, 4 years.				
English	306	101	48	7	462	.....	6	9	.....	15	47	.....	47	477
Public speaking	9	23	8	7	47	.....	2	.....	.....	2	13	1	14	49
Agricultural journalism	.....	1	1	.....	2	.....	.....	.....	.....	.....	2	.....	2	2
Library work	5	1	.....	.....	6	.....	.....	.....	.....	.....	6	.....	6	6
Modern language	72	38	6	.....	116	.....	6	10	.....	16	18	2	20	132
Psychology	.....	.....	3	.....	3	.....	12	.....	.....	12	1	1	2	15
History	15	7	24	.....	46	6	3	3	.....	12	9	2	11	58
Economics	9	9	25	47	90	.....	3	4	6	16	22	3	25	106
Rural economics	.....	3	17	19	39	.....	6	.....	.....	6	12	2	14	45
Law (political science)	.....	7	6	12	25	.....	.....	.....	.....	.....	7	.....	7	25
Sociology	.....	3	11	2	16	.....	3	.....	6	9	5	1	6	25
Industrial geography	2	.....	3	.....	5	.....	.....	.....	.....	.....	2	.....	2	5
Physical training	16	12	.....	.....	28	2	2	2	2	8	18	2	20	36
Hygiene	7	.....	4	.....	11	.....	.....	.....	.....	.....	8	.....	8	11
Military science	128	124	24	10	286	2	10	8	.....	20	46	1	47	306
Algebra	71	3	.....	.....	74	.....	.....	.....	.....	.....	20	.....	20	74
Geometry (solid, analytical)	16	1	.....	.....	17	6	.....	.....	.....	6	5	1	6	23
Trigonometry	62	14	.....	.....	76	.....	.....	.....	.....	.....	25	.....	25	76
Agricultural mathematics	16	.....	1	.....	17	.....	.....	.....	.....	.....	5	.....	5	17
Physics	59	114	22	.....	195	.....	11	.....	.....	11	33	.....	33	206
Geology	9	28	9	8	54	.....	15	.....	.....	15	19	3	22	69
Chemistry, inorganic	261	68	.....	.....	329	.....	.....	.....	.....	.....	47	.....	47	329
Chemistry, qualitative	40	38	3	.....	81	.....	15	.....	.....	15	26	3	29	96
Chemistry, quantitative	.....	30	17	.....	47	.....	11	6	.....	17	18	4	22	64
Chemistry, organic	3	82	18	5	109	.....	17	.....	.....	17	29	3	32	126
Chemistry, agricultural	3	69	10	40	92	.....	8	.....	.....	8	21	2	23	100
Chemistry, biochemistry	.....	11	.....	.....	11	.....	6	.....	.....	6	2	1	3	17
Biology	9	6	.....	.....	15	.....	.....	.....	.....	.....	4	.....	4	15
Breeding	.....	12	11	13	36	.....	2	.....	2	4	10	2	12	40
Physiology	3	16	5	.....	24	.....	9	4	.....	13	6	3	9	37
Zoology	59	105	18	.....	182	4	31	.....	.....	35	37	6	43	217
Bacteriology	9	35	48	18	110	.....	5	.....	.....	5	29	1	30	115
Entomology	3	34	24	5	66	6	11	4	.....	24	18	5	23	90
Botany (general)	187	56	6	.....	249	6	11	3	3	20	43	1	44	269
Botany (agricultural)	19	7	.....	.....	26	6	.....	.....	.....	6	6	1	7	32
Plant physiology	3	17	6	2	28	4	10	9	.....	23	8	6	14	51
Plant pathology	2	8	6	3	19	.....	3	4	.....	7	7	2	9	26

[1] See p. 21.

[2] Only those colleges are included in this column in which the respective subjects are *not required*.

TABLE 3.—*Summary of "weights" of required and optional subjects*—Continued.

	Weights required.					Weights optional.					Number of colleges in which required.	Number of colleges offering as optional.	Total colleges required and optional.	Total weights required and optional.
	First year.	Second year.	Third year.	Fourth year.	Total, 4 years.	First year.	Second year.	Third year.	Fourth year.	Total, 4 years.				
General agriculture	13												7	15
Soils	4	7	10	3	24			6		6	33	1	34	156
Soil physics		30	12	2	44						11	1	12	51
Fertilizers and manures		5	2	5	12									12
Field crops	37	34	30	9	121	3	6	2		11	22	7	29	133
Grain crops	12	12	2		26						4		4	33
Forage crops			4		4		4			4				29
Fruit growing	25	40	6		71		12			12	23	3	26	100
Pomology		15	10		25						5	2	7	31
Olericulture	12	25	6		43						5	2	7	45
Plant propagation		5	3		8		4			4	2	1	3	43
Forestry	5	4	3	3	15			2		2	3	1	4	19
Landscape horticulture			3		3						1		1	13
Animal industry	132	52	10		194		17	14	2	33	41	2	43	247
Nutrition		12	23	5	40				5	5	13	2	15	45
Veterinary science		20	26	23	69		12	13	3	28	10	5	15	39
Dairy husbandry	29	20	11		60						9	3	12	131
Poultry husbandry		4			4			2		2	3		3	42
Farm management	1	4	12	11	61	3		2	2	7	15	2	17	65
Farm accounts							2			2				7
Surveying	15	24	9	6	45						12	3	15	57
Rural engineering	3		3	6	12			4		4	3	2	5	21
Irrigation			3	5	8						2	2	4	12
Drawing	32	1	1		33						15	3	18	42
Shop work	30		3	3	36						13	2	15	46
Farm mechanics	22	22	5	4	53		4	3		7	14	3	17	72
Farm buildings	25			2	27		1			1	3	1	4	13
Thesis				12	12						6		6	18

It is interesting to compare the graphs representing the "weights" of each subject with the graphs of the number of colleges in which the subjects are required. First of all, the parallelism between the two sets of graphs is most noticeable. There are, however, certain striking differences. There is a greater variation between subjects in the "weight" column, emphasizing the difference in standing between the subjects listed. English stands out strikingly as the leading subject, heading the list with 462 units. Inorganic chemistry follows with 329 weights, and military training with 286. Botany follows with 249, animal industry 199, physics 195, zoology 182, and soils 150. Other subjects having over 100 weights (in order) are field crops 124, modern language 116, bacteriology 110, organic chemistry 109, and dairy husbandry 101.

It may be seen, then, that the "order of importance" of subjects is not quite the same in the two graphs. This is brought out below, where the subjects are listed according to rank:

Rank by number of colleges.	Rank by weights.
1. English.	1. English.
2. Inorganic chemistry.	2. Inorganic chemistry.
3. Military training	3. Military training.
4. Botany	4. Botany.
5. Animal industry.	5. Animal industry.
6. Zoology.	6. Physics.
7. Physics.	7. Zoology.
8. Soils.	8. Soils.
9. Dairy husbandry.	9. Field crops.
10. Organic chemistry.	10. Modern language.
11. Bacteriology.	11. Bacteriology.
12. Qualitative chemistry.	12. Organic chemistry.
13. Trigonometry	13. Dairy husbandry.

The order of the first five subjects is the same in both groups; and also for the first eight, except that physics and zoology are reversed. The last five subjects in both groups include bacteriology, organic chemistry, and dairy husbandry, but qualitative chemistry and trigonometry in the first group give way to field crops and modern language in the second.

The subjects with a small number of units to their credit also are deserving of attention. Glancing down the list we see sociology, agricultural mathematics, forestry, landscape horticulture, farm buildings, and general agriculture, for instance. What is the reason for their insignificant standing? Have they been tried and found wanting and now are dying a natural death? Or are they comparatively new subjects which have been recently introduced at a few institutions and are worthy of adoption by others? The place of some of these, such as forestry, unquestionably should be determined largely by local conditions. On the other hand, a subject

like agricultural mathematics is of general application and may be worthy of consideration in any college. While this diagram shows existing tendencies, it should not for this reason be interpreted as representing what is best in the four-year course. It is important to remember that, while adoption by a majority of colleges is strong evidence in favor of a subject, it does not conclusively prove its place in all curricula. This is simply an analysis of the situation as it is.

With respect to the optional work recorded in Table 2 and shown in the graph, little is to be said. Options are most abundant in the sophomore year. Some are offered in the freshman year, but in general most of the first year's work is required. Considerable optional work appears in the junior year, but this is reduced on account of the departmental group electives and the large amount of free election which begins in this year in many colleges. The optional work in the senior year is unimportant.

The relative standing of the subjects as found for required work is not greatly altered when the optional work is added.

IN WHAT YEAR SHALL A SUBJECT BE GIVEN?

Table 1 shows the distribution of required subjects, not only throughout the four years of the course, but also with respect to the number of hours a week and the number of semesters. The largest number of colleges requiring any given subject in any one of these places appears in heavy-face type. The largest number of colleges requiring a subject within any of the four years is given in italics. Also in the summary column for all four years at the right, the "most popular" number of hours a week, with the number of semesters, is indicated by the heavy-face type. These data are summarized in a more easily readable form in Tables 4 and 5.

Table 4 shows the "most popular year" for each subject. As would be expected, the academic subjects are found chiefly in the first year—English, modern language, and mathematics. Also, the sciences, inorganic chemistry and botany, are included here. Agricultural work is begun with field crops, animal industry, and shop work. An equal number of colleges require qualitative chemistry in the first and in the second year.

The second year sees a considerable expansion of the curriculum, and a great variation among the colleges. The outstanding subjects are physics, zoology, and chemistry (organic, qualitative, and quantitative) among the sciences, and soils, fruit growing, and dairy husbandry among agricultural subjects.

TABLE 4.—*Summary showing the year in which each subject is required in the largest number of colleges.*

FIRST YEAR.

Subjects.[1]	Number of colleges requiring subject in year indicated.[2]	Most common requirement for given year.		
		Hours per week.	Number of semesters.	Number of colleges.
English	46	3	2	33
Modern language	11	3	2	8
Library work	5	[illegible]	1	5
History	(3)5	3	1	3
Physical training	18	1	2	15
Hygiene	7	1	1	3
Military science	46	1	2	23
Algebra	18	3	1	7
Geometry (solid, analytical)	4	3	1	2
Trigonometry	21	3	1	10
Agricultural mathematics	4	3	1	2
Inorganic chemistry	40	4	2	15
Qualitative chemistry	(2)12	2,3 or 4	1	9
Botany, general	31	3	2	11
Botany, agricultural	4	2,3 or 4	1 or 2	4
General agriculture	6	1	1	3
Field crops	18	3	1	7
Animal industry	34	3	1	10
Drawing	16	2	1	6
Shop work	12	1	2	5

SECOND YEAR.

Public speaking	8	2 or 3	1	6
Physics	20	3	2	8
Geology	10	3	1	8
Qualitative chemistry	(1)12	2	1	5
Quantitative chemistry	11	2	1	6
Organic chemistry	22	3 or 4	1	14
Agricultural chemistry	14	3	1	7
Breeding	(3,4)8	3	1	2
Physiology	4	2,3,4 or 5	1 or 2	4
Zoology	22	3	2	9
Entomology	9	3 or 4	1	8
Plant physiology	5	2	2	2
Plant pathology	3	3	1	2
Soils	20	3	1	8
Soil physics	8	4	1	5
Grain crops	5	3	1	2
Forage crops	5	3	1	3
Fruit growing	14	3	1	6
Pomology	6	3	1	4
Olericulture	8	3	1	5
Plant propagation	7	3	1	5
Landscape horticulture	3	2	1	2
Dairy husbandry	20	3	1	15
Poultry husbandry	9	2 or 3	1	6
Surveying	9	2 or 3	1	6
Farm mechanics	8	3	1	4

THIRD YEAR.

History	(1)5	3	2	3
Sociology	3	3	1	2
Breeding	(2,4)4	2	1	2
Bacteriology	14	3	1	8
Nutrition	8	3	1	7

FOURTH YEAR.

Economics	12	3	1	7
Rural economics	7	3	1	5
Law (political science)	3	3	1	2
Farm management	11	3	1	5
Veterinary science	6	3	1 or 2	4
Breeding	(2,3)4	3	1	3
Thesis	6	2	2	2

[1] Subjects mentioned on p. 16 are not given here, since each is required in only one college.

[2] The numbers in parentheses indicate another year in which the respective subjects are required in an equal number of colleges.

Bacteriology and nutrition appear to be third-year subjects. The numbers for the other junior-year subjects are small, but such as are given show an equal number in the first and third year for history, and in the second, third, and fourth years for breeding. The number for sociology is too small to mean much.

The fourth year includes economics (general and rural), farm management, and veterinary science.

Again, it should be pointed out that these data must be interpreted liberally, with due allowance for the limitations of the study. As this applies only to required work, the position of any subject is shown only for the colleges in which it is required. This is the explanation of so many subjects falling in the sophomore year, and so few in the junior and senior years. Nevertheless, the table is suggestive, and indicates clearly certain tendencies. By comparing the figures opposite each subject with the number of colleges requiring it shown in diagram 1, an idea of their value can be obtained.

HOW MUCH TIME SHALL BE GIVEN TO A SUBJECT?

The number of credit hours a week and the number of semesters per year devoted to each subject in the largest number of colleges are shown in Table 5. The table is self-explanatory, and little comment is necessary.

Hygiene, library work, and general agriculture (as a distinct subject) are required in but few colleges, but they appear to be 1-hour 1-semester subjects. Public speaking, physical training, and military training occur most frequently as 1-hour 2-semester subjects. Three hours a week is the most common assignment, and of the 39 subjects falling in this class, 33 are for 1 semester, 5 for 2 semesters, and 1 is tied between 1 and 2 semesters. This, it must be remembered, is for required work only. It seems quite certain that for advanced courses, given as free or group electives for specialization, a larger amount of time is awarded, on the average, than is shown here for required work.

Three hours a week for one semester is certainly insufficient for English, modern language, physics, zoology, and botany when they are required; and this is borne out by the data assembled. Each of these subjects falls in the 3-hour 2-semester group.

Only 3 subjects fall in the 4-hour group and 2 in the 5-hour group. Of the former, soil physics is a 1-semester subject and inorganic chemistry continues for 2 semesters. The number of colleges requiring geometry is insignificant. Agricultural chemistry claims 5 hours a week for 1 semester, and physiology is tied for 1 semester in the 3-hour and the 5-hour classes, but the number is so small as to be of little significance.

TABLE 5.—*Distribution of subjects by semester hours per week and number of semesters per year.*

Subjects.	Number of colleges in which subject is required for given number of hours per week.									
	One hour.		Two hours.		Three hours.		Four hours.		Five hours	
	1 semester.	2 semesters.	1 semester.	2 semesters.	1 semester.	2 semesters.	1 semester.	2 semesters.	1 semester.	2 semesters.
Library work	5									
General agriculture	3									
Hygiene	3									
Public speaking		6								
Physical training		22								
Military science		48								
Shop work		5		5						
Qualitative chemistry			8		8					
Quantitative chemistry			7							
Plant physiology			2	2	2					
Plant pathology			3		3					
Fertilizers and manures			3							
Grain crops			2	2	2					
Forestry			2		2					
Landscape horticulture			3							
Poultry husbandry			5		5					
Farm accounts			2							
Surveying			5							
Drawing			6							
Farm mechanics			8							
Thesis				2						
History					6					
Economics					11					
Rural economics					10					
Law (political science)					3	3				
Sociology					3					
Algebra					7					
Trigonometry					10					
Agricultural mathematics					2					
Geology					13					
Organic chemistry					12					
Breeding					6					
Physiology					2				2	
Bacteriology					15					
Entomology					9					
Botany, agricultural					2					
Soils					12					
Field crops					14					
Forage crops					4					
Fruit growing					11					
Pomology					6					
Olericulture					7					
Plant propagation					8					
Animal industry					17					
Nutrition					10					
Veterinary science					6					
Dairy husbandry					21					
Farm management					9					
Rural engineering					4					
English						45				
Modern language						14				
Physics						13				
Zoology						16				
Botany (general)						12				
Geometry (solid and analytical)							2			
Soil physics							7			
Chemistry, inorganic								19		
Chemistry, agricultural									8	

IV. BALANCING THE CURRICULUM.

It is generally accepted that the four-year course should not be confined narrowly to any one type of work, but that it should include a certain amount of the different types of subject matter in order to give the student a well-rounded training. While the aim of the course is to prepare for the profession of agriculture, it must not be limited to agricultural subjects alone. The reasons for this are obvious. Many agricultural subjects are dependent upon prerequisite courses of the fundamental type, such as chemistry or botany. The aim of a college course leading to a bachelor's degree is more than vocational; it should train for the highest type of citizenship. For this reason the liberal, or academic, studies have an important and essential place. But granted that the student should pursue some work of these different types, what is the proper proportion of each?

Another factor in balancing the curriculum is that of the proportion of work to be required. How much should be required, how much offered as prescribed electives, and how much as free electives?

A study of this phase of the problem was accordingly undertaken. For this purpose all subjects were classified in the following five groups:

1. *Academic.*—All liberal subjects such as English, foreign language, social science, history, and mathematics, and also physical and military training.

2. *Scientific.*—All subjects commonly known as the sciences, except those which are strictly applied science in the field of agriculture; for example, botany, chemistry, and zoology.

3. *General agriculture.*—All agricultural subjects, including strictly applied agricultural science, except the professional or specialized subjects; for example, soils, crops, dairy husbandry.

4. *Special agriculture.*—All agricultural subjects pursued as a specialized group for professional preparation. For instance, in a departmental group course in horticulture, such subjects as pomology, small fruits and nursery practice would be classed as special agriculture.

5. *Free elective.*—All electives which would not fall in any of the preceding four groups.

The outlines of the four-year courses in the catalogues were studied carefully and the number of credit hours a week devoted to subjects in each of these groups tabulated for each year and for the total course. The proportion of time falling in each of these groups was then determined on a percentage basis.

At the same time another classification was made in a similar way for the following groups:

1. *Required.* All work required of all four-year students.

2. *Prescribed elective.* Subjects which were elective to a certain degree, and yet were limited by some degree of requirement; for example, optionals and group electives.

3. *Free electives.* The classification in the latter two sets of groups required a great deal of painstaking study and care. In many instances it was necessary to refer to the descriptive outline of a course to determine its proper place. Occasionally certain inconsistencies were found in the catalogues, and many special cases arose calling for individual judgment. Also, the number of determinations was so great that it is not improbable that some errors have crept in. However, the figures were cross-checked in two or three different ways, and the writer has reason to believe that they are substantially accurate.

The determinations were relatively easy when a single set of studies was pursued by all students for any given term or semester. However, the differentiation of work among the departmental group electives complicated matters considerably. In such cases it became necessary to make the classification for each departmental group, and take the average of the groups as the figures for the college. For instance, if a college offered a single course in the first and second years, and departmental group electives in agronomy, animal husbandry, and horticulture for the third and fourth years, it was necessary to make but one classification for the first two years, but for the third and fourth years the classification was made for each of the departmental groups, and then the average for each class (academic, scientific, etc.) taken for the college classification.

