DEPARTMENT OF THE INTERIOR
BUREAU OF EDUCATION

BULLETIN, 1924, No. 37

LAND-GRANT COLLEGE EDUCATION

1910 to 1920

PART II

THE LIBERAL ARTS AND SCIENCES INCLUDING MISCELLANEOUS SUBJECTS AND ACTIVITIES

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WASHINGTON
GOVERNMENT PRINTING OFFICE
1925

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25 CENTS PER COPY

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FOREWORD

For the sake of convenience this survey of land-grant college education is divided into five sections, published separately, as follows:

Part I. History and Educational Objectives of Land-Grant College Education.

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In this section (Part II) such subjects have been brought together as could not be readily classified under agriculture, engineering, or home economics. In addition to the study of the liberal arts and sciences, in relation to the technical fields, there is also included a treatment of the subjects of agricultural economics, rural sociology, industrial journalism, military training, physical education, general educational extension, and education in the negro land-grant colleges.

LAND-GRANT COLLEGE EDUCATION, 1910 TO 1920

PART II.—THE LIBERAL ARTS AND SCIENCES, INCLUDING MISCELLANEOUS SUBJECTS AND ACTIVITIES

Chapter I

THE LIBERAL ARTS IN THE LAND-GRANT COLLEGES

By GEORGE F. ZOOK

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The function of the liberal arts in the land-grant colleges has been a source of considerable difficulty and debate from the beginning of these institutions to the present time. Much as it has been discussed, there has never been complete agreement as to the meaning of that famous but very ambiguous statement in the Morrill Act of 1862, which states the purpose of the act to be—

> the endowment, support, and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such a manner as the legislatures of the States may respectively prescribe in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

In those States—one-half of the total number—where a State university has become the land-grant college, there has, of course, been no necessity to be concerned about the interpretation of this act save to conform to the general requirements regarding the purposes for which the Morrill funds may be spent. Even in those States where the land-grant colleges were founded as separate institutions the States have been free legally to duplicate the work of the State universities in liberal arts as extensively as circumstances seemed to justify. There has always been, however, considerable public disapproval of duplication in these fields if it resulted

in less attention to agriculture and mechanic arts. On account of a variety of circumstances the separate land-grant colleges are not now being confined to so restricted a field of instruction as formerly.

Historically the land-grant colleges have been impatient at the restraints imposed on them by State legislatures and public opinion. At the time the Morrill Act was passed there was comparatively little organized scientific knowledge in agriculture, and little progress was made in developing agriculture as an applied science until after the organization of the agricultural experiment stations. Mechanic arts existed in a somewhat similar hazy twilight zone until it finally emerged as engineering not many years ago. Home economics was unknown as a field of scientific instruction for 30 years after the Morrill Act was signed. On the other hand, the older colleges and universities for years had been graduating students in the traditional curricula in vogue at that time. It was natural and almost unavoidable that the new type of educational institution should select the majority of its faculty and administrators from among these graduates. It was also natural that many of these persons should distrust the vagueness of the early content of courses in agriculture and mechanic arts in favor of the definitely organized and better known subject matter of the liberal arts, which had an unquestioned standing among educators and laymen alike. Consequently, there was a constant tendency toward a duplication of the traditional curricula, which has been shaken off only after the development of basic and applied sciences relating to agriculture and engineering and their organization into diversified curricula.

To-day the problem of the liberal arts in engineering, agricultural, and home economics curricula revolves around two fundamental considerations: (1) The fact that the secondary education of boys and girls is not finished in the American high school, and, consequently, has to be continued in the higher institution, no matter what the type, which they next enter; (2) the constant obligation of higher institutions, no matter what the type, to continue the training of students for citizenship and for the appreciation of cultural values.

Contrary to almost universal practice in foreign countries, the secondary school in the United States is a four-year school superimposed on an eight-year elementary school. The secondary school period, which ought to be five or six years in length, begins at least one and probably two years later than it should, with the result that this secondary education is carried over into the realm of so-called higher education and there completed in a great variety of curricula, as best it can be. Examples of this situation are the ele-

mentary courses in foreign language, English rhetoric and composition, history, chemistry, physics, and biology, all of which should be completed before a student enters a course of study in engineering or agriculture. Under existing conditions, however, these subjects contest with the applied sciences and with one another for recognition in the curriculum with results varying all the way from adequate recognition to complete elimination. The usual curriculum in engineering, agriculture, and home economics is, therefore, an expedient compromise between secondary and vocational courses on the one hand and applied sciences and cultural and citizenship courses, in the realm of higher education, on the other—a compromise which defies classification and approaches but does not attain the professional level in higher education.