As a matter of record, the classification of the individual subjects is given. Obviously, subjects placed in the "Special agriculture" class vary with the different special groups of studies pursued. This in turn would affect the general agriculture class, and occasionally the academic and scientific classes. However, it may be understood that when a subject appears in the "Special agriculture" class for any college, it would not be included in any of the other classes for the same college.

The classification follows:

Academic.

English.	Extemporaneous speaking
Agricultural literature.	Foreign language.
Literature of farm life and county.	History.
Farm literature.	English economic history.
Composition.	American economic history
Agricultural journalism.	History of agriculture.
Agricultural publicity.	History of American agriculture.
Industrial publicity.	History of American horticulture.
Technical journalism.	Civil government.
Argumentation.	National government.
Public speaking.	State and municipal government.

Political parties.
Typewriting.
Military drill.
Political theory.
Irrigation law.
Business law.
Economics.
Economic science.
Political economy.
Labor problems.
Rural economics.
Agricultural economics.
Marketing problems.
Markets and marketing.
Marketing, agricultural products.
Social science.
Rural sociology.
Psychology.
Education.
Principles of education.
Teaching of agriculture.
Methods of teaching agriculture.
Extension teaching.
Biometry.
Mechanical drawing.
Hygiene.
College and station work.

Sciences.

Geology.
Meteorology.
Physics.
Organic chemistry.
Analytical chemistry.
Quantitative analysis.
Qualitative analysis.
Physiological chemistry.
Plant chemistry.
Phytochemistry.
Technical analysis.
Agricultural biochemistry.
Botany.
Ecology.
Plant physiology.
Plant histology.
Vegetable physiology.
Plant anatomy.
Plant embryogeny.
Plant taxonomy and histology.
Plant physiology and pathology.
Plant pathology.
Principles of plant pathology.
Classification of plants.
Evolution of plants.
Plant genetics.
Principles of breeding.
Heredity.
Genetics.
Organic evolution.
Cytology and embryology.
Embryology and histology.
Embryology.
Zoology.
Comparative physiology.
Physiology.
Anatomy and physiology.
Anatomy.
Vertebrate anatomy.
Veterinary anatomy.
Taxonomy.
Microscopical technique.
Mycology.
Bacteriology.
Entomology.

General Agriculture.

Soils.
Soil physics.
Soil fertility.
Fertilizers.
Fertilizers and manures.
Soil technology.
Soil bacteriology.
Chemistry of soils, fertilizers, etc.
Soil management.
Soil physics and management.
Soil surveying and mapping.
Farm drainage.
Drainage.
Irrigation.
Irrigation engineering.
Farm engineering and architecture.
Agricultural engineering.
Farm mechanics and machinery.
Surveying.
Landscape architecture.
Landscape gardening.
Rural sanitary equipment.
Farm management.
Farm records and accounts.
Farm accounts.
Plant culture.

Crops.
Cereals.
Cereal crops.
Farm crops.
Field crops.
Grain and corn judging.
Grain judging.
Forage crops.
Forage, fiber and root crops.
Cotton classing.
Field-crop diseases.
Crop improvement.
Corn breeding.
Small grain breeding.
Forage crop breeding.
Weeds and seed testing.
Plant pest control.
Forestry.
Elements of horticulture.
Pomology.
Commercial orcharding.
Pruning and orchard protection.
Spraying.
Vegetable gardening.
Truck farming.
Vegetable pathology.
Breeds.
Breeds of livestock.
Livestock judging.
Stock judging.
Livestock feeding and management.
Animal nutrition.
Nutrition and feeding.
Woodwork.
Forge work.
Farm buildings.
Farm structures.
Farm mechanics.
Farm motors.
General electrical engineering.
Farm machinery and motors.
Concrete construction and drainage.
Farm machinery.
Farm and power machinery.
Farm engineering.
Farm buildings and fences.
Shop.
Forging and metal work.
Rural architecture.
Animal feeding.
Feeding.
Principles of feeding.
Anatomy of farm animals.
Animal breeding.
Breeding.
Animal production.
Livestock production.
Veterinary medicine.
Veterinary science.
Common diseases.
Diseases of livestock.
Animal diseases.
Clinics.
Animal parasites.
Feeding and marketing horses.
Soundness and shoeing.
Sheep, horse, mule, beef.
Swine production.
Pork production.
Dairying.
Dairy farming.
Dairy judging.
Dairy stock feeding and management.
Dairy herd management.
Dairy management.
Milk production.
Market milk.
Milk inspection.
Dairy manufactures.
Butter making.
Cheese making
Dairy chemistry.
Agricultural chemistry.
Agricultural analysis.
Agricultural bacteriology.
Poultry.
Farm poultry.

Special Agriculture—Agricultural Chemistry Group.

Agricultural analysis.
Agricultural chemistry.
Chemistry of animal physiology.
Chemistry of soils, fertilizers, etc.
Food chemistry.
History of chemistry.
Microchemical methods.
Physical chemistry.
Organic chemistry.
Qualitative analysis.
Quantitative analysis.
Secondary agricultural industries.
Soil and fertilizer analyses.
Thesis.

Special Agriculture—Agricultural Education Group.

Agricultural extension and demonstration.
Administration of high-school agriculture.
Administration of schools.
Child development and adolescence.
Classroom management and practice.
Entomology for teachers.
Extension teaching.
High-school problems.
History of education.
Home and school gardening.
Methods of teaching.
Observation and curriculum.
Organization and materials.
Pedagogy of agriculture.
Practice teaching.
Principles of education.
Psychology.
Research and thesis.
Rural education.
Rural organization.
School hygiene.
School organization and management
Secondary and vocational education.
Secondary education.
Teachers' college.
Teaching of agriculture.
Teaching process.
Thesis.
Training in teaching agriculture.
Vocational education

Special Agriculture—Agricultural Engineering Group.

Automobiles.
Drawing.
Farm buildings.
Farm concrete.
Farm machinery.
Farm mechanics.
Farm motors.
Farm structures.
History of irrigation.
Hydraulics.
Irrigation.
Irrigation engineering.
Map drawing.
Masonry construction.
Pump and power problems.
Repair of farm machinery.
Rural engineering.
Surveying.
Terracing.
Tractors.

Special Agriculture—Agronomy Group.

Agricultural chemistry.
Agrostology.
Bulletin review.
Cereals.
Chemistry of soils, fertilizers, etc.
Corn breeding.
Cotton.
Crop breeding.
Crop improvement.
Crop and garden entomology.
Diseases of field crops.
Drainage.
Farm crops.
Fertilizers.
Field crops
Field management.
Forage crop breeding.
Forage crops
Grain judging.
Irrigation.
Irrigation engineering.
Methods of investigation.
Plant breeding.
Plant culture.
Plant pathology.
Potato growing.
Seminar.
Small grain breeding.
Special crops.
Soil bacteriology.
Soil fertility.
Soil management.
Soil physics.
Soil technology.
Soils.
Thesis.
Weeds and seed testing.

Special Agriculture—Animal Husbandry Group.

Animal breeding.
Animal chemistry.
Animal diseases.
Animal histology and embryology.
Animal nutrition.
Animal parasites.
Animal production.
Anatomy of farm animals.
Beef cattle and sheep production.
Beef production.
Breeds of live stock.
Bulletin review.
Butter making.
Common diseases.
Comparative anatomy.
Comparative physiology.
Dairy cattle feeding.
Dairy stock judging.
Dressing and curing meats.
Embryology of domestic animals.
Farm sanitation.
Feeding.
Feeding and marketing horses.
Feeds and feeding.
Handling and fitting live stock.
Herd book study.
Horse, swine, and dairy cattle.
History of breeds.
Hygiene and sanitation for animals.
Judging.
Live-stock economics.
Live-stock judging.
Live-stock management.
Live-stock practicums.
Live-stock records.
Market classes of live stock.
Market milk.
Marketing.
Meat production.
Meats.
Milk production.
Obstetrics.
Pedigree work.
Physiology of domestic animals.
Practicums.
Principles of animal breeding.
Research.
Sanitary science.
Seminar.
Sheep production.
Soundness and shoeing.
Swine production.
Testing milk and cream.
Thesis.
Veterinary hygiene and sanitation.
Veterinary science.

Special Agriculture—Botany Group.

Botanical drawing.
Classification of plants.
Crop diseases.
Forestry.
Plant anatomy.
Plant histology.
Plant materials.
Plant pathology.
Taxonomic botany.

Special Agriculture—Dairy Husbandry Group.

Agriculture advertising.
Animal breeding.
Animal chemistry.
Animal nutrition.
Animal parasites.
Bulletin review.
Butter judging.
Butter making.
Cheese making.
Chemistry of dairy products.
Common diseases.
Comparative anatomy.
Comparative physiology.
Dairy bacteriology.
Dairy breeds.
Dairy chemistry.
Dairy engineering.
Dairy literature.
Dairy sanitation.
Dairy technology.
Dairy research.
Dairying.
Embryology of domestic animals.
Factory management.
Factory operation.
Farm sanitation and communicable diseases.
Feeding and management of life stock.
Ice cream and ices.
Inspection of milk products.
Judging dairy cattle.
Judging dairy products.

Live-stock judging.
Live-stock management.
Management of the dairy herd.
Management of dairy plants.
Market classes of live stock.
Market milk.
Milk fermentation.
Milk production.
Milk products.
Milk technology.
Milk testing and inspection.
Obstetrics.
Physiology of domestic animals.
Principles of breeding.
Pure-bred herds.
Sanitary science.
Seminar.
Thesis.
Veterinary science.

Special Agriculture—Entomology Group.

Entomology.
Forest insects.
Insecticides, fungicides.
Plant pathology.

Special Agriculture—Farm Management Group.

Accounting and management of cooperative enterprises.
Economical organization of agriculture.
Farm accounts.
Farm management.
Field work.
Research.
Seminar.
Thesis.

Special Agriculture—Horticulture Group.

Architectural drawing.
Bulletin review.
Canning.
Canning and handling by-products.
Citrus culture.
Commercial pomology.
Control of insect pests.
Crop diseases.
Deciduous and subtropical fruits.
Engineering drawing.
Experimental horticulture.
Floriculture.
Floral decorations.
Forcing vegetables.
Forestry.
Fruit and vegetable judging.
Fruit farm management.
Fruit growing.
Garden flowers.
Greenhouse construction.
History and economics of horticultural research.
History of cultivated plants.
Home floriculture.
Horticultural entomology.
Horticultural literature.
Horticultural pathology.
Insects and diseases of citrus fruits.
Landscape gardening.
Market gardening.
Markets and marketing.
Nursery practice.
Plants.
Plant breeding.
Plant-disease control.
Plant evolution.
Plant materials.
Plant pathology.
Practical pomology.
Pruning and orchard practice.
Seminar.
Small-fruit culture.
Small fruits.
Special problems.
Spraying.
Subtropical fruits.
Systematic pomology.
Tree repair.
Truck farming.
Vegetable gardening.
Vegetable literature.
Vegetable physiology.

Special Agriculture—Poultry Husbandry Group.

Animal breeding.
Animal parasites.
Breed types of poultry.
Commercial poultry farming.
Comparative physiology.
Domestic fowls.

Farm sanitation and communicable diseases.
Feeding, care, and management.
Housing.
Incubation and breeding.
Market poultry.
Marketing.
Marketing and judging poultry products.
Poultry anatomy and physiology.
Poultry bacteriology.
Poultry feeding.
Poultry judging.
Poultry literature.
Poultry management.
Poultry parasites, diseases and hygiene.
Poultry research.
Reproduction.
Selection, breeding and housing.
Seminar.
Thesis.
Veterinary science.

Special Agriculture—Soils Group.

Agricultural geology.
Chemical analysis of soils.
Drainage.
Mechanical analysis of soils.
Mineralogy.
Soil chemistry.
Soil fertility.
Soil physics.
Soil physics and management.
Soil productivity.
Soil surveying.
Research.
Thesis.

If two or more subjects were offered as optionals, and were of the same type of work, they were placed in the corresponding class. This was true of most optionals encountered. However, there were some instances when the optionals were not of the same type, and then the amount of time devoted to them was classified as "elective."

In case a college provided specialization through the offering of combinations of "majors" and "minors," the time devoted to the majors was classified as "special agriculture," while minors were classed as "electives." The systems of offering majors and minors varied so considerably in different colleges that it was necessary in some cases to approximate the proportions in the last two years, but this was done as accurately as possible after a careful study of the details of each system.

The classification of subjects in the required, prescribed elective, and free elective groups was relatively easy. The time devoted to subjects required of all students was placed in the first group. Optionals, majors and minors, and the prescribed work in the departmental group electives (with the exception of subjects required in all groups) were classed as prescribed electives. In some colleges an elective system is in effect in which there is a large degree of choice as to individual subjects, but a specified number of credits must be taken from certain listed groups of subjects. These also were considered as prescribed electives. Free electives include all electives allowing perfect freedom of choice.

The results of these two classifications are shown in Table 6 and diagrams 2, 3, 5, and 6.

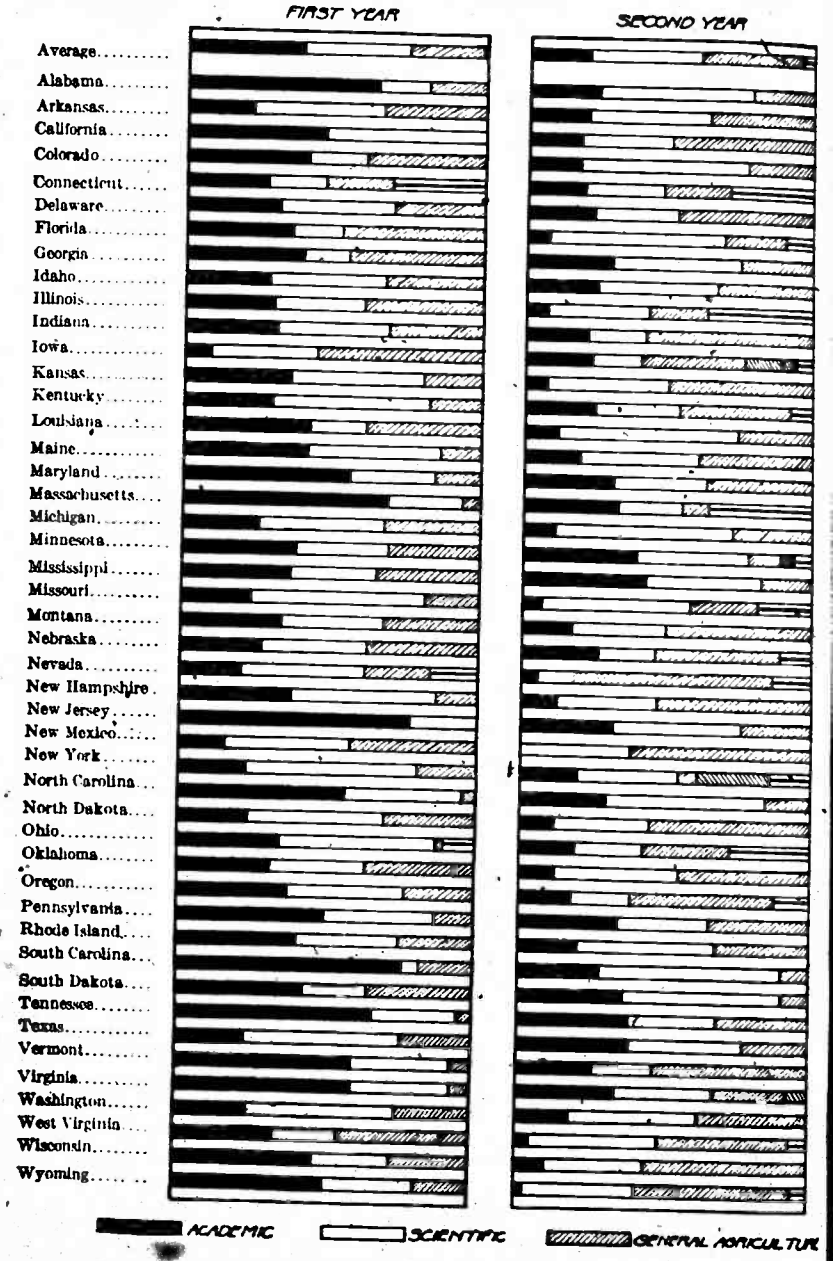


DIAGRAM 2.—*Distribution of types of work in colleges of agriculture, by years.*

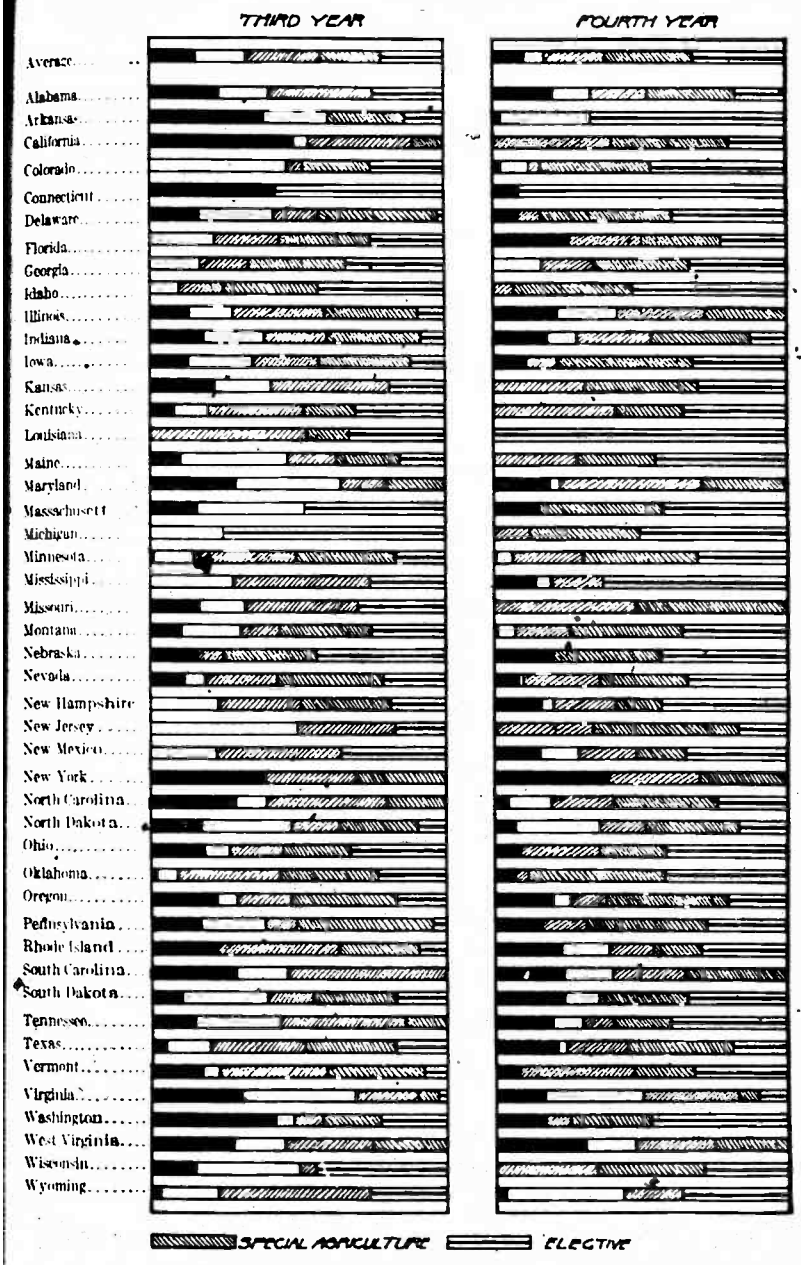


DIAGRAM 2.—*Distribution of types of work in colleges of agriculture, by years.*

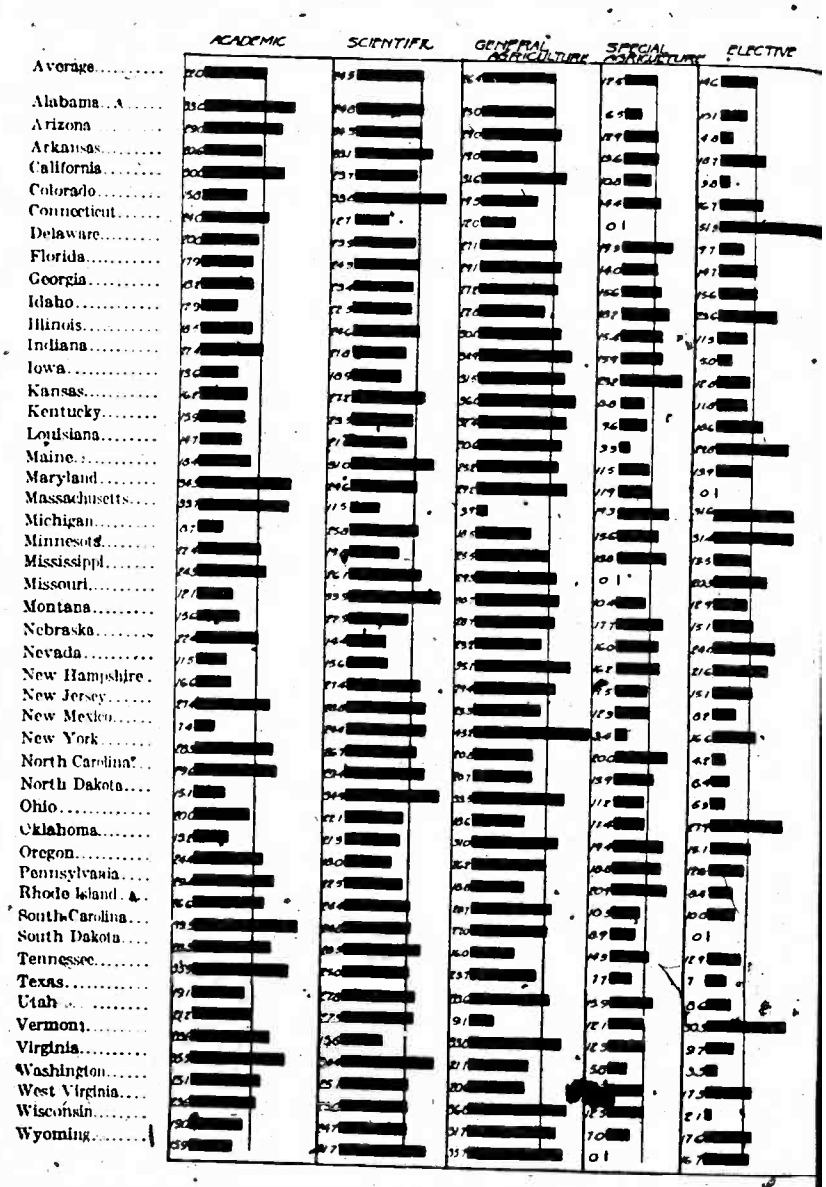


DIAGRAM 3.—*Distribution of types of work in colleges of agriculture, total course.*

TABLE 6. *Distribution of work in the curricula of the State colleges of agriculture*—PART 1.

Colleges.	First year.					Second year.					Third year.					Fourth year.					Total course.					
	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Total agriculture.	Elective.
	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
Alabama	64.8	16.3	18.9	0	0	23.7	51.3	25.0	0	0	24.0	16.0	36.0	0	24.0	21.4	12.2	19.3	29.4	17.7	33.6	24.8	25.0	6.5	31.5	10.1
Arizona																					29.0	24.3	29.0	12.9	41.9	4.8
Arkansas	22.2	44.5	33.3	0	0	19.5	41.6	38.9	0	0	38.5	22.2	0	26.2	13.3	0	1.2	1.9	30.0	66.9	20.6	28.1	19.0	13.6	32.6	18.7
California	47.1	52.9	0	0	0	16.6	30.6	52.8	0	0	48.6	5.7	34.3	11.4	0	0	0	40.0	40.0	20.0	30.0	23.7	31.6	10.8	42.4	3.8
Colorado	41.5	19.5	39.0	0	0	16.5	57.5	26.0	0	0	0	46.8	5.8	23.0	24.4	2.7	9.5	4.0	37.8	46.0	15.8	33.8	19.3	14.4	33.7	16.7
Connecticut	27.5	20.0	22.5	0	30.0	17.5	27.5	22.5	0	32.5	42.9	0	0	0	57.1	8.6	0	0	0	91.4	24.0	12.7	12.0	0	12.0	51.3
Delaware	31.8	39.0	29.2	0	0	21.4	28.6	50.0	0	0	16.7	25.0	16.7	38.9	2.7	8.3	0	8.3	44.5	38.9	20.0	23.9	27.1	19.3	46.4	9.7
Florida	36.1	16.7	47.2	0	0	6.3	59.4	21.8	0	12.5	0	21.9	21.9	31.8	24.4	25.6	0	24.4	25.6	23.4	17.9	24.3	29.1	14.0	43.1	14.7
Georgia	40.0	15.0	45.0	0	0	28.6	42.8	28.6	0	0	0	16.7	16.7	33.3	33.3	0	16.7	16.7	33.3	33.3	18.2	23.4	27.2	15.6	42.8	15.6
Idaho	28.3	39.7	32.0	0	0	23.0	40.4	36.6	0	0	0	9.7	15.3	32.5	42.5	0	0	7.3	40.6	52.1	12.9	22.5	22.8	18.2	41.0	23.6
Illinois	30.3	30.3	39.4	0	0	6.7	33.3	20.0	0	40.0	12.5	15.7	31.2	31.2	9.4	22.8	20.0	28.6	28.6	0	18.5	24.6	30.0	15.4	45.4	11.5
Indiana	31.1	37.8	31.1	0	0	19.5	19.5	61.0	0	0	18.6	19.9	21.7	31.3	8.5	19.3	8.9	26.2	33.8	11.8	22.4	21.8	34.9	15.9	50.8	5.0
Iowa	8.4	36.4	55.2	0	0	21.6	15.7	35.7	18.9	8.1	13.0	21.6	23.0	30.5	11.9	10.8	0.6	11.1	45.0	32.5	13.6	18.9	31.5	23.2	54.7	12.8
Kansas	36.1	44.4	19.5	0	0	5.5	41.7	52.8	0	0	21.9	18.7	40.7	0	18.7	0	0	31.2	37.5	31.3	16.2	27.2	36.0	8.8	44.8	11.8
Kentucky	30.6	52.7	16.7	0	0	23.1	28.2	38.4	0	10.3	8.3	11.1	33.3	16.7	30.6	0	0	41.2	23.5	35.3	15.9	23.5	32.4	9.6	42.0	18.6
Louisiana	43.3	18.3	38.1	0	0	10.7	60.8	28.5	0	0	0	0	53.1	14.1	32.8	0	0	0	0	100.0	14.7	21.6	30.6	3.3	33.9	29.8
Maine	42.9	44.2	13.0	0	0	17.5	40.0	42.5	0	0	10.7	35.8	16.1	21.9	15.5	0	0	28.6	26.8	44.6	18.4	31.0	25.2	11.5	36.7	13.9
Maryland	56.8	28.4	14.8	0	0	29.7	30.8	39.5	0	0	29.3	34.8	16.7	19.2	0	20.0	3.6	46.3	30.1	0	34.3	24.6	29.2	11.9	41.1	0
Massachusetts	70.0	23.3	6.7	0	0	31.7	21.7	8.3	0	38.3	15.8	0	0	36.8	47.4	15.8	0	0	42.1	42.1	33.7	11.5	3.9	19.3	23.2	31.6
Michigan	25.0	43.3	31.7	0	0	10.0	60.0	30.0	0	0	0	0	0	25.0	75.0	0	0	12.5	37.5	50.0	8.7	25.8	18.5	15.6	34.1	31.4
Minnesota	38.5	30.8	30.7	0	0	37.7	37.6	11.6	5.5	8.2	1.4	12.8	35.5	34.2	16.1	1.2	4.9	24.3	38.4	31.2	22.4	19.8	25.5	18.8	44.8	13.5
Mississippi	30.7	29.3	34.0	0	0	40.9	39.4	19.7	0	0	0	28.3	46.7	0	25.0	15.0	5.0	16.7	0	63.3	24.3	26.1	29.3	0	29.3	20.3
Missouri	23.6	58.8	17.6	0	0	5.9	50.0	23.5	0	20.6	16.1	16.1	38.7	0	29.1	0	0	48.0	52.0	0	12.1	33.9	30.7	10.4	41.1	12.9
Montana	34.2	34.2	31.6	0	0	15.8	31.6	52.6	0	0	10.8	20.2	12.6	32.2	24.2	1.6	5.6	18.1	38.4	36.3	15.6	22.9	28.7	17.7	46.4	15.1
Nebraska	27.2	36.4	36.4	0	0	25.0	18.8	43.7	0	12.5	15.6	0	9.4	31.3	43.7	21.4	0	0	35.7	42.9	22.4	14.4	23.2	16.0	39.2	24.0
Nevada	21.1	42.1	21.1	0	15.7	5.3	10.6	68.4	0	15.7	11.1	6.6	25.0	36.4	20.9	8.3	1.9	25.0	30.0	34.8	11.5	15.6	35.1	16.2	51.3	21.6
New Hampshire	37.8	48.7	13.5	0	0	11.1	33.3	55.6	0	0	0	22.8	28.7	30.1	18.4	16.9	4.2	20.2	16.0	42.7	16.6	27.4	29.4	11.5	40.9	15.1
New Jersey	77.8	22.2	0	0	0	31.6	42.1	26.3	0	0	0	50.0	33.3	0	16.7	0	0	33.3	50.0	16.7	27.4	28.8	23.3	12.3	35.6	8.2
New Mexico	15.8	42.1	42.1	0	0	0	36.3	63.4	0	0	0	22.4	42.1	0	35.5	16.1	12.9	19.4	16.1	35.5	7.4	29.4	43.2	3.4	46.6	16.6
New York	22.2	58.3	19.5	0	0	18.8	34.4	6.2	25.0	15.6	38.4	0	30.8	30.8	0	38.4	0	30.8	30.8	0	28.3	28.7	20.8	20	40.8	4.2

TABLE 6.—*Distribution of work in the curricula of the State colleges of agriculture*—PART I—Continued.

Colleges.	First year.					Second year.					Third year.					Fourth year.					Total course.					
	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Elective.	Academic.	Scientific.	General agriculture.	Special agriculture.	Total agriculture.	Elective.
	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
North Carolina	56.5	39.1	4.4	0	0	29.1	54.2	16.7	0	0	29.2	9.6	41.2	20.0	0	5.0	15.0	20.0	35.0	25.0	29.6	29.4	20.7	13.9	50.1	6.4
North Dakota	23.1	46.2	30.7	0	0	11.1	31.9	57.0	0	0	17.1	30.4	16.1	26.3	9.5	7.2	27.8	16.7	31.4	16.9	15.1	34.9	33.5	11.2	44.7	5.3
Ohio	34.2	52.7	2.6	0	10.5	17.7	23.5	29.4	0	29.4	17.7	8.8	17.7	23.5	32.3	8.8	0	26.5	23.5	41.2	20.0	22.1	18.6	11.4	30.0	27.9
Oklahoma	31.2	32.1	36.7	0	0	11.2	43.0	45.8	0	0	2.2	6.8	34.1	34.0	22.3	7.9	0	4.8	47.0	41.2	13.2	21.3	31.0	19.4	50.4	15.1
Oregon	37.7	39.1	23.2	0	0	16.5	20.6	49.2	0	13.7	22.8	6.4	18.3	35.6	16.9	20.7	5.0	12.1	42.1	20.1	24.4	18.0	26.2	18.8	45.0	12.6
Pennsylvania	50.0	37.5	12.5	0	0	33.8	30.1	36.1	0	0	16.1	22.2	11.4	45.1	5.2	16.9	0	14.0	40.4	28.7	29.4	22.5	18.8	20.9	39.7	8.4
Rhode Island	40.8	34.5	24.7	0	0	19.5	46.3	34.2	0	0	22.8	0	40.5	26.6	10.1	23.1	15.4	15.4	15.4	30.7	26.6	24.4	28.7	10.3	39.0	10.0
South Carolina	76.3	5.9	17.8	0	0	27.4	61.5	11.1	0	0	28.9	17.0	54.1	0	0	24.4	14.8	25.2	35.6	0	39.3	24.8	27.0	8.9	35.9	0
South Dakota	43.2	21.7	35.1	0	0	35.1	54.1	10.8	0	0	9.6	29.2	16.4	27.8	17.0	25.0	9.3	1.7	29.3	34.6	28.3	28.5	16.0	14.3	30.3	12.9
Tennessee	66.7	28.5	4.8	0	0	38.1	28.5	33.3	0	0	14.3	28.5	42.9	14.3	0	20.0	10.0	10.0	20.0	40.0	35.9	25.0	23.1	7.7	31.4	7.7
Texas	23.8	52.4	23.8	0	0	38.1	38.1	23.8	0	0	5.2	14.5	32.5	30.4	17.4	22.7	2.6	19.6	36.6	18.5	19.1	27.8	28.6	15.9	44.5	8.6
Utah																										
Vermont	59.6	33.3	7.1	0	0	25.0	20.0	55.0	0	0	16.7	5.6	38.1	33.3	8.3	8.3	0	38.9	19.5	33.3	21.2	27.3	9.1	12.1	21.2	30.3
Virginia	59.7	33.8	6.5	0	0	33.5	32.2	25.9	8.4	0	30.2	34.4	26.8	6.9	3.7	17.5	32.9	32.2	8.0	9.4	28.6	15.6	33.8	12.3	46.1	9.7
Washington	24.1	50.6	25.3	0	0	17.1	43.9	39.0	0	0	41.5	6.2	10.2	19.7	22.4	18.0	0	7.4	28.2	46.4	35.3	34.4	21.1	5.8	26.9	3.3
West Virginia	33.3	22.2	44.5	0	0	5.3	42.1	44.7	0	7.9	27.8	16.7	30.5	25.0	0	29.4	17.8	26.4	26.4	0	25.1	25.1	20.6	11.9	32.5	17.3
Wisconsin	47.4	26.3	26.3	0	0	10.6	32.5	57.5	0	0	14.7	35.3	5.9	0	44.1	0	0	34.3	33.3	33.4	19.0	24.7	31.7	7.0	38.7	17.6
Wyoming	51.5	30.3	18.2	0	0	3.1	37.5	53.1	0	6.3	3.2	19.4	51.6	0	25.8	3.3	40.0	20.0	0	36.7	15.9	31.7	35.7	0	35.7	16.7
Average	39.3	35.1	20.4	0	1.2	19.9	37.1	35.9	1.2	5.9	15.5	17.3	25.3	21.5	20.4	11.6	6.5	19.6	28.7	32.5	22.0	24.5	26.4	12.5	38.9	14.6

TABLE 6.—*Distribution of work in the curricula of the State colleges of agriculture*—PART II.