The disconcerting thing about this situation is not altogether the variety and usually the fragmentary amount of recognition accorded to what is really the completion of the secondary school subjects, with the consequent crowding of courses in applied sciences, but the fact that these secondary courses are being attempted at a time in the development of most young men and women when the zeal for general education has been superseded by a desire for specialized training leading to some definite calling or profession. Consequently, there is likely to be among the students lack of interest in general education which is consciously or unconsciously promoted by instructors in applied science who are naturally engrossed in their own subjects. Indeed, how can one blame students 18 and 19 years of age for failing to grow enthusiastic about an elementary course in foreign language or English composition which should have been completed several years before! It would appear that such a situation can appeal favorably only to those who lack a sense of humor or, better, pathos.

While it is to be regretted that our system of elementary and secondary education makes it necessary for young men and women to continue in the engineering, agricultural, or home economics curricula, the acquisition of the tools of knowledge, such as elementary history, foreign language, and English composition, there is another type of liberal studies, consisting of advanced history, economics political science, sociology, literature, psychology, and philosophy, which should be within the reach of all students in higher institutions in degrees which vary in accordance with the length and character of the technical curricula which they pursue.

There are two general reasons why all land-grant colleges, as well as all other higher institutions, are under obligation to infuse courses of this character with those in the applied sciences in order to make up curricula in agriculture, engineering, or home economics. These reasons go back to the fundamental aims of education, including

higher education. There is a public obligation to provide specialized training to enable students to do some useful work in the world in order not only to supply more completely their own physical wants, but to add to the general store of society's material resources. The satisfaction of physical wants is, however, not the full measure of the end in view. There are other and higher values, cultural and ethical in nature, toward which men and women continually aspire and for which gradual emancipation from the dull cares of earning a livelihood gives time and opportunity. Therefore, merely to provide an education whereby men and women may satisfy their material wants more completely and in shorter hours, without at the same time opening up to them the channels of culture and self-development in literature, art, and music, and the wide range of human thought and activities, may truly be compared to the parable of the man who asks for bread and is offered a stone. In this material age, we have been laying much stress on professional and technological education as a means of helping young people to perform efficiently and effectively in their working hours, but we have, by no means realized our obligation to educate young people to spend their nonworking hours pleasantly and profitably. This is the realm in which the lives of young men and women are made and unmade. This is the field of the cultural studies, and it is a necessary part of every curriculum in all higher institutions, including the land-grant colleges.

The second reason for the necessity of liberal arts studies in the curricula of the land-grant colleges is to give students citizenship training. The simple basis for this statement is the fact that the United States is a democracy and consequently we look to the people, through their representatives in National, State, and local government, and through the influence of public opinion on these representatives, for the solution of our complex social and political problems. It ought to be more axiomatic than it is that this Government can not succeed unless there is widespread public intelligence concerning the problems which face us in local, State, National, and even international affairs. If then, the blessings of a democratic form of government are to be preserved, it is essential not only that the citizen should learn how to earn well and how to develop himself physically, mentally, morally, and spiritually, but also to participate intelligently in the conduct of our Government. The land-grant colleges and all other types of higher institutions have a very important obligation to include in all their curricula, no matter how technological in nature, a reasonable amount of subjects intended primarily to prepare students to become intelligent leaders of public opinion on economic, social, and political problems which under our form of government are our common concern.

Unfortunately, the natural tendency to crowd the curriculum with technical subjects, and the necessity of including a number of elementary subjects in languages, rhetoric, and science in order to complete the secondary school education has left quite inadequate room for either the cultural or citizenship subjects in most courses of study in land-grant colleges. Furthermore, on account of the breaking up of the social sciences among a number of departments, including history, political science, economics, and sociology, almost no attempt is made in such courses as are offered to give students a well-rounded program of subject matter from these and other fields of study. For example, a report of a committee of the Society for the Promotion of Engineering Education, made in 1918, summarized the situation concerning citizenship training in engineering schools. In 42 courses of study leading to a civil engineering degree, 18 required no social sciences whatever, while 21 required general economics, 2 political science, 1 sociology, and 1 industrial history. In the same number of mechanical engineering courses of study, 13 had no requirements in citizenship subjects, 21 required general economics, 3 political science, 1 sociology, and 1 industrial history. In electrical engineering courses of study, 14 had no requirements of citizenship subjects, 21 required general economics, 3 political science, 1 sociology, and 1 industrial history. Among the 23 electrical engineering schools which have requirements in citizenship subjects, one school requires 12 hours, one 6 hours, and six 2 hours. The amount of social science required in other engineering courses of study is similar to that in electrical engineering.

Turning to the situation in agriculture, one finds that about one-tenth of the usual curriculum is elective. An additional one-sixth is devoted to nontechnical subjects. The social sciences, including education and psychology, occupy a little less than 5 per cent of the curriculum. Almost without exception, the curricula in agriculture contain some work in the social-science group. The amount varies from 3 to 23 hours, with a median requirement of 8 hours. Here, as in engineering, there has been considerable tendency of late to substitute courses in practical economics for the more general ones. Accordingly, at present one finds in the agricultural curriculum such courses as rural economics, farm management, and marketing.

The urgent demand at present is that at all land-grant colleges, as well as at all other types of higher institutions, there should be adopted some definite program of citizenship training which should be given a prominent place, befitting its importance in every curriculum, and that in organizing this program departmental divisions of the institution should be disregarded sufficiently so as to obtain comprehensive and unified courses running through several semesters of the typical four-year curriculum. A very interesting and

suggestive beginning in this direction has been made at Columbia University in the course entitled "An Introduction to Contemporary Civilization," which is required of all students in the freshman year. Courses of similar character have also been introduced at Dartmouth College, Leland Stanford University, University of Missouri, Princeton University, and Rutgers College.

In these institutions it has been found desirable, in order to secure the greatest measure of success, to place the program of citizenship courses in charge of some one person or group of persons, and to select for the content of the course subject matter primarily from the social-science fields of study. In this way the claims of particular college departments are made to give way to the larger consideration of supplying students with a unified course or group of courses which cover, so far as time permits, the problems of citizenship.

In this review of the situation concerning the liberal arts in land-grant colleges, it is apparent that the departments which are responsible for the courses may be compelled to devote the greater part of their time to engineering or agricultural students rather than to those who will later specialize in some one of these fields. In a separate land-grant college it may even be that very little opportunity will exist for advanced courses or research in any of the liberal arts subjects. In this respect the liberal arts are not on the same footing as the basic sciences, which need to be developed as consistently as the applied sciences themselves, because the progress of agriculture and engineering, for example, is determined in considerable part by the progress which is made in the basic sciences.

Nevertheless, notwithstanding the difference in the function of the liberal arts in land-grant colleges from the basic sciences, it is no less important. Indeed, those who are engaged in the missionary work of developing cultural appreciation and citizenship education among students, whose chief interest at that particular time may be in engineering, agriculture, or home economics, are entitled to the satisfaction that they are imparting a type of instruction which is more and more appreciated by students after they leave college and encounter the complex problems of life. The person who devotes the major portion of his life to teaching as a form of service has his reward as well as the profesor who has ample opportunity for research in addition to teaching.

In conclusion, it can not be made too plain that, under present conditions, a satisfactory solution of the problem of the liberal arts in the curricula of the typical land-grant colleges, as, for example, engineering and agriculture, is impossible. The elementary school period is too long and the secondary school period too short. The permanent cure for the situation lies in finding a way to lengthen either

the secondary school period or the period of study at the colleges of engineering and agriculture. The former is in every way preferable, and the general interest which is now being shown in the junior college movement and the possibility of reducing the number of elementary grades to six or seven offer considerable hope that the solution of the liberal arts in the curricula of the land-grant colleges is in sight. Until that time comes, we shall be compelled to continue the unsatisfactory policy of inserting here and there, wherever room can be requisitioned, a few scattered and far too elementary courses in liberal arts.

Chapter II

THE RELATION OF THE BASIC SCIENCES TO EDUCATION IN THE LAND-GRANT COLLEGES

By CHARLES E. MARSHALL
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The land-grant colleges are scientific schools which place their emphasis on applied science; they seek to use scientific knowledge in practical pursuits, and strive to make practice and science one and the same thing. The schools are so organized that this is not the only aim, for it is quite generally conceded that the important function is to be founded upon or associated with subject matter which will broaden the vision of the student, develop his character, liberalize his views, and, in short, bring him in intimate contact with his environment.

The land-grant colleges have many technical or practical issues. With the multiplication of these practical issues there is a corresponding increase of intensive specialization. The more restricted the specialization, of course, the more limited are the scientific laws which are brought over for application. This situation leads to the deduction that inasmuch as only a very meager amount of science is needed for each of the much curtailed practices, it is not necessary that the student equip himself in fundamental science. The assumption is then made that what little science is required may be given along with the practice. The result of this line of reasoning short-circuits the aim of the land-grant college by reducing it to that of a trade school and nullifies the interest the institution has in the education of a man.

There would be no difficulty in establishing, too, that even in a strictly vocational school it is rare that the work of the many practical

issues completely coincides with the work expected of the student when he launches upon his career in life. When this happens his particular practical and intense specialization in college has little educational merit because it has little of resourcefulness, of basicity, of suggestiveness, and of training outside of his specialized craftmanship itself. Its constructive values are eliminated through the substitution of trade values, which are largely mechanical. The flavor of an apple is found deep in the soil and atmospheric conditions, although it may be enjoyed by the palate but may not be understood by a superficial mind.