Colleges.	First year.				Second year.				Third year.				Fourth year.				Totals for four years.			
	Required.	Elective.			Required.	Elective.			Required.	Elective.			Required.	Elective.			Required.	Elective.		
		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Alabama	100.0	0	0	0	100.0	0	0	0	64.0	36.0	0	36.0	4.6	75.8	19.6	95.4	69.7	26.0	4.3	30.3
Arizona																	50.0	45.2	4.8	50.0
Arkansas	100.0	0	0	0	100.0	0	0	0	55.6	33.3	11.1	44.4	0	62.5	37.5	100.0	65.8	22.8	11.4	34.2
California	88.2	11.8	0	11.8	93.1	6.9	0	6.9	34.3	65.7	0	65.7	48.0	32.0	20.0	52.0	67.4	28.8	3.8	32.2
Colorado	100.0	0	0	0	100.0	0	0	0	0	75.6	24.4	100.0	0	53.8	46.2	100.0	52.5	30.8	16.7	47.5
Connecticut	70.0	0	30.0	30.0	67.5	0	32.5	32.5	42.9	0	57.1	57.1	8.6	0	91.4	91.4	48.7	0	51.3	51.3
Delaware	100.0	0	0	0	100.0	0	0	0	58.3	38.9	2.8	41.7	22.2	38.9	38.9	77.8	72.3	18.0	9.7	27.7
Florida	100.0	0	0	0	65.6	21.9	12.5	34.4	18.8	58.8	21.4	81.2	0	70.6	29.4	100.0	47.8	37.6	14.6	52.2
Georgia	100.0	0	0	0	100.0	0	0	0	0	66.7	33.3	100.0	0	66.7	33.3	100.0	51.3	31.1	15.6	46.7
Idaho	100.0	0	0	0	85.6	8.6	5.8	14.4	5.6	51.9	42.5	94.4	0	47.9	52.1	100.0	47.9	27.1	25.0	52.1
Illinois	100.0	0	0	0	60.0	0	40.0	40.0	12.5	78.1	9.4	87.5	0	100.0	0	100.0	42.3	46.2	11.5	57.7
Indiana	100.0	0	0	0	80.5	19.5	0	19.5	30.2	69.8	0	69.8	29.3	71.7	0	71.7	60.7	39.3	0	39.3
Iowa	100.0	0	0	0	26.5	73.5	0	73.5	17.8	70.3	11.9	82.2	0	67.5	32.5	100.0	36.5	52.9	10.6	63.5
Kansas	100.0	0	0	0	100.0	0	0	0	52.1	28.1	18.8	46.9	0	68.9	31.1	100.0	65.5	22.7	11.8	34.5
Kentucky	100.0	0	0	0	89.7	10.3	0	10.3	52.8	16.7	30.5	47.2	0	64.7	35.3	100.0	62.1	22.1	15.8	37.9
Louisiana	100.0	0	0	0	100.0	0	0	0	43.8	56.2	0	56.2	0	80.0	20.0	100.0	64.7	30.9	4.4	35.3
Maine	100.0	0	0	0	100.0	0	0	0	36.7	57.7	15.6	73.3	29.9	31.5	44.6	76.1	66.9	22.2	13.9	36.1
Maryland	100.0	0	0	0	100.0	0	0	0	57.3	42.7	0	42.7	52.0	48.0	0	48.0	74.4	26.6	0	26.6
Massachusetts	100.0	0	0	0	61.7	38.3	0	38.3	0	52.6	47.4	100.0	0	57.9	42.1	100.0	41.5	36.7	21.8	58.5
Michigan	100.0	0	0	0	100.0	0	0	0	0	25.0	75.0	100.0	0	50.0	50.0	100.0	50.0	18.8	31.2	50.0
Minnesota	84.6	15.4	0	15.4	49.6	42.1	8.3	50.4	16.7	67.2	16.1	83.3	0	68.8	31.2	100.0	39.1	47.5	13.4	60.9
Mississippi	92.0	8.0	0	8.0	100.0	0	0	0	75.0	0	25.0	25.0	36.7	0	63.3	63.3	77.4	2.3	20.3	22.6
Missouri	100.0	0	0	0	79.4	0	20.6	20.6	51.6	29.0	19.4	48.4	0	100.0	0	100.0	62.1	27.4	10.5	37.9
Montana	92.1	7.9	0	7.9	89.5	10.5	0	10.5	21.5	53.2	25.3	78.5	0	63.8	36.2	100.0	51.2	33.6	15.2	48.8
Nebraska	81.8	18.2	0	18.2	68.8	18.7	12.5	31.2	25.0	31.2	43.8	75.0	21.4	35.7	42.9	78.6	50.4	25.6	24.0	49.6
Nevada	100.0	0	0	0	100.0	0	0	0	41.7	37.5	20.8	58.3	14.5	20.8	64.7	85.5	72.3	14.2	13.5	27.7
New Hampshire	100.0	0	0	0	100.0	0	0	0	41.1	40.3	18.3	58.6	33.7	23.6	42.7	66.3	68.9	16.0	15.1	31.1
New Jersey	100.0	0	0	0	100.0	0	0	0	83.3	0	16.7	16.7	0	83.3	16.7	100.0	71.2	20.6	8.2	28.8
New Mexico	100.0	0	0	0	100.0	0	0	0	59.2	40.8	0	40.8	48.4	16.1	35.5	51.6	78.7	13.9	7.4	21.3
New York	83.3	0	16.7	16.7	47.8	25.0	31.2	56.2	0	100.0	0	100.0	0	100.0	0	100.0	36.7	50.0	13.3	63.3

TABLE 6.—*Distribution of work in the curricula of the State colleges of agriculture*—PART II—Continued.

Colleges.	First year.				Second year.				Third year.				Fourth year.				Total course.			
	Required.	Elective.			Required.	Elective.			Required.	Elective.			Required.	Elective.			Required.	Elective.		
		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.		Prescribed.	Free.	Total.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
North Carolina	100.0	0	0	0	100.0	0	0	0	39.6	60.4	0	60.4	0	75.0	25.0	100.0	59.5	34.2	6.3	40.5
North Dakota	100.0	0	0	0	100.0	0	0	0	32.6	67.4	0	67.4	40.5	59.5	0	59.5	75.1	24.9	0	24.9
Ohio	78.9	21.1	0	21.1	70.6	29.4	0	29.4	17.7	82.3	0	82.3	0	100.0	0	100.0	42.9	57.1	0	57.1
Oklahoma	100.0	0	0	0	100.0	0	0	0	10.2	67.5	22.3	89.8	8.3	50.5	41.2	91.7	56.8	28.2	15.0	43.2
Oregon	71.0	29.0	0	29.0	49.4	36.8	13.8	50.6	20.4	62.7	16.9	79.6	18.6	61.3	20.1	81.4	40.4	47.1	12.5	59.6
Pennsylvania	100.0	0	0	0	100.0	0	0	0	7.8	87.0	5.2	92.2	15.0	56.3	28.7	85.0	56.6	35.0	8.4	43.4
Rhode Island	100.0	0	0	0	100.0	0	0	0	54.5	35.4	10.1	45.5	56.4	12.8	30.8	43.6	78.1	11.9	10.0	21.9
South Carolina	100.0	0	0	0	100.0	0	0	0	100.0	0	0	0	39.3	60.7	0	60.7	84.8	15.2	0	15.2
South Dakota	100.0	0	0	0	100.0	0	0	0	57.4	25.7	16.9	42.6	16.0	49.5	34.5	84.0	68.2	18.9	12.9	31.8
Tennessee	100.0	0	0	0	100.0	0	0	0	85.7	14.3	0	14.3	40.0	0	60.0	60.0	84.6	3.8	11.6	15.4
Texas	100.0	0	0	0	100.0	0	0	0	46.7	53.3	0	53.3	34.3	65.7	0	65.7	71.7	28.3	0	28.3
Utah																	0	69.7	30.3	100.0
Vermont	100.0	0	0	0	100.0	0	0	0	66.7	33.3	0	33.3	33.3	66.7	0	66.7	76.6	23.3	0	23.3
Virginia	100.0	0	0	0	76.9	23.1	0	23.1	80.0	17.0	0	17.0	55.0	45.0	0	45.0	79.0	21.0	0	21.0
Washington	100.0	0	0	0	100.0	0	0	0	19.9	57.7	22.4	80.1	7.4	46.2	46.4	92.6	56.8	26.0	17.2	43.2
West Virginia	100.0	0	0	0	92.1	0	7.9	7.9	58.3	41.7	0	41.7	0	100.0	0	100.0	63.9	34.0	2.1	36.1
Wisconsin	100.0	0	0	0	100.0	0	0	0	26.5	11.7	61.8	73.5	0	66.7	33.3	100.0	61.3	16.9	21.8	38.7
Wyoming	100.0	0	0	0	65.6	31.3	3.1	34.4	62.9	8.1	29.0	37.1	36.7	25.0	38.3	63.3	67.1	15.9	17.0	32.9
Average	96.6	2.4	1.0	3.4	87.3	8.6	4.1	12.7	38.7	44.5	16.8	61.3	16.3	55.9	27.8	83.7	59.7	28.1	12.2	40.3

TYPE OF WORK.

Some very interesting facts are discovered from a study of diagram 3. Considering the total four-year course, we find that the average in each of the classes for the 48 colleges is as follows:

Time given to the different classes of subjects.

	Per cent.
Academic	22.0
Scientific	24.5
General agriculture	26.4
Special agriculture	12.5
Total agriculture	38.9
Free elective	14.6
Total	100.0

These averages represent what is probably very nearly the proper balance of the curriculum, but of course are not definite proof. The wide variation in each class is interesting, and is brought out in the following table:

Variation in each class.

Classes.	Minimum.	First quartile.	Median.	Third quartile.	Maximum.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Academic	7.4	15.9	20.6	28.3	39.3
Scientific	11.5	22.1	24.6	27.4	34.9
General agriculture	3.9	20.8	27.2	31.0	43.2
Special agriculture	.0	9.6	12.3	15.9	23.2
Total agriculture	12.0	33.7	40.9	44.7	54.7
Elective	.0	8.2	12.9	17.6	51.3

These figures bring out very strikingly the great deviation from the average among the different colleges. It appears that some institutions must offer a course extremely weak in some types of work. However, too much should not be concluded merely from the extent of the variation. Usually the colleges which require a small amount of work of any one class allow considerable time for election, in which the additional work of this type may be taken.

It is probably true that, if a study were made of the records of electives actually taken in all the colleges, it would be found that in case a small amount of work is required in the special agriculture group the electives chosen would be largely in this class. This would also probably be true for the general agriculture group to a smaller degree. The same could be said to a lesser extent of the scientific group and would apply least in the case of the academic group.

Variations are still more striking in the work of the individual years. Of the 46 colleges for which the different years' work is represented (it is not given for the colleges of Arizona and Utah, since they have the group elective system), all require some academic work in the first year, all require scientific work, all but two some work

in general agriculture, none special agriculture, and 3 elective. The variation is as follows:

	Range in per cent.
Academic	8.4 to 77.8
Scientific	5.9 to 58.8
General agriculture	.0 to 55.2
Elective	.0 to 30.0

The averages for the first year are, academic, 39.3; scientific, 35.1 general agriculture, 24.4; special agriculture, 0; and elective, 1.2. It is thus seen that the first two groups occupy approximately three-fourths of the first year's work.

Passing to the second year's work we find a dropping off of the academic, but an increase in the scientific, general-agriculture, and elective groups. Also, special agriculture makes a small beginning. The averages are, academic, 19.9; scientific, 37.1; general agriculture, 35.9; special agriculture, 1.2; and elective, 5.9. All colleges require work of the scientific and general agriculture types, and all but one some academic work. Specialization begins in 4 colleges, and elective work is allowed in 15 of the 46.

The variations are still wide, as shown below:

	Range in per cent.
Academic	0.0 to 40.9
Scientific	10.6 to 61.5
General agriculture	6.2 to 68.4
Special agriculture	.0 to 25.0
Total agriculture	8.3 to 68.4
Elective	.0 to 40.0

The most striking change in the third year is the beginning of specialization. This group jumps to 21.5 per cent and elective work to 20.4. General agriculture falls off to 25.3, scientific to 17.3, and academic to 15.5. Most colleges retain some academic work, however, all but 10 requiring some of this type. Some work in the scientific group is required in all but 7 colleges. General agriculture subjects are required in all but 4, and specialized work in all but 10. Electives are offered in 39 out of the 46.

The variations are still greater this year, as is shown in the following table:

	Range in per cent.
Academic	0 to 48.6
Scientific	0 to 50.0
General agriculture	0 to 54.1
Special agriculture	0 to 38.9
Total agriculture	0 to 69.7
Elective	0 to 75.0

The last year shows a shrinking of the first three groups and an increase in the last two, the averages being: Academic 11.6, scientific 6.5, general agriculture 19.6, special agriculture 29.7, and elective 32.5. All but 12 require some academic work, only 25 scientific, all but 4 general agriculture, all but 4 special agriculture, and all but 6 allow some electives. In the four instances where there is no special agri-

culture group, specialization is of course made possible through the elective work.

The variations in this year are greater than in any previous year, as shown below:

	Range in per cent.
Academic	0 to 38.4
Scientific	0 to 40.0
General agriculture	0 to 48.0
Special agriculture	0 to 52.0
Total agriculture	0 to 100.0
Elective	0 to 100.0

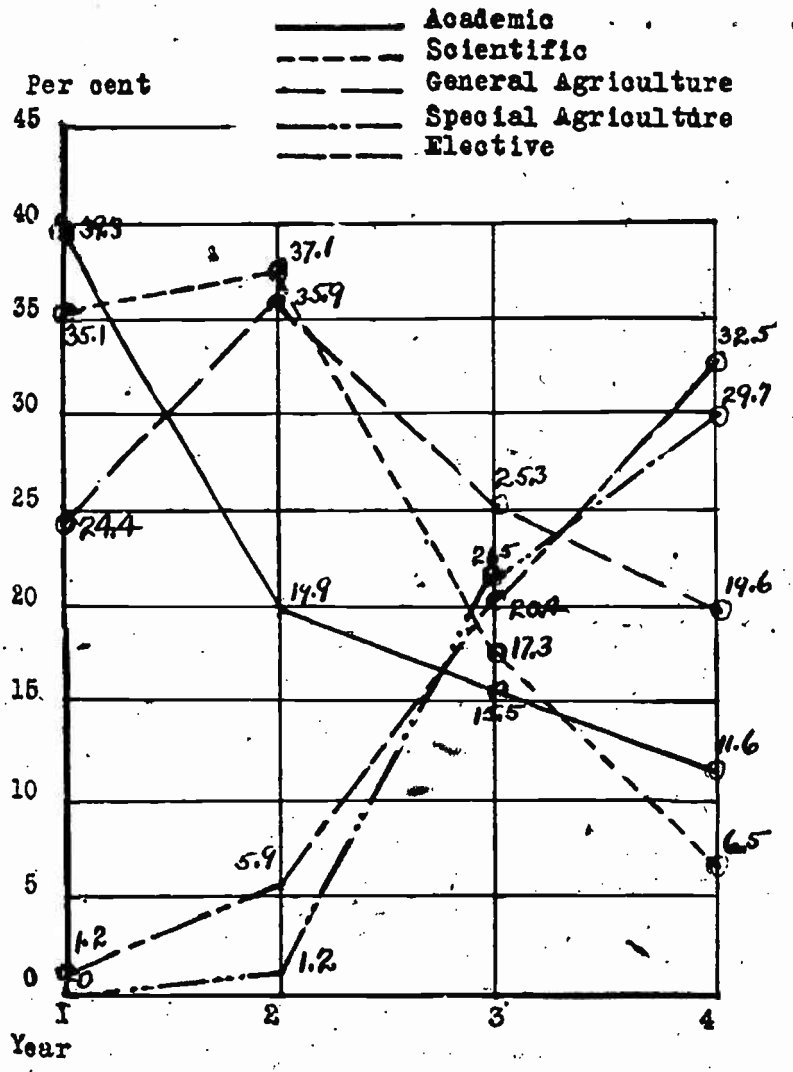


DIAGRAM 4.—*Variation of types of work throughout the four years.*

The tendencies of these five groups are shown in diagram 4. The academic falls steadily throughout the four years. Both the scientific and the general agriculture curves rise in the second year and fall through the third and fourth. Elective work begins in the first year at a low mark and special agriculture in the second year, and both rise steadily thoughout the remaining years of the course.

HOW MUCH FREEDOM OF ELECTION?

A study of diagram 6 gives an idea of the degree of freedom allowed in the election of work in the different colleges. As in the case of diagram 3, there is great variation, but certain general tendencies are apparent.

Considering the total course, the average for the 48 colleges is: Required, 59.7 per cent; prescribed elective, 28.1 per cent; and free elective, 12.2 per cent. It may be noticed that the elective group in the first classification does not always correspond with either the prescribed or free elective groups here, or with their sum. This is true because the two classifications were made on a different basis, as has been explained. For instance, optionals would be classed as prescribed electives, but might fall in one of the first four groups of the first classification, thus modifying the figures for the electives so that they would not correspond in the two classifications. The variation is as follows:

	Minimum.	First quartile.	Median.	Third quartile.	Maximum.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Required	0.0	50.0	62.1	71.2	84.8
Prescribed elective	.0	18.8	26.0	34.2	69.7
Free elective	.0	4.1	11.6	15.6	51.3
Total elective	15.2	28.3	37.9	50.0	100.0

There is only one college in which some work is not definitely required and only one not giving prescribed elective work. Eight colleges offer no free elective, limited freedom of choice being given through the prescribed elective.

In the first year most work is required, the amount of elective work being negligible. The percentages stand: Required, 96.6; prescribed elective, 2.4; and free elective, 1.0. All work is required in 37 of the 46 colleges considered. Prescribed elective work is given in 7 colleges and free elective in only 2. The variations are:

	Range in per cent.
Required	70 to 100
Prescribed elective	0 to 29
Free elective	0 to 30

In the second year the amount of both prescribed and free elective work increases, the averages being: required, 87.3; prescribed elective, 8.6; and free elective 4.1. The variations are as follows:

	Range in per cent.
Required	26.5 to 100.0
Prescribed elective	.0 to 73.5
Free elective	.0 to 40.0

All of the 46 colleges include some required work, 15 offer prescribed elective, and 11 free elective.

The amount of required work drops off markedly in the third year, and prescribed electives take first place. The averages are: Required 38.7, prescribed elective 44.5, and free elective 16.8. All but 5 colleges, however, include some required work; all but 4 offer some prescribed elective, and all but 16 some free elective work.

The variations are as follows:

	Range in per cent.
Required	0 to 100
Prescribed elective	0 to 100
Free elective	0 to 75

Passing to the fourth year, a further falling off of required work and an increase in both prescribed and free elective is noticed. The percentage of required work becomes 16.3, while that of prescribed elective becomes 55.9 and of free elective 27.8. Twenty-five colleges, however, still include some required work. All but 3 have prescribed elective, and all but 12 some free elective. The variation is somewhat similar to that of the third year:

	Range in per cent.
Required	0 to 56.4
Prescribed elective	0 to 100.0
Free elective	0 to 91.4

Diagram 7, representing the tendency of these three groups through the four years, shows a consistent drop of the required curve through the four years, and a corresponding steady rise for the prescribed and free elective curves.

INFLUENCE OF GEOGRAPHICAL LOCATION ON BALANCE OF CURRICULUM.

While the variation found in the curricula of different colleges is certainly due in large part to the personal element—the individual opinions of the administrative officers of the institution, as well as other factors difficult to measure—there are at least two factors which are open to study, namely, geographical location and size of college.