What our relation may be to the gigantic scheme of nature is a question we are unable to answer, but we have learned that all its movements, reactions, and changes are regulated by immutable laws, the same laws which control our physical or material well-being and which through some unknown channel influence very greatly our intellectual and spiritual outlook. The intimate relationship existing between nature and man is blended in a wonderful mechanism operating in spite of man, but which man may fully utilize within the limits of its different modes. Man, therefore, should understand the possibilities available to him through the regulatory laws controlling this mechanism. Unless he is a mere tool to be used by others or an inert factor to be driven hither and thither by the moving elements, he must know the directive agencies which are in charge and the forces which control, that he may deflect them to his needs and desires. Nature appears to maintain her completeness, her unity, and her stability although she is constantly undergoing transformation and change within her boundaries. It is within and through the alterations which are her modus operandi that man fits and functions and acts. Here he has the free play of his will, which is in turn regulated and restricted because nature, so far as man is concerned, functions within herself only.

Man may exercise his will and have freedom of expression and action, may assume lordship over his physical environment, may boast his divinity along with the Creator, and may reach out indefinitely to infinite distances in interpreting the universe, but every law of the universe holds him in its own shackles.

Nature's science or the natural sciences, which are only human words for these laws and that out of which they come, are the preeminent basis upon which to build. Mathematics attaches to them as a mode to denote quantity in its time and spatial relations. A great philosopher has said of mathematics, "She guides reason to the knowledge of nature, in her greater as well as in her lesser manifestations, in her beautiful order and regularity; guides her, moreover, to an insight into the wonderful unity of the moving forces in

the operation of nature, far beyond the expectations of a philosophy building only on experience; and that she thus encourages philosophy to extend the province of reason beyond all experience, and at the same time provides it with the most excellent materials for supporting its investigations, in so far as their nature admits, by adequate and accordant intuitions."

It will be gathered from this that nature and science are one and man a part. Only as man interprets nature and becomes conscious of her manifestations does he comprehend his relationships. Because science finds its expression through a human of humans, or because science appears to be an accumulation of revelations, it does not follow that its province is measurable by human effort or knowledge. Science, if regarded as the product of the human, is known to the human only in a very restricted manner. This is true whether the truths have been already revealed to the human or not. Consequently, science must be considered as coincident with the universe although the human, in his treatment, will deal with it as he looks out of his environment upon it and sees it as the results of his work.

Science is objective, concrete and stable. The laws of nature are generally acknowledged by all students of science. Wars, revolutions, and human turmoil do not disturb them. Agitations, dogmas, beliefs, and creeds, as subjective products, must give way although they often create temporary confusion. The facts of science stand their ground in spite of anything man may do, for they are part of the universe and regulated by some higher power—or Power.

It is this detachment from man's subjective influence that makes for the stability, persistency, and consistency of science. Man as a scientist uses nature by adhering to her laws which govern.

Science as man measures it moves on with the greater and greater understanding of the universe. Its progress in the mind of man is measured by his capacity to interpret and demonstrate his objective environment. Its accretional growth, so far as man is concerned, is the taking on of new materials subjected to the crucial tests of many experiences yielding identical results.

Science has had to be resolved to secure progress. The very fact that the universe is our world in which we act and that our actions are dependent upon our acquaintance with the reactions going on about us, and that we as individuals can master so meagerly, forces this resolution.

At the present time, therefore, there are almost innumerable sciences. The divisions are not natural divisions and they are not necessarily made for the same reasons. They have been developed simply because the individual mind can not comprehend the multi-

tude of details for research, instruction, and application in the whole field of science and even in one of the sciences. Experts are essential in every subfragment if progress is to be made.

Much has been said about scientific thought; less has been written to illustrate wherein the value lies. Although it may have been accepted by many minds as the most reliable thinking procedure in a general sense, there has always been lacking a failure to press its worth into thinking practices not only on the part of scientists themselves but those classifying in other divisions. The scientists have forgotten the real diamond of science in their intensive search for other stones of less value. They have even neglected to carry over their scientific thinking into their general thinking. Those who have not been trained in scientific thought scarcely know what the process is, and often allege scientific thinking when only the crudest semblance is recognizable. Indifference, together with ignorance of it, may account for its dismal failure in social, political, and practical issues while it permeates scientific literature of a serious nature.

The mind which seeks an established and commonly acknowledged basis from which to start and then proceeds step by step with verified accretions and relationships toward a self-determining conclusion is a safe mind. This process necessarily entails all the functions of the human mind. It is not simple but the highly complex. Every percept must be weighed and judged before it can be employed as one of the elemental facts; every fact must be correlated and harmonized in the synthesis of all parts out of which will form an impersonal inclusive concept. If this is done objectively and honestly, subjective influences other than the faults of the senses will not creep in to be assigned to personal prejudices.