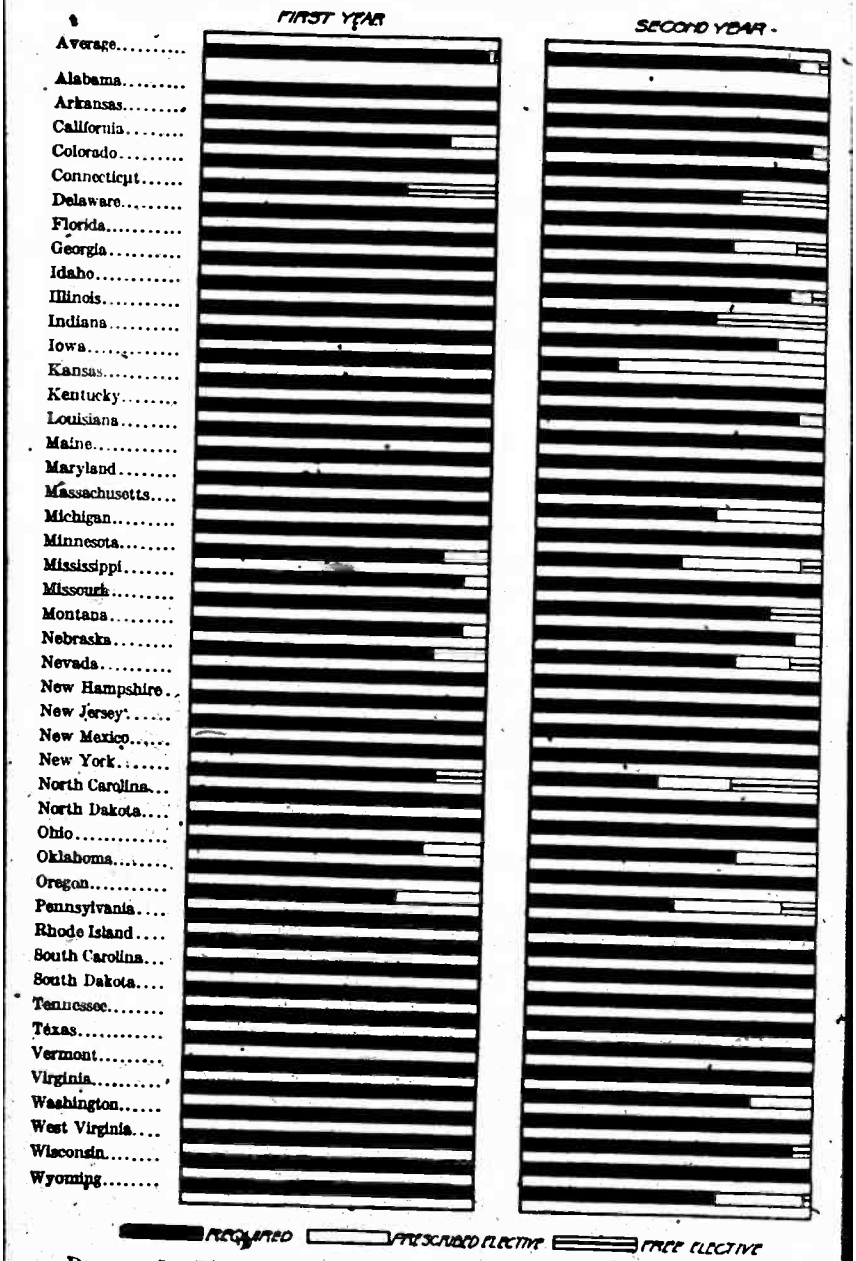


DIAGRAM 5.—*Distribution of required work in the colleges of agriculture, by years.*

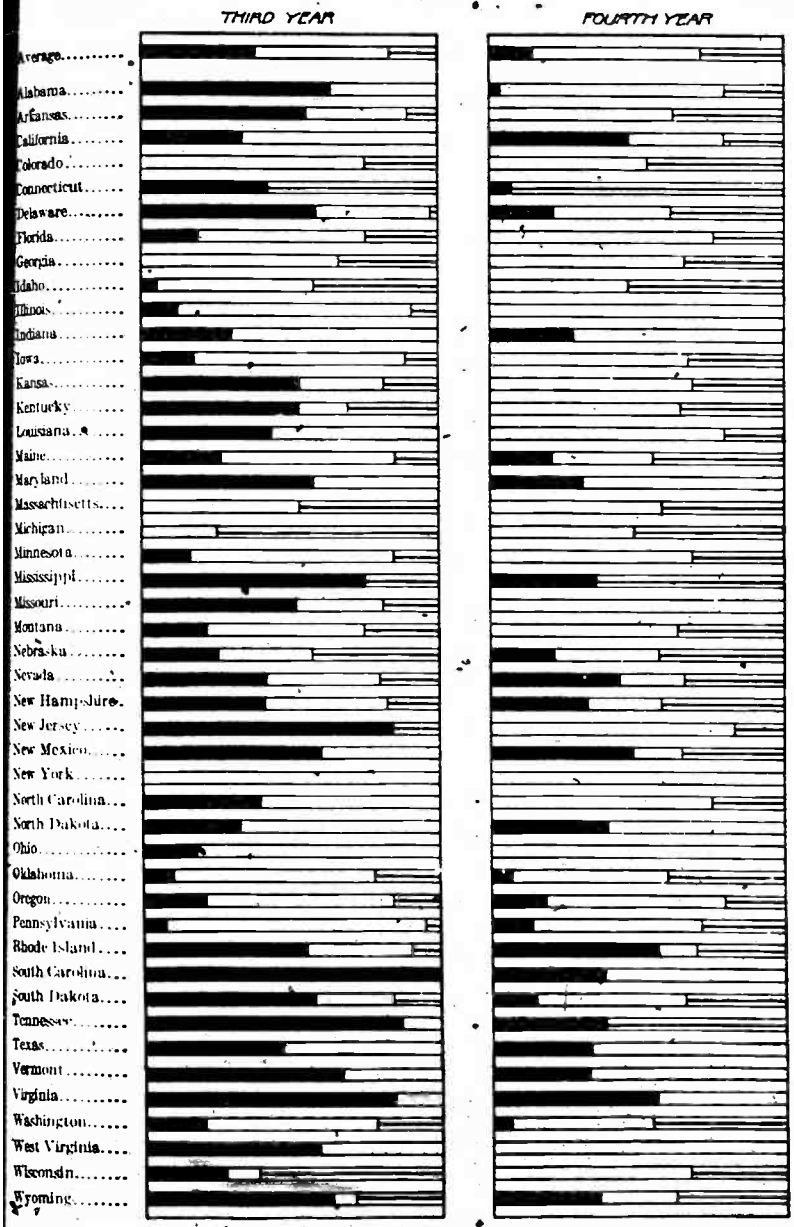


DIAGRAM 5.—*Distribution of required work in the colleges of agriculture, by years.*

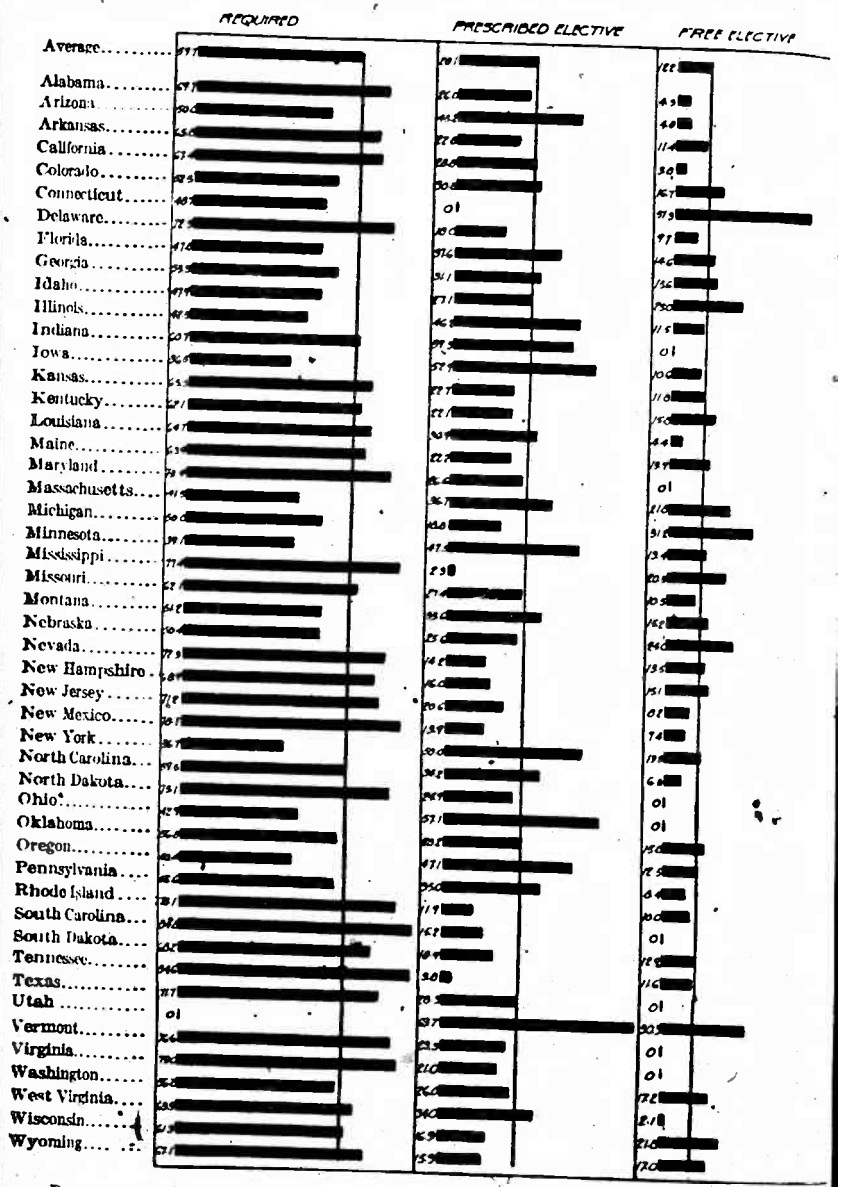


DIAGRAM 6.—*Distribution of required work in the colleges of agriculture, total course.*

To determine the influence of geographical location, if any, the averages for the total course in each college were grouped according to the common geographical division of States,[6] as shown in Table 7,

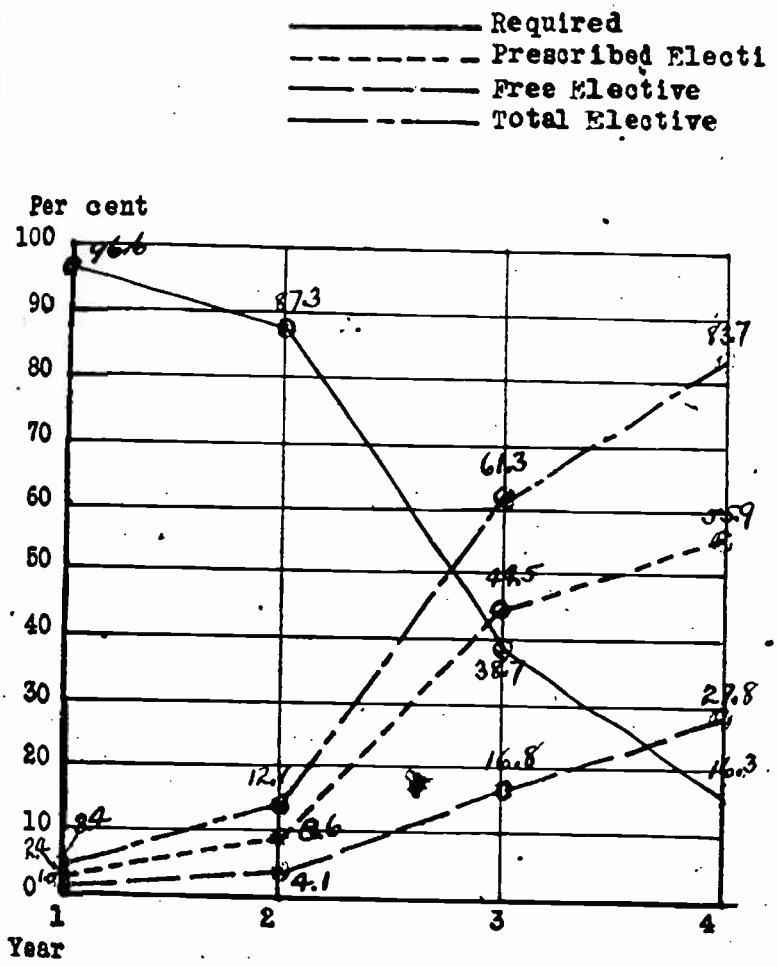


DIAGRAM 7.—*Variation in required work throughout the four years.*

and the averages determined for each geographical group. Data were not determined for each year, the figures for the total course being the important consideration here. The averages for both type of work and the freedom of choice are given together. The results are shown graphically in diagram 8.

[6] New York was included in the New England group, since its climatic and topographic conditions more closely resemble those of this group than those of the Middle Atlantic States.

TABLE 7.—*Distribution of types of work in the curriculum according to geographical location.*

Geographical groups.	Academic.	Scientific.	General agriculture.	Special agriculture.	Total agriculture.	Elective.	Required.	Prescribed elective.	Free elective.	Total elective.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
New England	25.2	21.3	22.0	12.1	34.1	19.4	59.2	22.9	17.9	40.8
Middle Atlantic	27.8	24.9	24.6	16.1	40.7	6.6	68.4	25.0	6.6	31.6
Southern	24.4	25.7	27.2	10.5	37.7	12.2	67.2	24.1	8.7	32.8
East Central	17.7	23.8	26.7	18.1	39.8	18.7	51.4	35.7	12.9	48.6
West Central	18.6	25.3	28.1	14.7	42.8	13.3	56.7	31.4	11.9	43.3
Mountain	16.2	23.9	27.9	11.9	39.8	18.1	52.5	31.3	16.2	47.5
Pacific	26.5	22.3	26.2	13.8	40.0	11.2	54.9	34.0	11.1	45.1
Average	22.0	24.5	26.1	12.5	38.9	14.6	59.7	28.1	12.2	40.3

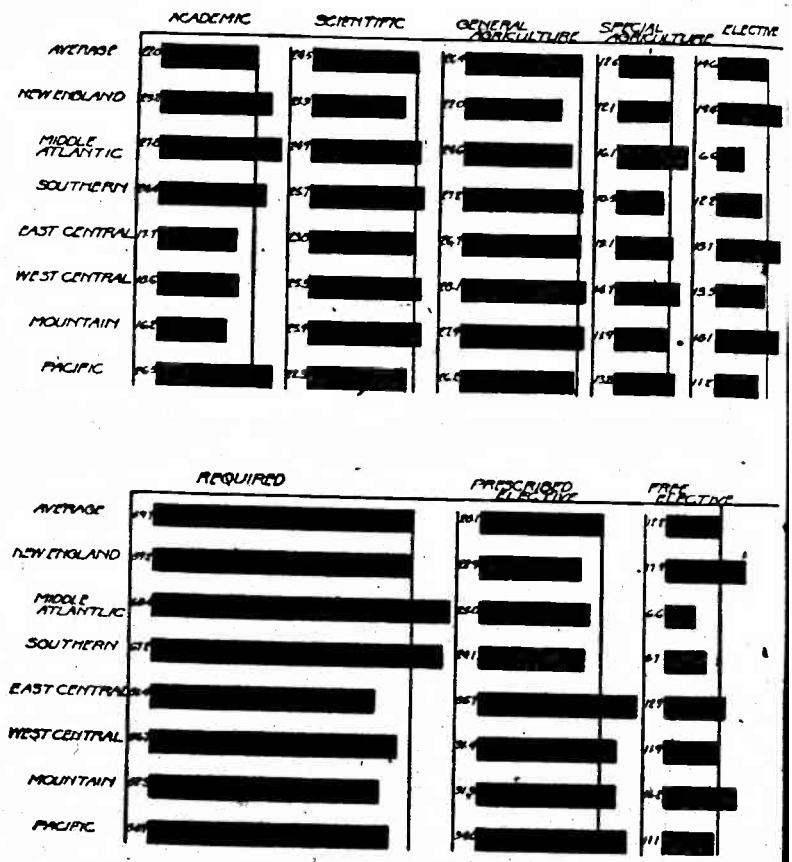


DIAGRAM. 8.—*Influence of geographical location on balance of curriculum.*

Some interesting tendencies are revealed here. In general, there is a falling off in academic work as we go from east to west. The only variations are a slight rise in the Middle Atlantic group over the New England group and an abrupt rise in the Pacific group. The figures for this last group, however, may not mean much, as the group contains only three colleges, not enough to furnish a fair average. The total variation in the academic class is from 16.2 to 27.8 per cent. There is remarkably little variation in the next three classes, showing that geographical location apparently has little effect on them. For the scientific class the range is only from 21.3 to 25.9 per cent, for general agriculture from 22 to 28.1 per cent, and special agriculture from 10.5 to 16.1. The proportion of total agriculture is remarkably constant for all except the New England group, in which it is low, being largely offset by the large proportion of elective work. Barring this group, which has a proportion of 34.1 per cent of total agriculture, the variation among the groups is only from 37.7 to 42.8 per cent. The West Central group shows the highest proportion. The remarkable correspondence of the East Central, Mountain, and Pacific groups is noteworthy, the first two being 39.8 and the third 40 per cent. In the elective class a tendency corresponding to the academic is noted, only it is the converse. Barring the New England and Pacific groups, there is a general increase in the proportion of elective work from east to west. The total variation is from 6.6 to 19.4 per cent.

With respect to freedom of choice of studies, represented in the lower part of the diagram, there appears also to be a general tendency. With slight exception the proportion of required work falls off as we move westward. Of the prescribed elective work, a relatively low proportion is found in the New England, Middle Atlantic, and Southern groups, while that in the other four groups is considerably higher and very nearly the same for all groups. There is also a general tendency toward an increase in the proportion of free elective work in the westward trend, with the exception of the first and last groups. The range of variation is as follows:

	Range in per cent.
Required	51.4 to 68.4
Prescribed elective	22.9 to 35.7
Free elective	6.6 to 17.9

To summarize, the most striking influence of geographical location on the curriculum seems to be a decrease in the proportion of academic work and of required work, and a corresponding increase in the freedom of choice, as the location of the college changes from the eastern toward the western part of the country. The New England and southern groups are relatively low in the proportion of total agriculture, but the proportions for the other five groups are remarkably close, all being within a few units of 40 per cent.

INFLUENCE OF SIZE OF COLLEGE ON BALANCE OF CURRICULUM.

Contrasts are often drawn between the "small college" and the "large college," until many of us have grown to associate certain attributes with these types of institution. Are these generally accepted ideas founded on fact, or are they the result of unwarranted conclusions hastily-drawn? It was to arrive at some of the fundamental differences between large and small colleges of agriculture that this phase of the data was studied.

The 48 colleges were divided into five classes, according to enrollment during the year 1917–18. This classification was based on enrollment figures furnished by the United States Bureau of Education, and represents the total number of students pursuing the four-year course in agriculture, regardless of enrollment in other departments of the college or university, or of short or special courses in agriculture. The following classification was adopted arbitrarily as representing what was thought to be suitable for this study:

Group No.	Students.	Colleges.
1	Less than 100	11
2	100–300	14
3	300–500	8
4	500–700	4
5	Over 700	11
Total		48

The averages for these groups were determined in the same manner as for the geographical groups, and are set forth in Table 8. The results are shown graphically in diagram 9. It so happened that the individual colleges fell into the different groups in such a way that the geographical factor became no longer effective. That is, each of the groups formed according to size includes institutions from a number of geographical groups, so that in this part of the study location is eliminated as a factor influencing the averages.

TABLE 8.—*Distribution of types of work in the curriculum according to size of college.*

Number of students.	Number of colleges.	Academic.	Scientific.	General agricultural.	Special agricultural.	Total agricultural.	Elective.	Required.	Prescribed elective.	Free elective.	Total elective
		P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Less than 100	14	20.5	25.4	30.3	11.9	42.2	11.9	67.8	23.2	9.0	32.1
100–300	14	21.9	25.7	23.4	11.3	34.7	17.7	57.5	20.7	15.8	42.5
300–500	8	20.3	23.0	25.1	13.2	38.3	12.4	61.3	27.6	11.1	38.7
500–700	8	22.0	23.1	26.4	11.9	38.3	15.7	57.2	32.7	10.1	42.8
Over 700	4	17.3	24.0	23.2	18.5	43.7	15.0	41.4	42.0	16.6	58.6
Average		22.0	24.5	26.4	12.5	38.9	14.6	59.7	28.1	12.2	40.3

A study of the data shows an increase in the proportion of academic work through groups 1 and 2 until the highest point is reached in the college of 300 to 500 students. There is then a decided dropping off

as the size of the college increases. The total variation is from 17.3 to 26.3 per cent. The proportion of scientific work is remarkably constant, varying only from 23 to 25.7 per cent. It appears to be slightly larger in the two smaller groups. General agriculture stands highest in the smallest group, with 30.3 per cent, and lowest in the 100–300 student group, 23.4 per cent. It is very nearly the same in the other three groups, differing only 0.1 per cent in the third and fifth.

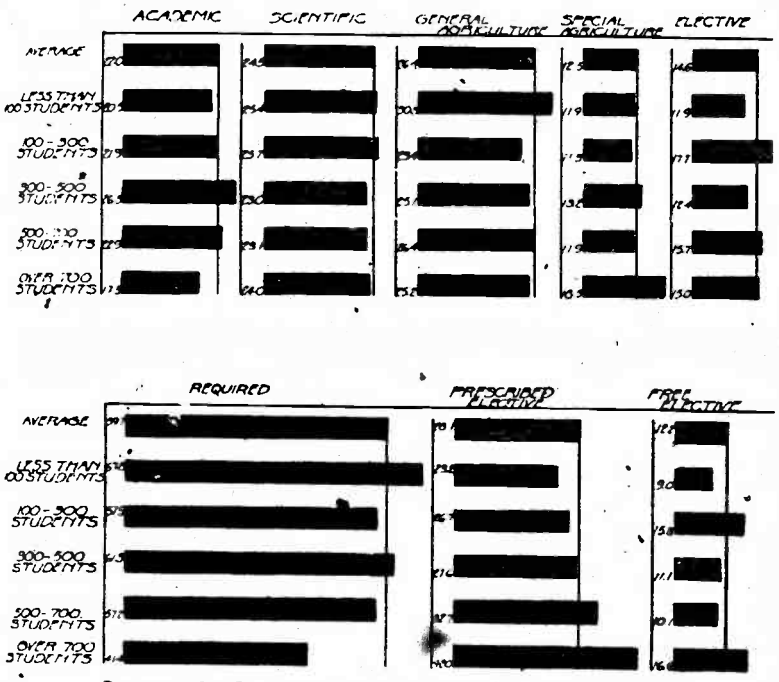


DIAGRAM 9.—*Influence of size of college on balance of curriculum.*

The most striking fact about the special agriculture class is the greater degree of specialization in the group of largest colleges—18.5 per cent compared with 11.3 per cent in the 100–300 student group. The latter is very close to the proportion for the first and fourth groups, which is 11.9 per cent in both cases.

It is also interesting to note that in total agriculture the largest colleges provide the most, 43.7 per cent, but that the smallest are not far behind, with 42.2 per cent. The 300–500 and the 500–700 groups offer the same proportion of total agriculture, 38.3 per cent. The 100–300 group has the lowest average, 34.7 per cent.

A very decided tendency is shown with respect to the freedom of choice; the proportion of required work decreases with an increase in size. There is only a slight break in the curve representing this fall;

the third group shows slightly more required work than the second. Conversely, the proportion of prescribed elective increases without a break directly with the size of the college. With the exception of the second group, this tendency is shown also for the total elective work. The variations are:

	Range in per cent.
Required	41.4 to 67.8
Prescribed elective	23.2 to 42.0
Free elective	9.0 to 16.6

Summarizing the influence of size upon balance of curriculum, the available data indicate that (1) the medium-sized college requires the largest proportion of academic work, with the largest and smallest colleges requiring the least; (2) size has little influence on the proportion of scientific work; (3) the smallest colleges require the most general agriculture and the largest offer the greatest degree of specialization; (4) the proportion of total agriculture is highest in the largest colleges, and nearly as high in the group of smallest institutions; and (5) the proportion of required work varies inversely and elective directly with the size of the college.

BALANCE OF CURRICULUM IN SIX WELL-KNOWN AND REPRESENTATIVE AGRICULTURAL COLLEGES.

In studying the curriculum of any one college, we often resort to a comparison with some of the well-known colleges of high repute. There are, throughout the country, a number of agricultural colleges which have risen to positions of prominence as a result of able administration, adequate State support, liberal endowment, instruction of a high order, or other conditions. It was thought that a study of the balance of curricula in a small group of these well-known institutions would be interesting, and the colleges of the following States were chosen for this purpose: California, Illinois, Iowa New York (Cornell), Minnesota, and Wisconsin. These were selected not with the idea that they are unquestionably the best six colleges in the country, but rather were picked from that larger somewhat indefinitely defined group of agricultural colleges generally accepted as being of high repute. The selection was made also with due regard for size and geographical location, in order that these factors may not influence results. It should be noted that four geographical groups and three of the size groups discussed in the preceding section are represented in these six colleges. Other colleges of equally good standing might have been included, but for convenience the number was limited to six. The averages for these are shown in Table 9 and diagram 8. For the sake of comparison, the averages for all 48 colleges are shown with them.

TABLE 9.—*Distribution of types of work in the curricula of six well-known agricultural colleges.*[1]

Colleges.	Academic.	Scientific.	General agriculture.	Special agriculture.	Total agriculture.	Elective.	Required.	Prescribed elective.	Free elective.	Total elective.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
California	30.0	23.7	31.6	10.8	42.4	3.8	67.4	28.8	3.8	32.6
Illinois	18.5	24.6	30.0	15.4	45.4	11.5	42.3	46.2	11.5	57.7
Iowa	13.6	18.9	31.5	23.2	54.7	12.8	36.5	52.3	10.6	63.5
Minnesota	22.4	19.8	25.5	18.8	44.3	13.5	39.1	47.5	13.4	60.9
New York	28.3	26.7	20.8	20.0	40.8	4.2	36.7	50.0	13.3	63.3
Wisconsin	19.0	24.7	31.7	7.0	38.7	17.6	61.3	16.9	21.8	38.7
Average of above	22.0	23.0	28.5	15.9	44.4	10.6	47.2	40.4	12.4	52.8
Average of all 48 colleges	22.0	24.5	26.4	12.5	38.9	14.6	59.7	28.1	12.2	40.3

[1] According to announcements of courses for 1917–18.

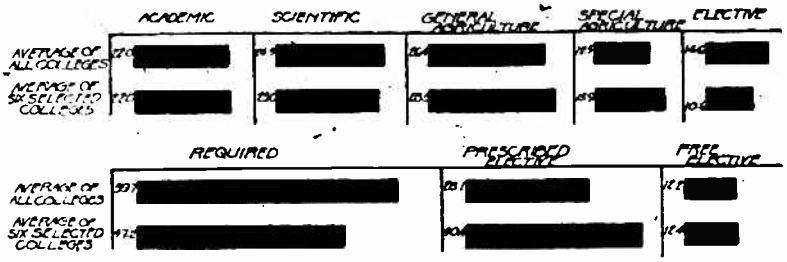


DIAGRAM 10.—*Balance of curriculum in six well-known agricultural colleges.*

Within this small group we find considerable variation. For instance, academic work ranges from 13.6 to 30 per cent, but the average, 22 per cent, is exactly the same as for the entire 48. Scientific work varies less, from 18.9 to 26.7, with an average of 23, about 1 per cent less than for the total number of colleges. Both general agriculture and special agriculture are higher for this group than the average for the country, making the total agriculture 44.4, as compared with 38.9 for all the 48 colleges, a very considerable difference. All but one of these colleges require over 40 per cent of total agriculture, the one falling below having the highest proportion of elective work. The proportion of elective work for the group is less than for the general average, 10.6, as compared with 14.6; and in the different colleges it varies greatly, ranging from 3.8 to 17.6 per cent.

The amount of required work varies from 36.5 to 67.4, averaging 47.2, which is more than 12 per cent lower than the average for the country. This difference is made up in the amount of prescribed elective work, which is 40.4 per cent, as compared with 28.1 per cent for all 48 colleges. The free elective work is practically the same in both cases, being 12.4 per cent for the six colleges considered and 12.2 for all colleges.

Thus a comparison of the averages for these six colleges with those of all 48 colleges brings out the following significant points:

(1) This group corresponds closely to the average for all 48 colleges in the proportion of academic and scientific work, and in the proportion of free elective.

(2) It is much below the average in the proportion of required work.

(3) It is considerably above the average in the proportion of both general and special agriculture, and hence of total agriculture.

What is the significance of these differences? Accepting for the moment the premises that these six colleges represent a step in advance over the average for the country, and that they more nearly approach the ideal than the average college, then we at once conclude that the average college requires about the proper amount of academic and scientific work, but that it should give more of both general and special agriculture. Also, it allows about the right amount of free elective work, but should give more prescribed elective and less required work. Of course we have no right to make these conclusions, for we can not be certain that the premises are correct. However, evidence in the form of opinion generally accepted by the public would substantiate these premises, and consequently the conclusions are worthy of consideration.

V. SPECIALIZATION.

In addition to the proportion of time that should be allowed for specialization, studied above as the "Special agriculture" type of work, there are other important phases of specialization. When should specialization begin? What is the best method of providing for it? To get some light on these questions the several curricula were studied from this viewpoint and Table 10 was prepared.

A glance at the first four columns of the table is convincing. Thirty-seven colleges, or over three-fourths, begin specialization in the third year, while 5 of the remainder start it in the second year and 6 in the fourth.[1]

It seems generally accepted that the junior year is the proper time for specialization to begin, and in view of this weight of opinion, for average conditions we are probably safe in drawing this conclusion.

Passing to the method of offering specialization, we find a greater diversity of opinion. For the purposes of this study, specialized work was classified in three groups: (1) The departmental group elective, (2) the major option, and (3) free elective.

[1] In making this classification, merely the offering of elective work was not considered a beginning of specialization. However, if the offering of electives was clearly intended as a provision for beginning specialization, then specialization was considered as starting at this point.

TABLE 10.—*Summary of methods of specialization in the State colleges of agriculture.*

States.	Year when specialization begins.				Departmental group.	Major-minor option.	Free elective.
	First.	Second.	Third.	Fourth.			
Alabama				X	X		
Arizona			[1] X				[2] X
Arkansas			X		X		
California			X			X	
Colorado			X		X		
Connecticut		X					X
Delaware			X			X	
Florida			[1] X		X		
Georgia			X			X	
Idaho			X		X		
Illinois			X				[2] X
Indiana			X		X		
Iowa				[1] X	X		
Kansas		[3] X				X	
Kentucky			X				X
Louisiana			X				X
Maine			X		X		
Maryland			X		X		
Massachusetts			X			X	
Michigan			X		X		
Minnesota		X			X		
Mississippi				X			X
Missouri				[1] X			X
Montana			X		X		
Nebraska			X			X	
Nevada			X		X		
New Hampshire			X			X	
New Jersey				X			[2] X
New Mexico			X		X		
New York			[1] X				
North Carolina			X		X		
North Dakota			X		X		
Ohio			X			X	
Oklahoma			X		X		
Oregon			X			X	
Pennsylvania			X		X		
Rhode Island			X				[2] X
South Carolina				X		X	
South Dakota			X		X		
Tennessee		X					X
Texas			X		X		
Utah			[1] X			X	
Vermont			X		X		
Virginia			[1] X		X		
Washington			X		X		
West Virginia			X			X	
Wisconsin			X			X	
Wyoming			X		X		
Total	1	5	37	6	24	13	11

[1] Mainly in this year; some begun in previous year.
[2] Free election limited to a certain degree by optional groups.
[3] Second term.

In the departmental group elective are included all curricula in which a sharp differentiation occurs at some point in the course, and the student elects a more or less definitely prescribed course (or "group" of studies) in some one department of the college. In this group most of the work is prescribed, but there is usually some free election provided, varying in the different colleges.

The major option comprises a choice of one main subject, known as a "major." The other subjects chosen in some colleges are designated as "minors." In some instances minor electives are prescribed as making suitable combinations with given majors, and the student elects the combination. In other cases considerable freedom is allowed in the choice of minors, but usually the combination of

subjects is made with the advice and approval of the head of the department in which the major option is chosen.

In the free elective class we have placed the curricula in which still greater freedom of choice is allowed, no definite combinations being offered. It is true in practically all colleges, however, that elective subjects are chosen with the recommendation and approval of respective heads of departments or the dean. In many instances, also, there are certain limitations to the choice of electives; that is, it may be prescribed that a certain number of credits shall be taken from one or more of the different types of subjects, in order to preserve the balance of the curriculum.

There is such a variation within each of these methods in the different colleges that the three merge into each other. Thus, as the elective work increases in a departmental group elective, it becomes practically a major option. Likewise, as the restrictions applied to a major option are removed, we have the free elective.[8]

On this basis the 48 colleges were classified as shown in the second section of Table 10. The departmental group is the most popular, being found in one-half of the colleges. The major option and free elective have about an equal standing, with 13 and 11 colleges to their credit, respectively.[9]

The number of colleges offering a departmental group elective in each of the more important collegiate departments was determined in this connection. The following summary shows the departments in the 24 colleges offering this type of specialization in order from the greatest number to the smallest: Animal husbandry 23, agronomy 22, horticulture 20, dairy husbandry 15, agricultural education 11, general agriculture 6, poultry husbandry 6, agricultural chemistry 5, farm management 4, agricultural engineering 4, biology 4, entomology 3, soils 3, forestry 2, botany 2, and several others 1 each.

A number of other groups were recorded for one college each. In most instances they differ from those mentioned above chiefly in name and represent in general the lines of work covered in the list given. Animal husbandry, agronomy, horticulture, and dairy husbandry stand out as the more important groups, and would appear to have a place in most colleges. Agricultural education as shown here is of no special significance at this time, as the administration of teacher training in the colleges under the provisions of the Smith-Hughes Act has gone into effect since these curricula were

[8] There is a somewhat definite type of specialization half-way between the major option and the free elective. This has been termed the "optional group," but since it occurs in only a few instances, it was not considered of sufficient importance for a separate classification. We have placed such curricula in either the second or the third class, according as the case under consideration was more closely related to one or the other. This is the type of specialization in which the individual subjects are arranged in groups and the student allowed to elect some credits, not less than a certain minimum, from each group. We may include here also such free electives as are rather narrowly limited to given types of work; for example, a certain number of credits from such types as agriculture, nonagriculture, science, etc.

[9] Four of the latter are of the "optional group" class.

published and has modified the whole aspect of the college course in agricultural education.

At this point it may be of interest to note the large number of subjects that are included in the respective departmental groups, as shown in the lists on pages 31–37.

An examination of these lists indicates some significant facts: (1) Many highly specialized courses are being offered; (2) there is a great diversity of subjects, due probably to local conditions; (3) the course in agriculture apparently is being spread out to cover a wide field; (4) there is a lack of uniform terminology as applied to the respective courses.

INFLUENCE OF GEOGRAPHICAL LOCATION ON SPECIALIZATION.

In order to determine whether the factor of geographical location has any definite relation to the time specialization is begun or the method pursued, the colleges were classified by geographical groups and Table 11 prepared.

TABLE 11.—*Specialization as affected by geographical location.*

Geographical groups.	Year when specialization begins.			Departmental group.	Major-minor option	Free elective.
	Second	Third.	Fourth.			
New England	1	6		3	1	3
Middle Atlantic		3	1	2	2	
Southern	2	9	3	7	3	1
East Central		5		2	2	1
West Central	2	3	2	4	2	1
Mountain		8		5	1	2
Pacific		3		1	2	
Total	5	37	6	24	13	11

It appears that no sharp tendencies are shown. In three groups, East Central, Mountain, and Pacific, specialization begins in all colleges in the third year. The majority of colleges in all other groups begin specialization in this year, except in the West Central Group, where the time is distributed almost evenly among the second, third, and fourth years.

As to method of offering specialization, geographical location has no apparent influence.

INFLUENCE OF SIZE OF COLLEGE ON SPECIALIZATION.

What effect might the size of the college have on specialization? To throw some light on this aspect of the problem, Table 12 was prepared.

The tendency to begin specialization in the third year is carried out quite uniformly throughout these groups. The 100–300 group shows some considerable specialization in the sophomore year and the 500–700 group in the senior year.

The smallest three groups of colleges show a decided tendency toward the departmental group elective, while the 500–700 group favors the major option. The largest college group is equally divided between the departmental group and the free elective methods. Some free election occurs in all but the 300–500 group.

TABLE 12.—*Specialization as affected by size of college.*

Number of students.	Year when specialization begins.			Departmental group.	Major-minor option.	Free elective.
	Second.	Third.	Fourth.			
Less than 100		13	1	9	2	
100–300	3	11		7	3	
300–500	1	5	2	5	3	
500–700		5	3	1	5	
Over 700	1	3		2		2
Total	5	37	6	24	13	1

These may be merely chance variations and therefore have no special significance. However, there is probably a fundamental principle behind the variation with size. Apparently, the departmental group option is most satisfactory for the college having less than 500 students, while the major option system is most suitable for the college of from 500 to 700 students or probably larger. We should not be warranted in drawing conclusions from the "over 700" group, since it is too small to give fair averages.

SPECIALIZATION IN SIX WELL-KNOWN AND REPRESENTATIVE AGRICULTURAL COLLEGES.

Following out the idea taken up previously, the curricula of the six well-known colleges selected were studied with respect to these problems, as shown in Table 13. About the only definite thing to be concluded from the table is that the third year appears to be the most suitable time to begin specialization, four of the colleges beginning here to two in the second year. There is an equal division among the departmental group, major option, and free elective systems of specialization.

TABLE 13.—*Specialization as found in six well-known agricultural colleges.*[1]

Colleges.	Year when specialization begins.			Departmental group.	Major-minor option.	Free elective.
	Second.	Third.	Fourth.			
California		×			×	
Illinois		×				×
Iowa	×			×		
Minnesota	×			×		
New York		×				×
Wisconsin		×			×	
Total	2	4	0	2	2	2

[1] According to announcements of courses for 1917–18.

VI. REQUIREMENTS IN PRACTICAL EXPERIENCE.

Perhaps the most generally recognized weakness of the average four-year course in agriculture is its failure to associate closely and accurately the college work with actual practice. It is the old problem of putting theory into practice. Agriculture is primarily an art, and it is impossible to master it fully without some practical experience. That this is true has been shown over and over in the man graduated from the agricultural course who has never had any practical work outside the laboratory. Such men can not expect to succeed in agricultural endeavor until they have acquired some experience. This has constituted a real problem for agricultural colleges, and in an effort to meet it, the generally accepted plan of farm-practice requirements has grown up. Some interesting data as to how the colleges are meeting this problem are shown in Table 14. The data were gleaned from the college catalogs and tabulated as accurately as possible, but they may be somewhat incomplete. First of all, a majority of the 48 colleges require some farm practice. No requirement in practice was found for 23 colleges, but by the present time more colleges may be requiring it.