This is as far as mind can go in acquiring truth. The objectivity and concreteness of science through the senses gives unquestioned advantages in this respect because of possible precision that can not be obtained in any other field of thought.

Returning to the situation existing in our formal education after trying to name the purposes of the land-grant colleges and what some of the characteristics of pure science are as it pertains to an education, it may be well to enumerate some of the difficulties encountered in the teaching of pure science.

Practical or utilitarian education has called for scientific facts as such which would concern some specific practice. "Only the practical" is solicited by the so-called practical men. Educational objectives are thus completely forgotten in this attempt to turn an isolated fact away from its relations and to measure the higher aspirations of life in economic standards. What is the use of anything that has no "dollar value" is the attitude or implied question.

Such an approach to life leads to the conversion of old masterpieces in painting to canvas, and classic literature to paper. These facts wanted for practical use were given birth by the discovery of fundamental truths. Should the offspring be detached from the parent without understanding, without relationship, and without recourse to become only mental flotsam? This is again the trade specter and it has engulfed us.

Now, the fundamental in science has always stood as the basis for the superstructure. It has borne its weight, limited its extension, and outlined its form. It is the directing hand in our very practical guide on our travels. There it stands permanently; should the superstructure give way for any reason, upon it may rise again another superstructure which man fashions within its circumscribed dimensions.

Facts, scientific facts, keep accumulating till our library shelves are lumbered with their records. They are there as a reserve to be drawn upon, like gold hoarded in the treasury. They are to be used when they can be adjusted to our scheme of life. Now our lives are directed by policies, laws, theories, hypotheses, and concepts into which these facts must find their place, harmonize, play a rôle, and furnish energy for action. Can they be made fully effective if man is not familiar with the forms into which they must fit or must he just keep trying haphazardly until he can make them fit? Instructors flagrantly forget that facts without their forms do not help in life more than a loose stone picked up in the field which may be left behind unused and unfitted or by accident finds its way into a fence or a building. Fundamental science is the fence or building or forms into which facts as stones must enter if there is to be assigned any significance to them. Here is the form which should grasp the teacher of science and any teacher using mere facts or data. The form is the scheme of thought which provides self-direction.

A wrong understanding of fundamental science and the significance of facts has led in many instances to multiplication of recipe courses in the sciences which are not constructive and not fundamental. The best that can be said about them is that they furnish drill and skill, and the worst that can be said is that they furnish only confusion. Often technique and methods bury any radiant energy present to total darkness. Science is wrestling with this situation at present, for out of it has partly developed a very fruitful pedagogical problem.

Allied with the modern fad of organizing, too, an attempt has been made to organize facts regardless of natural fundamental relationships and without due regard to their place in an educational system. They have been inserted into practices impertinently with

loss of their significance leading thus to very unsatisfactory results. Facts and texts and lectures and quizzes have also been organized for use of students. After this organization has been accomplished the mechanical operation of the educational organization begins. Into the hoppers of the students go the facts until they are crammed and surfeited. At examination, with the abracadabra and the waving of the wand of the instructor, out should pour such of the selfsame facts as are called for, unchanged, unrelated, and almost unrecognized by the student. Such constitutes some of our formal scientific education of to-day.

Another important element which menaces pure science in applied schools is found in its relations and its limitations as it bears upon applied science and upon practice. Were it possible to agree upon a definite policy which carries lines of demarcation which place each in its proper sphere of action, there would be no trouble arising from this source.

In our contentions we have given the right of way to pure science as compared with applied because applied, if reduced to its simplest form, would be only a fragment picked out of pure science and fitted to each of different practices. If the foundation is secure in pure science then the applied may be restricted to very limited proportions so far as educational and practical values are concerned. It would be simply bridging over with applied details from pure science to practice. This done, with all the sciences entering into a practical vocation, the part of the vocationalist who now appears is to assemble all of the scientific applications pertinent and make them express themselves in the practices of the specific vocation.

Land-grant colleges seek an understanding of nature for their students. This can be provided only by pure science, because such is science. The difficulties met are only human and surmountable. The place it should occupy in the curriculum and its relation to humanistic subjects, applied science, and practice can be easily established.

Therefore it may be concluded that, in spite of the weaknesses of the human agents in presenting fundamental science, in spite of the failure to develop mental forms for isolated scientific facts, in spite of the necessity for resolving science into many fragments for human efficiency, in spite of the difficulties encountered in accomplishing unification, in spite of the mind's remissness in following the processes of scientific thought, it is patent that pure or basic science has no peer in any other subject of an educational curriculum of a land-grant college, because its laws are nature's laws; its substance is the very substance out of which we spring and in which

we live; its reactions are our reactions. Truthfully, then, must this background of life make for better practices, better living, better thinking, and likewise better cultured men.