There is some variation as to the amount required. Twelve colleges require 6 months, six require 3 months, three 1 year, and two 6 weeks. In one of these instances a full year is advised, while only 6 months are required. Of the two remaining colleges, in one the amount required is determined by the head of the department in which the student majors; in the other the student must show a sufficient degree of familiarity with ordinary farm practices.

The "when" of the farm practice is another important question. Three colleges advise that the requirement be met before matriculation. The greatest number, 11, require it any time before graduation. In six colleges it must be completed before the beginning of the senior year. The reason is obvious—a familiarity with practical methods is prerequisite to the best work of a special type, such as is usually pursued in the last year. In four colleges it is required before the junior year, and in two at any time during the four years of the course.

Only 3 of the 25 require that the work be taken under the direct supervision of the college. Nine of these, however, require that the work be done on an approved or accredited farm. In one or two instances this may be on the university farm, or under the direct supervision of the college.

Most of the colleges allow no academic credit for this practice work. Four colleges allow credit, two of them only for satisfactory work done in excess of the minimum requirement.

TABLE 14.—*Summary of requirements in farm practice in the State colleges of agriculture.*

State.	Practice required.		Amount.				Time.							Under supervision of college.		On approved or accredited farm.		Academic credit given.	
	Yes.	No.	6 weeks.	3 months.	6 months.	1 year.	Between second and third years.	Between third and fourth years.	Before third year.	Before fourth year.	Any time during college.	Any time before graduation.		Yes.	No.	Yes.	No.	Yes.	No.
Alabama		×																	
Arizona	×									×				×			×		×
Arkansas		×		×															
California	×		×						×					×		×		×	
Colorado		×																	
Connecticut	×			×						×		×		×		×		×	
Delaware	×				×									×		×		×	
Florida	×											×		×		×	×		
Georgia		×																	
Idaho	×			×							×			×	×				×
Illinois		×																	
Indiana		×																	
Iowa	×				×														
Kansas		×												×	×				
Kentucky	×				×														
Louisiana		×								×				×		×			×
Maine	×																		
Maryland	×			×			×	×				×		×		×			×
Massachusetts		×												×		×			×
Michigan		×																	
Minnesota	×				×														
Mississippi		×										×		×	×				×
Missouri	×					×													
Montana	×				×							×		×		×			×
Nebraska		×										×		×		×			×
Nevada		×																	
New Hampshire	×				×														
New Jersey		×										×		×					×
New Mexico		×																	
New York	×					×				×				×		×			×
North Carolina		×																	
North Dakota	×				×						×			×	×				×
Ohio	×					×		×						×		×			×
Oklahoma	×				×					×		×		×		×			×
Oregon	×													×		×			×
Pennsylvania	×		×					×		×									
Rhode Island	×				×							×		×		×			×
South Carolina		×																	
South Dakota		×																	
Tennessee		×																	
Texas		×																	
Utah		×																	
Vermont	×				×							×		×		×			×
Virginia		×																	
Washington		×																	
West Virginia	×			×															
Wisconsin	×				×			×		×		×		×		×			×
Wyoming	×				×							×		×		×			×
Total	25	22	2	6	12	3	1	2	4	6	2	11	3	22	9	16	4	21	

[1] In excess of minimum requirement.
[2] Two summers or one whole year.
[3] Must show satisfactory knowledge of practice.
[4] 16 weeks.
[5] If deficient in practice at matriculation.
[6] Amount to be determined by head of department.

It thus appears from these data that in general a requirement of farm practice is to be recommended. The largest number of colleges require a minimum of 6 months to be completed any time before graduation, either under the supervision of the college or on an accredited or approved farm. No credit is given in most of the colleges, but the student must satisfy the faculty that he has had sufficient experience to apply his college work satisfactorily.

INFLUENCE OF GEOGRAPHICAL LOCATION ON REQUIREMENTS IN PRACTICAL EXPERIENCE.

An effort was made to determine the relations of geographical location and size of college to the requirements in farm practice, and accordingly Tables 15 and 16 were prepared.

TABLE 15.—*Farm practice requirements as affected by geographical location.*

Geographical groups.	Practice required.		Amount.				Time.						Under supervision of college.		On approved or accredited farm.		Academic credit given.	
	Yes.	No.	6 weeks.	3 months.	6 months.	1 year.	Between second and third years.	Between third and fourth years.	Before junior year.	Before senior year.	Any time during college.	Any time before graduation.	Yes.	No.	Yes.	No.	Yes.	No.
New England	6	1	....	1	3	1	....	....	....	1	....	5	....	6	....	6	....	6
Middle Atlantic	3	1	1	1	1	....	1	2	....	1	....	....	1	2	1	2	1	2
Southern	4	10	....	2	2	....	....	....	1	1	....	2	1	3	1	3	1	3
East Central	2	3	....	....	1	1	....	....	1	....	....	1	....	2	1	1	....	2
West Central	4	3	....	....	3	1	....	....	1	....	1	2	....	4	3	1	1	3
Mountain	4	4	....	2	2	....	....	....	....	2	1	1	....	4	2	2	....	4
Pacific	2	1	1	....	....	....	....	....	1	1	....	....	1	1	1	1	1	1
Total	25	23	2	6	12	3	1	2	4	6	2	11	3	22	9	16	4	21

Some significant facts are brought out here. The New England and Middle Atlantic States lead in the farm practice requirements; there is a decided tendency to omit the requirement in the Southern States, while in all other groups about as many omit the requirement as include it. Apparently this is due to conditions peculiar to the different sections. In the New England and Middle Atlantic States a larger proportion of city-bred boys are enrolled in the colleges of agriculture, who have had no practical farm experience previous to matriculation. In the Central and Western States a much larger proportion of the students come from farms, and familiarity with farm practices is more general. In the Southern States the prevalence of Negro labor affects the situation.

The data do not show any special influence on the amount of practice required or the time when required. The only other variation worthy of note is that the tendency to require work on approved or accredited farms seems strongest in the West Central group.

INFLUENCE OF SIZE OF COLLEGE ON REQUIREMENTS IN PRACTICAL EXPERIENCE.

The relation of size to practice requirements is shown in Table 16. Again, one or two facts are outstanding. A larger proportion of small colleges require farm practice than of the larger ones, the most marked tendency being in the "less than 100" group. With 100 to 500 students only about two-fifths of the colleges make this requirement. Above this number practice is required by just one-half of the colleges.

This is difficult to explain. It is not due to geographical location, as there is no correlation between it and size. It may be merely a chance effect.

TABLE 16.—*Farm practice requirements as affected by size of college.*

Number of students.	Practice required.		Amount.				Time.						Under supervision of college.		On approved or accredited farm.		Academic credit given.	
	Yes.	No.	6 weeks.	3 months.	6 months.	1 year.	Between second and third years.	Between third and fourth years.	Before junior year.	Before senior year.	Any time during college.	Any time before graduation.	Yes.	No.	Yes.	No.	Yes.	No.
Less than 100	10	4	....	3	7	....	1	1	....	3	1	5	....	10	2	8	1	9
100-300	6	8	....	3	2	....	....	....	1	1	....	1	....	6	2	4	....	6
300-500	3	5	1	....	2	....	....	1	....	....	....	2	1	5	2	3	....	5
500-700	4	4	1	....	....	2	....	....	2	1	....	1	1	3	3	1	1	3
Over 700	2	2	....	....	1	1	....	....	1	1	....	....	....	2	1	1	....	2
Total	25	23	2	6	12	3	1	2	4	6	2	11	3	22	9	16	4	21

The rest of the data in the tables are so scattering as to be practically meaningless, except that apparently the size factor has no influence on the points considered. A possible exception is that the practice work required in all colleges of the 300–500 group must be on approved or accredited farms, but the number is too small to have much meaning.

REQUIREMENTS IN PRACTICAL EXPERIENCE IN SIX WELL-KNOWN COLLEGES.

What of the farm practice in the six well-known colleges under consideration? Table 17 shows that farm practice is required in five out of the six, a very significant fact. The time requirement is six months for three of them. In two of the number it must be completed before the beginning of the junior year, in one before the senior year, and in two at any time before graduation. The work is under the supervision of the college in only one instance, but is on accredited or approved farms in four. Credit is given in two instances.

TABLE 17.—*Farm practice requirements in six well-known agricultural colleges.*

Colleges.	Practice required.		Amount.				Time.						Under supervision of college.		On approved or accredited farm.		Academic credit given.	
	Yes.	No.	6 weeks.	3 months.	6 months.	1 year.	Between second and third years.	Between third and fourth years.	Before junior year.	Before senior year.	Any time during college.	Any time before graduation.	Yes.	No.	Yes.	No.	Yes.	No.
California	X	....	X	....	....	....	....	....	X	....	....	....	X	....	X	....	X	....
Illinois	....	X	....	....	....	....	....	....	....	....	....	....	....	X	....	X	....	X
Iowa	X	....	....	....	X	....	....	....	X	....	....	....	....	X	....	X	....	X
Minnesota	X	....	....	....	X	....	....	....	....	X	....	....	....	X	....	X	....	X
New York	X	....	....	....	....	X	....	....	....	....	....	X	....	X	....	....	....	X
Wisconsin	X	....	....	....	X	....	....	....	....	....	....	X	....	X	....	X	....	X
Total	5	1	1	....	3	1	....	....	2	1	....	2	1	4	4	1	2	3

VII. MIDDLE COURSES IN AGRICULTURE.

It is not the purpose of this study to consider the curriculum of any but the four-year course in agriculture. Closely related with the four-year curriculum, however, is the problem of providing an agricultural training for persons who are unable to meet the entrance requirements for the four-year course, or for other reasons can not take such a course. The colleges are meeting this need by providing "short" and "middle" courses in agriculture for this class of applicants. The winter short course is not very closely related to the four-year course, but the "middle" course has much in common.

We find that 30 of the 48 colleges give these special or middle courses. The usual course of this type is a two-year course, 19 of the number being of this length. However, 5 are one-year courses, and 6 run for three years, each year's work consisting of a comparatively short period of about five months.

VIII. THE QUESTIONNAIRE STUDY.

In order to have the benefit of the best available opinion on the curriculum of the agricultural college, to supplement the study recorded above, the questionnaire following was sent to the deans of all the State colleges (except the New Jersey State College).

THE FOUR-YEAR COURSE IN THE COLLEGE OF AGRICULTURE. WHAT SHOULD THE COURSE COMPREHEND?

The College of Agriculture of the State of .....

Reported by ...., Dean.

April —, 1919.

I. In your opinion, what proportion of the credit of the four-year course in agriculture, based on semester hours, should be devoted to each of the following groups of subjects? (Write the percentage in the space opposite the name of each group.)

(*a*) Academic (including language, history, social science, mathematics, physical training), per cent, ...

(*b*) Scientific (all scientific topics except strictly applied agricultural science), per cent, ...

(*c*) General agriculture (all agricultural topics except specialized lines covered in (*d*)), per cent, ...

(*d*) Special agriculture (professional), per cent, ...

(*e*) Free elective, per cent, ...

Total, per cent, 100.

II. What proportion of the work should be:

(*a*) Required work, per cent, ...

(*b*) Prescribed elective, per cent, ...

(*c*) Free elective, per cent, ...

Total, per cent, 100.

III. Which of the following subjects do you believe should be *required* in a four-year course in agriculture, and in what year?

Subjects.	Should it be required? (Write "yes" or "no" opposite each.)	If so, in which year? (Write 1, 2, 3, 4 for 1st, 2d, 3d, or 4th years.)	If so, how many term-hours per week should be given to it?
1. English			
2. Public speaking			
3. Foreign language			
4. Algebra			
5. Solid geometry			
6. Trigonometry			
7. Physical training			
8. Military training			
9. History			
10. General economics			
11. Rural economics			
12. Rural sociology			
13. General chemistry			
14. Qualitative chemistry			
15. Quantitative chemistry			
16. Organic chemistry			
17. Botany (general, agricultural)			
18. Entomology			
19. Zoology			
20. Bacteriology			
21. Physics			
22. Soils and soil management			
23. Soil fertility			
24. Field crops			
25. Feeds and feeding			
26. Types and breeds of farm animals			
27. Live-stock management			
28. Dairy production			
29. Dairy manufactures			
30. Poultry husbandry			
31. Vegetable gardening			
32. Fruit growing			
33. Forestry			
34. Farm management			
35. Farm shopwork			
36. Farm machinery			
37. Drainage			
38. Research thesis			
Others			

IV. Specialization:

A. When should specialization begin? Check one of the following:

1. Second year, ... 2. Third year, ... 3. Fourth year, ...

B. What is the best method of providing for specialization in advanced courses? Check one of the following:

1. Selection of departmental group of prescribed subjects .....
2. Choice of combination of "majors" and "minors" .....
3. Free election of specialized subjects .....

V. Farm Practice:

A. Should some practical farm experience be required for graduation? Yes, No. If so, what, should be the minimum?

1. 3 months .....; 2. 6 months .....; 3. 1 year .....; 4. More than 1 year .....

B. Should it be under the supervision of the college? Yes, No.

C. When should it be required? (Check):

1. Before entering college .....;
2. Between 1st and 2d years .....;
3. Between 2d and 3d years .....;
4. Between 3d and 4th years .....;
5. Any time before graduation .....;
6. Any time during college course .....

VI. What should be expected of the college graduate?

A. Check below what, in your opinion, the graduate of the four-year course in agriculture should be expected to do successfully:

1. Superintend a large farming enterprise, without other training or experience than that required for graduation .....
2. Conduct a farm as owner or share-tenant without other training or experience, etc.....
3. Act as a county agricultural agent, without other training or experience, etc., ...
4. Act as extension specialist in his special field, without other training or experience etc. .....
5. Have sole charge of some branch of a farming enterprise, such as an orchard, dairy herd, poultry flock, etc. .....
6. Or should we not expect of the graduate more than the following without further training and experience? (Check):
   - (*a*) Assistant farm superintendent .....
   - (*b*) Assistant county agent .....
   - (*c*) Assistant extension specialist .....
   - (*d*) Commercial work related to agriculture .....
   - (*e*) Other types of work .....

B. In what respects, if any, do you think the average agricultural college has failed in its effort to turn out trained men; in other words, what have been the weak spots in the average graduate's training? (Check):

1. Deficiency in academic training .....
2. Deficiency in training in fundamental sciences .....
3. Incompleteness of training in general agricultural topics .....
4. Failure to master any special branch of agriculture .....
5. Lack of adequate farm experience .....
6. Failure to develop high moral sense of responsibility to the service in which he is engaged .....
7. Other points .....

C. Should the graduate of the four-year course in agriculture be expected to qualify for agricultural research work calling for initiative and responsibility, without further training or experience? Yes, No.

VII. We shall appreciate it if you will amplify on the questions asked in VI. What, in your opinion, should be expected of the graduate of the agricultural college? In what respects has the college failed in its efforts to give adequate training? What changes would you suggest for improving the training now given? Also, additional comment on any of the above questions would be welcomed.

The questionnaires were sent the first part of April, 1919, and 35 replies were received. The deans of three colleges replied without answering the questionnaire directly, not caring to give their opinions in the form outlined. Most of the other 32 answered all questions; in a few instances answers to some questions were omitted. The results were summarized and are given on the pages following.

Whenever the summary of a point is represented by an average figure, only the actual number of answers is considered, not the total number of questionnaires returned. A comparison of the summary of the questionnaire with the data obtained from a study of the existing curricula is interesting.

BALANCE OF CURRICULUM.

Table 18 shows the balance of curriculum as expressed in the replies to the questionnaire compared with the averages compiled from the catalogues which have been discussed.

TABLE 18.—*Distribution of types of work.—Existing curricula compared with questionnaire replies.*

Types of work.	Average of 29 questionnaire replies.	Average of 48 colleges.	Difference.
Academic	17.7	22.0	−4.3
Scientific	27.2	24.5	+2.7
General agriculture	23.8	26.4	−.6
Special agriculture	16.7	12.5	+4.2
Total agriculture	42.5	38.9	+3.6
Elective	12.6	14.6	−2.0
Required	61.4	59.7	+5.7
Prescribed elective	23.6	28.1	−4.5
Free elective	12.9	12.2	−.2

There is considerable difference between the existing curricula and the combined opinion of the deans. The latter shows over 4 per cent less academic work, 2.7 per cent more scientific, 0.6 per cent less general agriculture, over 4 per cent more special agriculture, and 2 per cent less elective. Also, an increase of nearly 6 per cent in the required work is indicated, with 4.5 per cent less prescribed elective. The proportion of free elective is practically the same in each case. Summarizing, it appears that the consensus of opinion is in favor of less academic work, and more scientific and agricultural, and less freedom of choice of subjects.

SPECIALIZATION.

The opinion concerning specialization, compared with existing conditions, is shown in Table 19.

TABLE 19.—*Specialization—Existing curricula compared with questionnaire replies.*

Time and method.	Recommended in 32 replies to the questionnaire.	As found in 48 colleges.
Time to begin:		
Second year	3	5
Third year	27	37
Fourth year	2	6
Method:		
Departmental group	[1] 20	24
Major-minor option	8	13
Free elective	9	11

[1] The total in this column equals more than 32, because more than one method was recommended in some questionnaires.

The tendencies shown here correspond closely. While the number of colleges represented in the first column is only two-thirds the number in the second column, the distribution among the different groups is practically the same. The third year is decidedly the most favored for beginning specialization, and the departmental group is the most popular method. The free elective system and the major-minor system appear to be about equally popular.

FARM PRACTICE.

A decided opinion that farm practice should be required for graduation is expressed in the replies to the questionnaire. Of the 32 replies, only one was not in favor of requiring farm practice. This would indicate that there is a greater desire for farm practice than the colleges have been able to put into effect, as it is found to be required in only slightly over half of the colleges. The comparative figures are shown in Table 20.

TABLE 20.—*Farm practice—Existing curricula compared with questionnaire replies.*

Amount and time.	Recommended in 23 replies to the questionnaire.	As found in 48 colleges.
Required	31	27
Not required	1	25
Amount:		
Six weeks		2
Three months	4	6
Six months	13	12
One year	12	3
More than one year	1	
Under supervision of college:		
Yes	19	3
No	12	22
Time—		
Before entering		
Between first and second years	4	
Between second and third years	5	1
Between third and fourth years	4	2
Before junior year		4
Before senior year		6
Any time during college	6	2
Any time before graduation	16	11

Six months is the most general requirement in both cases, but there is a stronger tendency to make it one year in the questionnaires.

There is a striking difference in the matter of college supervision of practice work. While in effect in few colleges, the majority of the answers are in favor of it.

As to the time the work should be required, there is general agreement, any time before graduation being most generally designated. The other items in this part of the table do not allow an accurate comparison, because of a difference in the method of tabulation and of wording the questionnaire. One point, however, is worthy of

note. In six colleges it is required that the practice work be completed before the beginning of the fourth year, and in four colleges it comes before the third year. In five replies to the questionnaire, the period between the second and third years is designated, and in seven replies, before entering college. It seems certain that the earlier the work can be completed, the better it is for the student. Without question it should be completed before the beginning of the fourth year, in order to be of benefit in the advanced work of the last year. Where practicable, it should probably be acquired before the third year.