Chapter III

THE RELATION OF THE SCIENCES TO THE KNOWLEDGE OF AGRICULTURE, WITH SPECIAL REFERENCE TO GRADUATE STUDY AND RESEARCH

By A. R. Mann

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The rapidity and the reliability with which progress is made in the knowledge of agriculture, and hence in the development of the industries of agriculture and the institutions of country life, are dependent upon a clear understanding of the contribution which the sciences have to make in the solution of agricultural problems, and upon the extent to which the sciences are themselves developed and their methods and findings successfully applied in agricultural researches, studies, and operations. The agencies of agricultural education and investigation have now reached such proportions, and many of the problems of the agricultural industries have attained such a degree of complexity and difficulty, that a larger and more general appreciation of the very extensive identification of the sciences with agricultural progress is of great importance. It is the purpose of this paper to set forth some of the questions that give immediate interest to the matter, and to indicate some of the interrelations that exist, particularly in the higher ranges of study and in research.

STATEMENT OF THE PROBLEM

For the purposes of the college of agriculture, especially for advanced and postgraduate study, and research, what development is necessary in the sciences on which agriculture and country life rest? Is it possible for the several fields of agricultural technology and rural social science to be developed to a high collegiate or university basis apart from the development, at the same institution, of the underlying sciences in their higher as well as their more elementary ranges? Must there be development of the pure sciences beyond the needs of the undergraduates in the several technical fields? Stated

in another way, is access to advanced and postgraduate courses in the basic sciences themselves requisite for the proper development of the several technical and social fields with which the college of agriculture is charged, assuming that the college aspires now or later to realize its full opportunity as an institution for the higher learning? Recognizing the colleges of agriculture, and the experiment stations in connection therewith, as the chief dependence of the Nation for the solution of problems and the discovery of knowledge relating to plant and animal production and the maintenance of a permanent agriculture adequate to its growing needs, can the research which these obligations impose be effectively sustained, and the training of research workers successfully accomplished, if the institutions lack higher development in the sciences with the application of which these workers are chiefly concerned?

There does not yet appear to be agreement among educators on the answers to this series of questions; and there is far less agreement and less understanding of their central importance on the part of public officials, and sometimes of educational commissions which seek to determine and define the proper scope of the agricultural colleges, particularly in those States in which the colleges are geographically or administratively separate from the State universities. The future of the separated land-grant colleges of agriculture is altogether bound up in the way in which these questions are settled in the respective States or institutions. The answers revealed by the existing organization or policy in some of the States decree that in those States the colleges of agriculture shall be conceived as high-grade vocational training schools, fitting primarily for the vocations of farming, and this with only a narrow basis in science; and that they are not concerned with the larger ultimate needs of the States in the preparation of leaders, technical specialists, investigators, teachers, and the expansion of agricultural knowledge through worth-while graduate study and research. Perhaps this is as it should be in certain States at the present stage of development. In other States the existing organization and policy declare that in the highest interest of the Commonwealth the colleges of agriculture shall prepare students for farming in an atmosphere of science and by means of curricula rich in science content, and that students who are so minded may, through years of postgraduate study, acquire such a knowledge and technique in the higher levels of the serving sciences as will equip them to undertake the solution of difficult problems in agriculture, many of which will give way only under a scientific method of attack.

It is the thesis of this paper that a college of agriculture can not realize its legitimate aim as an institution of university grade, nor

most efficiently serve either the highest or the permanent needs of the agriculture and country life of its State, if it is deprived by State or institutional policy or insufficient funds from access, somewhere within the institution, to basic science departments which are free to develop her sciences to a large degree, in both undergraduate and graduate fields. It is recognized that States vary widely in financial ability and that institutions differ in size and range of interest of student bodies; that the desired development will usually have to be gradual, and that for a considerable period of time a college may be compelled for financial reasons to emphasize certain aspects of the sciences to the temporary exclusion of others; that it will perhaps not be necessary or wise for all the institutions to seek to develop advanced work in all the fields. Wisdom and discretion, in the light of public need and financial resources, must determine the course for each institution. Of highest import, however, is the recognition of the principle forbidding the imposition of arbitrary and unwise limitations which find their source in misconception or in a narrow or partisan view, instead of in actual financial impotence of the Commonwealth, or because an institution may not yet have attained a development where the offering of graduate instruction is advisable.

The defense of this thesis is to be found in an examination of the requirements of the fields of the college of agriculture for the knowledge and the methods which the sciences underlying agriculture and rural social existence have to give. It is not necessary to generalize in a discussion in which the wealth of concrete evidence is great.

THE UNDERGRADUATE REQUIREMENTS

Since it is the purpose of this paper to consider chiefly the more advanced educational functions of the colleges of agriculture, for which the larger development of the sciences is necessary, time will not be taken to discuss the undergraduate phase in detail; and it is entirely outside the present purpose to discuss curricula. Adherence is quite generally given to the conception that the undergraduate should receive instruction, to the extent of an elementary course at least, in each of the sciences which enter largely into agricultural knowledge, and that for certain lines of undergraduate study more than the usual introductory courses will be needed. The tendency is likely to be in the direction of increasing the time given to the basic sciences, with a correlative reduction in certain of the technical subjects, for those students who remain for four years. Not only will this be made possible, but it may be strongly indicated as the teaching of vocational agriculture in schools of less than college grade matures. Institutions that seek gradually to bring

their science departments to a standing which will maintain the quality of advanced study of research suggested in what is to follow in this discussion, and that give the science development a direction appropriate to the needs of the college, will not lack for available instruction for undergraduate requirements. The determination of the exact content for each curriculum is a question for the teachers in the respective fields to work out. It seems to be an ever-present subject in every faculty. Colleges of agriculture in which graduate work is now highly developed find great differences in the readiness of students coming to them to enter immediately upon graduate study, owing chiefly to the great variation in the nature and amount of science now required of undergraduates in the several colleges.

The omission here of further discussion of this phase is no reflection on its great importance and complexity or on the need for its independent consideration.

GRADUATE STUDY AND STAFF RESEARCH

The requirements of graduate study and staff research may be considered together. While the latter will frequently benefit very greatly from the association of workers in so-called pure and applied fields who have progressed far beyond the levels of the best graduate study, the science requirements for such study will amply serve the present purpose.

We may now seek substantiation of the thesis of this paper by a glimpse at the dependence on the sciences of a few of the fields of study commonly recognized as having a place in colleges of agriculture. In this statement large use is made of the experience and viewpoints of teachers and investigators in the respective fields, in the institution with which the writer is connected, substantiated by observation elsewhere.

SOIL TECHNOLOGY

The interrelation of the sciences and graduate study in soil technology is to be found in the uses to which the sciences can be put in investigating the properties of soils. Geology, for example, had furnished the foundation for the classification of soils, which may be considered as the first step toward the development of a soil science now rapidly taking form. Chemistry has given a knowledge of the nutrient elements and of the toxic substances which occur in soils. It shows the rate of, and to some extent the reasons for, solubility of the plant nutrients; the relation of the soluble to the insoluble compounds; the absorptive properties; the fate of the solute, such as a fertilizer salt, when applied to soil; the presence and extent of acidity; and other facts, too numerous to mention, concerning the

nature and properties of soils. Bacteriology and chemistry have made it possible to discover many of the transformations of nitrogen, especially those processes by which the native supply becomes susceptible to absorption by plants, the means by which the soil acquires nitrogen from the atmospheric supply, the biological cycles through which carbon, sulphur, and certain minerals pass, and many other phenomena, a knowledge of which has modified for the better the usual methods of soil management. The soil physicist has an equally wide and rich field of work. The applications of the sciences to the study of soils are almost beyond enumeration.

Specialization in soil technology, or edaphology, is not usually encouraged among the undergraduates because the openings for specialists in this field are chiefly in colleges and research institutions, and for such positions postgraduate study is a recognized requirement. From what has been stated above, it is evident that an understanding of soil technology requires some knowledge of the sciences of chemistry, physics, geology, bacteriology, and plant physiology. Beyond these requirements of undergraduates, the graduate should possess a knowledge of glaciation and the processes of weathering, as derived from geology; he will need organic chemistry, qualitative and quantitative analysis, and physical chemistry. These may be said to constitute the minimum requirements for advanced study. One who expects to make investigations in soil technology should follow one of the sciences far beyond these minimum requirements until he qualifies as a specialist in the technique of that science and has an excellent knowledge of its literature. He must be able to think and work in terms of some one science which he will chiefly employ in his research. The more expert he becomes in the basic science, the greater will be the likelihood of his making advances in knowledge in his field.

PLANT DEPARTMENTS

Pomology.—Persons expecting to do advanced and research work in pomology should have, in addition to supporting courses in plant pathology, entomology, soils, plant breeding, and the like, and especially sound training in the various phases of botany—general botany, plant physiology, histology, cytology, and taxonomy. A person can not do effective work in pomology without the technique of botany and a very wide knowledge of the literature. At some institutions the practice is to encourage students who are specializing in pomology to take their major work in botany. Advanced courses in chemistry, treating the physiological, the biological, and the organic divisions of the subject, are highly desirable. Courses in physics will be helpful for special problems in pomological research.