WHAT SUBJECTS SHOULD BE REQUIRED AND WHEN?

The opinion of the deans with respect to what subjects should be required, and when, is shown in Table 21. In some instances the year in which a subject should be required was not indicated, and accordingly only those indicating the place in the curriculum are included in the columns.

A comparison of this table with Table 4 shows a remarkable similarity with respect to position of subjects in the curriculum. With few exceptions, the subjects fall in the same year in both tables. Public speaking and general economics, appearing here in the third year, are second and fourth year subjects, respectively, in Table 4; but there is little other difference. The terminology used in the questionnaire does not correspond in all cases with that in Table 4; also many subjects are not listed, but the important ones are given, and the tables are comparable in essential respects. It may be noted that the total figure in the first column is often less than the sum of the yearly figures. This is due to the method of tabulation. In the replies to the questionnaire, more than one year was often given as suitable for a subject, and in such cases the subject was listed under both or all years given.

Some subjects have received unanimous indorsement in all replies to the questionnaires; most of those listed are included by the majority. Subjects indorsed in less than half of the questionnaires appear at the foot of the list for each year. In the first year, the less popular subjects are foreign language, algebra, and solid geometry; in the second year, forestry; third, history, live-stock management, dairy manufactures, and drainage; and fourth, research thesis. The evidence is against these subjects as requirements in the curriculum, but of course it is not proof that they should not be included more generally, or at least where local conditions would make it desirable. There seems to be a decided feeling that foreign language should not be required, much stronger than is evidenced by the curricula themselves.

What subjects should be required and when should they be given?

[Figures represent number recommending each subject.]

Year.	Total.	First year.	Second year.	Third year.	Fourth year.
FIRST YEAR.					
English	30	29	16	5	2
Trigonometry	15	11	.....	.....	.....
Physical training	21	19	16	7	5
Military training	27	[1]27	[1]27	5	3
General chemistry	30	29	4	.....	.....
Botany	30	28	13	1	.....
Types and breeds	28	20	12	2	1
Farm shop	19	14	6	2	1
Foreign language	3	3	2	.....	.....
Algebra	11	8	.....	.....	.....
Solid geometry	6	6	.....	.....	.....
SECOND YEAR.					
Qualitative chemistry	21	9	11	2	.....
Quantitative chemistry	16	2	14	2	.....
Organic chemistry	22	2	15	6	2
Zoology	25	[1]13	[1]13	1	.....
Entomology	20	2	13	10	1
Physics	16	2	15	.....	.....
Soils and soil management	27	3	17	10	1
Field crops	28	13	17	8	.....
Dairy production	22	10	15	8	4
Poultry husbandry	18	7	9	7	6
Vegetable gardening	20	7	16	4	1
Fruit growing	21	7	12	9	3
Farm machinery	21	4	9	6	3
Forestry	6	2	4	.....	2
THIRD YEAR.					
Public speaking	18	4	6	7	4
General economics	20	.....	4	14	5
Bacteriology	25	.....	10	15	4
Soil fertility	18	1	5	10	2
Feeds and feeding	23	2	10	13	4
Live stock management	13	1	6	7	5
Drainage	10	2	3	4	3
Dairy manufactures	9	3	5	6	3
History	8	1	2	5	3
FOURTH YEAR.					
Rural economics	22	.....	2	12	13
Rural sociology	18	.....	.....	8	14
Farm management	22	.....	1	11	20
Research thesis	4	.....	.....	.....	3

[1] Equal numbers place these subjects in first and second years.

WHAT TO EXPECT OF THE COLLEGE GRADUATE.

It was desired to learn the opinion of leaders in agricultural education as to what line of work the graduate of the agricultural college may be expected to pursue successfully, without other training or experience than that required for graduation. Accordingly, such a question was included in the questionnaire. A summary of the replies follows:

1. Superintendent of large farming enterprise, 2.
2. Operator of farm, 17.
3. County agricultural agent, 4.
4. Extension specialist, 3.
5. Have sole charge of some special branch of farming, 18.
6. Assistant farm superintendent, 23.
7. Assistant county agent, 25.
8. Assistant extension specialist, 22.
9. Commercial work related to agriculture, 23.

It is difficult to give definite answers to these questions, for so much depends on the personality of the individual and his previous experience. Young men of ability above the average, who were farm-reared, might be able to perform the first, third, and fourth types of work successfully on leaving college, but they are exceptions. A young man of moderate ability should succeed with the second enterprise, provided he has had ample farm experience. A city-bred man who had simply completed the minimum requirements in practice stipulated in most colleges would not be likely to succeed from the beginning in the operation of a farm unless he had unusual ability.

It appears to be quite generally accepted that the college graduate should begin in a subordinate place, for example, as an assistant in some agricultural endeavor, and here gain the necessary experience which would enable him shortly to assume a more responsible position. As expressed by the dean of one of the northeastern colleges, the graduate needs a year's experience for "hardening off."

To the question whether the graduate should be expected to qualify for agricultural research work calling for initiative and responsibility, 29 replies were "No" and only 1 "Yes."

WHAT ARE THE WEAKEST SPOTS IN A COLLEGE MAN'S TRAINING?

It is only natural that the agricultural college, in its rapid growth of recent years and in its effort to meet new conditions that have arisen, should not succeed in all cases to furnish a training of high grade in all respects. The replies to the set of questions concerning the "weakest spots" in a college man's training are significant. The summary follows:

1. Deficient in academic training, 18.
2. Deficient in scientific training, 16.
3. Incomplete training in general agriculture, 7.
4. Failure to allow sufficient specialization, 9.
5. Inadequate requirements in experience, 18.
6. Failure to develop sense of moral responsibility to profession, 14.
7. Faulty instruction, 3.

Inadequate academic and scientific training, lack of experience, and failure to develop a feeling of moral responsibility to the profession appear to be the chief points of weakness. The last mentioned has been so keenly felt in one institution that a course in agricultural relationships has been introduced to meet the need. All of these factors do not correspond with the replies to another part of the questionnaire. For example, in Table 18 we find that a reduction in the proportion of academic work is recommended, but here a weakness in this department is acknowledged. This may be due to a failure to appreciate the amount of time necessary for this work, or perhaps it is believed that this need should be met by better in-

struction in academic subjects rather than by devoting a greater amount of time to them. The need for an increase in scientific training and in farm practice is confirmed in both parts of the questionnaire.

There would probably have been more to designate faulty teaching as one of the chief reasons if this had been included in the check list in the questionnaire, as this was brought out many times in the general comment on the questions. In fact, this point of weakness is probably more generally recognized than any other. Various reasons were given: Inadequate training of instructors, insufficient time available to the instructor for preparing work and for study in keeping abreast with agricultural development, use of old and out-of-date textbooks, poor methods, inefficient use of time, especially in laboratory work. It was brought out that the sciences should be taught from the agricultural viewpoint, not by instructors who know nothing of and have no sympathy with agriculture. Another condition emphasized was the failure to apply the technical training, to tie up theory with practice, to bring classroom and field together. This undoubtedly is the chief reason for the almost unanimous recommendation that farm practice be required.

IX. BASIS FOR REORGANIZATION OF THE CURRICULUM.

From the present-day tendencies and that portion of the foremost opinion on the agricultural college curriculum presented above, we should be able to determine some of the fundamental principles upon which a curriculum should be based.

The aim of the agricultural course should be the first consideration. Even at this point of beginning there is some difference of opinion, but we are probably safe in assuming that the generally accepted aim is twofold, cultural and vocational. The college degree should stand for more than mere efficiency in one profession; it should mean a certain knowledge of the affairs of the world, an appreciation of the intricate relationships existing in the present stages of civilization, some insight in social and economic problems, and a broadened point of view which is essential to intelligent and useful citizenship. For this reason, the cultural aim must be kept in view. Along with this goes the vocational aim; the training for a profession, a means of livelihood. Sufficient attention should be given to this aim to develop an efficient worker, to give the student a foundation knowledge in his chosen field essential to successful endeavor.

Another factor which must be considered in the organization of any college curriculum is the previous preparation of the student, or, in other words, the college entrance requirements. The entrance requirements of the colleges were not taken up in this study, but

the data should be interpreted with due allowance for this factor. A summary of entrance requirements of the agricultural colleges is given by Jarvis.[1]

Certain factors other than the curriculum are necessary to the successful administration of an agricultural course, such as (1) efficient instruction, (2) adequate equipment (field and laboratory), (3) adequate preparation of the student for college, (4) the intelligence and application of the student. However, as this paper is limited to a study of the curriculum *per se*, these will not be discussed in detail.

There is a great variation among the different colleges in the total number of semester hours required for graduation.

This was not taken up in the present study, for it has been summarized by Jarvis.[2] The total ranges from 124 to 228 hours, and the median requirement is 157 hours, somewhat less than 40 a year or 20 a semester. Variation in the method of equating laboratory hours in terms of credit hours is largely responsible for this difference. The most generally accepted method is to equate 2 laboratory hours as 1 credit hour. On this basis, 20 credit hours a semester, or 160 credit hours for graduation, probably represents a fair requirement.

The other fundamental factors may be summarized briefly. When both existing curricula and the opinions of the deans of the agricultural colleges are considered, the data indicate that the following represent the principles underlying the curriculum of the agricultural college. This summary does not represent an exact "average" of the catalog data and questionnaire answers, but due consideration in each instance is given to both.

1. The distribution of types of work should be about as follows: Academic, 21 per cent; scientific, 27 per cent; general agriculture, 26 per cent; special agriculture, 14 per cent; total agriculture, 40 per cent; elective, 12 per cent; total, 100 per cent.

2. The proportion of required work should be about as follows: Required, 62 per cent; prescribed elective, 26 per cent; free elective, 12 per cent.

3. The work of the first year should be predominantly of the academic and scientific types, forming a foundation for the advanced work in agriculture to follow.

4. Some academic work should be given each year in order to fulfill the cultural aim, and in order to develop a broad point of view within the student as he progresses toward the completion of his course.

5. Some work in agriculture should be given in the first year, in order to give the student the agricultural viewpoint as soon as

[1] Jarvis, C. D. U. S. Dept. Int., Bur. Educ., Bul., 1918, No. 29, pp. 19-33.
[2] Ibid., p. 27.

possible, and should follow in increasing proportions throughout the four years.

6. All work in the first year should be required. Some election may be allowed in the second year, but most election should be left until the third and fourth years.

7. During the first and second years, courses covering the fundamental principles of agricultural science should be required, in order to form a basis for the technical training to follow.

8. Elementary courses in the main branches of agriculture should be required in the first two years in order to form a foundation for specialized study and to give the student a wide outlook on the field of agriculture and an unprejudiced view of its different phases, so that he may make his choice of special work intelligently.

9. Specialization should commence at the beginning of third year.

10. The best method of offering specialization is the "Departmental group," in which a student elects his special work by choosing a definitely outlined course of studies arranged to fit for the field in question with an allowance for a small amount of free election.

11. A minimum of six months of farm practice, completed before the fourth year, preferably before the third year, and better still before matriculation, should be required.

12. Certain subjects should be required in all curricula; others are desirable and in most cases should be included, but because of local conditions may be left out. These are indicated, respectively, as Groups A and B.

Group A.

First year:
- English.
- Physical or military training.
- General chemistry.
- Botany.
- Types and breeds of farm animals.

Second year:
- Public speaking.
- Zoology.
- Qualitative chemistry.
- Organic chemistry.
- Soils and soil management.
- Farm machinery.
- Dairy production.
- Poultry husbandry.
- Field crops.
- Fruit growing.

Third year:
- Bacteriology.
- Entomology.
- Economics.

Fourth year:
- Farm management.
- Rural economics.

Group B.

First year:
- Algebra.
- Trigonometry.
- Farm shop.

Second year:
- Physics.
- Vegetable gardening.

Third year:
- History.
- Feeds and feeding.
- Soil fertility.

Fourth year:
- Rural sociology.

13. Foreign language should be required only of students who have not had at least two years in preparatory school and of those who are preparing for teaching or research.

14. The curriculum should be shaped to meet local conditions in the State and at the college.

This summary is given as epitomizing the data surveyed, and should be interpreted as such. It is fully appreciated that local conditions are usually the determining factor in formulating a curriculum and that the differences of conditions governing different institutions make it impossible to apply any one hard and fast rule to all colleges alike. These principles, therefore, should be interpreted liberally and should be considered as being of broad rather than specific application.

Neither should they be accepted as unqualifiedly constituting the "best" curriculum. Individuals will take exception to some of the points. They do not represent in all instances what the writer would favor. For example, he believes that the proportion of academic work should be somewhat increased and the elective reduced by a corresponding degree. In most other points, however, he is in virtual agreement.

X. HOW MEASURE THE EFFICIENCY OF A CURRICULUM?

The ultimate test of the efficiency of any curriculum is the quality of the product, the ability of the student graduated. Even this is not a fair test, however, for the personality of the student is an all-important factor; and other factors mentioned, such as the quality of instruction, equipment, etc., would influence the results. It is obviously desirable to have some other means of judging the efficiency of any given curriculum, most desirable before it is put into operation and "tried out" on an unfortunate group of students. The need for some method of measuring the efficiency of a curriculum became more apparent to the writer as he studied the curricula of different colleges, and discovered the great lack of uniformity among different institutions, and as it became apparent that the different colleges had evidently been shaping their curricula around different guiding principles.

The measure of efficiency heretofore applied has been the concept of the ideal curriculum in the mind of the individual as compared with the actual curriculum in question. This means that there have been as many different measures as there were individuals considering the problem, and so we have failed to reach any generally accepted standards.

In the effort to find a means of measuring the efficiency of a curriculum it seemed to the writer that the use of any definite unit of measure is impracticable. The curriculum of any given college must be

so adapted to local conditions that the "best" curriculum would probably not be the same for any two colleges. Granting, then, that a certain variation in the curricula of different State colleges is necessary in order to meet local conditions, the problem resolves itself into (1) singling out the factors which should be considered in making the adaptation, and (2) the provisions that shall be made in shaping the curriculum to meet them.

Some of the factors to which the curriculum of any one State college should be adapted are given here, being listed, in the opinion of the writer, in the order of their importance.

1. *The agricultural practices of the State.*—This is self-evident and needs no elaboration.

2. *The agricultural needs of the State.*—This factor should be considered in its broadest sense. It involves, first, a recognition of any weak features of the State's agriculture, as well as the agricultural resources and latent possibilities of the State and the lines of development that should be followed; and second, a recognition that professional leadership is necessary in carrying out any program of development. The college should aim to train its students for this leadership.

3. *The educational system of the State.*—Articulation with the secondary schools, of course, is necessary. Another point of contact is in the training of teachers and extension workers.

4. *The nature of the student clientage.*—The needs of the student, as determined by his previous training, farm experience, capacity, and aims, are varying factors, and certain tendencies predominate in particular States. These are of sufficient importance to be a determining factor in formulating a curriculum.

5. *The resources and facilities available for instruction purposes*, including such items as funds, faculty, and materials and equipment in field and in laboratory. The curriculum is often limited by a shortage or lack of any one of these.

6. *The organization of the college*, especially in relation to other divisions of higher education. For instance, the curriculum problem in the small college differs from that of the large university, where such questions as the offering of courses in other colleges (e. g., the college of liberal arts) must be considered.

While recognizing the need for variation, however, it should be possible to form a general judgment of the efficiency of any curriculum by comparing it with the standards which it has been the purpose of this study to discover. Assuming, then, that the courses are well taught, that the facilities of teaching are adequate, and that the student shows both ability and application, one may expect successful results if the curriculum measures up to the following table of standards. The so-called "normal" factors of items 2 to 5 represent

the most generally accepted practices throughout the agricultural colleges of the country, modified by the epitomized opinion of the deans of these colleges. Item 4 is based on the study by Jarvis. The factor of variation is covered by item 6.

This table of standards should not be regarded as permanent. It will necessarily change with the development of agricultural education. The growth of agricultural instruction in secondary schools is one of the movements which will have an important influence on the agricultural college, and it is generally predicted that with the universal establishment of vocational secondary agriculture; under the provisions of the Smith-Hughes Act, the chief aim of the agricultural college will gradually change from the training of farmers to the training of rural leaders and scientific experts. This, of course, will necessitate modifications in the curriculum, and any standards that may now be fixed would be subject to change.

STANDARDS OF THE CURRICULUM OF THE AGRICULTURAL COLLEGE.

1. Number of semester hours required for graduation—normal, 140 to 150, depending upon credit equivalents for laboratory work.
2. Balance of curriculum:
   - A. Normal—Academic, 21 per cent; scientific, 27 per cent; general agriculture, 26 per cent; special agriculture, 14 per cent; elective, 12 per cent.
   - B. Normal—Required, 62 per cent; prescribed elective, 26 per cent; free elective, 12 per cent.
3. Farm practice required for graduation: Normal, 6 months.
4. Specialization: Normal—Departmental group elective system commencing at beginning of third year.
5. Required courses:

   Normal.—First-named subjects for each year required of all students in the year indicated. Those in parentheses desirable.

   First year.—English, physical or military training, general chemistry, botany, animal husbandry—basic course (algebra, trigonometry, farm shop).

   Second year.—Public speaking, zoology, qualitative chemistry, soils and soil management, farm machinery, dairy production, poultry husbandry, field crops, fruit growing, (physics, vegetable gardening).

   Third year.—Bacteriology, entomology, economics, (soil fertility, history, feeds and feeding).

   Fourth year.—Farm management, rural economics, rural sociology.
6. Adaptability to local conditions: Normal.—The curriculum should be shaped with consideration for:
   1. The agricultural practices of the State.
   2. The agricultural needs of the State.
   3. The educational system of the State.
   4. The nature of the student clientage.
   5. The resources and facilities available for instruction purposes.
   6. The organization of the college.

ADDENDA.

Shortly before this bulletin went to press there appeared a report of progress of the subcommittee on college instruction in agriculture, appointed in 1919 by the Commissioner of Education.[13] Several of the topics treated above are touched upon in this report. Closely in accord with the recommendations here set forth, the committee reports a growing opinion in favor of basic courses of agricultural subject matter early in the curriculum, departmental group electives beginning in the junior year, and an adjustment of the curriculum to the broader aspects of the agricultural problem rather than to meet special needs. The desirability of certain additional features is pointed out, including, among others, an advanced general course required in the senior year, which would present the production, economic and social problems of agriculture as a connected whole; and special training for the teachers of agriculture in the Smith-Hughes and other secondary schools, for extension workers and for agricultural journalists, providing a relatively large proportion of basic agricultural work in the course.

[13] U. S. Dept. Int., Bur. of Ed., Higher Educ. Circ. 21, July, 1920.

INDEX.