In the advanced fundamental courses, not only does the student acquire a fund of basic information and of theoretical considerations which may suggest vital lines of attack in research regarding the growth and response of fruit plants and their products, but the subject matter is well adapted for the creation and development of a scientific technique, and, because of its type and discipline, a habit of accurate and critical thinking which are invaluable in solving the problems of the pomological field. In studying the response to pruning, to cite but one example, not only is the research pomologist concerned with the immediate and visible response to the removal of wood, but he is interested in knowing the effects on the various physiological and chemical processes, which may have a determining influence on subsequent behavior, including, possibly, such remote effects as resistance to cold, and the set, development, and keeping quality of the fruit. The determination of the nature of such influences requires not only an intimate knowledge of the plants with which one is dealing, but also a thorough training in the theories of plant physiology and chemistry and a working familiarity with the more intricate scientific apparatus and methods.

Practically the same requirements as here recited hold also for vegetable and field-crop studies.

Plant-disease control.—The nature of plant pathology, which in its treatment of abnormal disease conditions presupposes a knowledge of normal conditions in healthy individuals, involves the necessity that the student shall take postgraduate work in order to become a trained pathologist. As a rule, from three to five years of postgraduate work, leading to the degree of doctor of philosophy, are necessary for adequate training in this field.

When a student had received instruction in the elementary phases of plant pathology, which are based on a general knowledge of botany, it is yet necessary for him to have training in advanced courses in the sciences of plant physiology, mycology, bacteriology, organic and physical chemistry, and plant histology before progress can be made. Disease is a complex response of cells or groups of cells to some external or internal stimulus. Since all diseases are exhibited by some type of abnormal cellular activity, it is essential that the student be thoroughly trained in plant physiology in order that he may understand normal or healthy cellular activity. Training in mycology and bacteriology is necessary because the great majority of diseases are caused by either fungi or bacteria; and the technique used by plant pathologists is based on that used by bacteriologists. The tendency in physiology and other biological sciences is to express all actions and reactions in terms of chemical changes, thus emphasizing the need for training in organic and physical chemistry. The pathologist must understand the chemistry of the various

spray mixtures he uses. The response of cells to stimuli often results in abnormal growth in size or number of cells; hence, it is necessary for the student to have training in plant histology in order that he may be able to properly contrast abnormal or unhealthy cells with normal conditions.

Before completing the work for a doctorate, it is desirable, if not necessary, that the student receive advanced instruction in one or more of the following, depending upon the phase of plant pathology in which he is especially interested: Genetics, cytology, biometry, physics, and entomology. Training in genetics is essential in order that the very important phase of control of diseases by breeding and selection may be properly handled. Cytology is needed for its bearing on genetics, and also because of the technique involved. The student should be trained in biometry in order that he may properly interpret the data secured from his investigations. Physics, like chemistry, is important in all work in biology. Entomology is indicated because many of the most important diseases are disseminated by insects, and all spray schedules, for the control of diseases of fruit, vegetables, and the like, are based on the control of insect pests as well as of plant diseases.

Plant physiology.—Plant physiology is a secondary science, and is quite as fundamental for studies in agriculture as many of the primary sciences. While it is not everywhere developed as a department in the colleges of agriculture, large use is made of it by research workers and graduate students in all plant departments. It may be given a place in this discussion because of its great importance.

A knowledge of plant physiology in turn necessitates a knowledge of many sciences basic to it. The function of plant physiology is to discover and interpret the internal processes in plants, the summation of which makes for plant growth, reproduction, and response. It involves at the outset, therefore, a knowledge particularly of plant morphology, cytology, anatomy, and taxonomy.

Equally important with the various phases of botany are the chemical sciences. A thorough training for plant physiology necessitates a fundamental training in chemistry, including biochemistry and colloid chemistry, which should be equivalent, or nearly so, to that of a man specializing in chemistry. A fundamental training in physics is essential. Plant physiology is not botany in a restricted sense, nor is it chemistry or physics. The methods of research used in all three must be combined. Mathematics is also becoming more and more important in physiological research.

Progress in plant physiology is dependent upon the development in other basic sciences, and upon the ability of the plant physiologist to utilize discoveries of these sciences.

ANIMAL DEPARTMENTS

Animal husbandry.—There are certain fundamental sciences which, it is believed, comprise training prerequisite to the beginning of graduate work in animal husbandry: Introductory organic chemistry, elementary organic chemistry, introductory experimental physics, general botany, general zoology, veterinary physiology, bacteriology, genetics, and anatomy.

There are other sciences which, though they may not yet be considered essential for entering upon graduate work in animal husbandry, should, if not previously studied, form a part of the graduate work. These will vary somewhat according to the nature of the graduate study pursued. For work in animal nutrition, physical chemistry and biometry are deemed essential, while animal pathology, histology, analytical chemistry, further work in organic chemistry, and perhaps other sciences may be required, according to the nature of the student's special interest. One of the most fruitful fields of research in animal nutrition is that which considers the relation of diet to health, and, conversely, to the development of disease. Studies in this field involve detailed pathological examinations, particularly when the use of small animals permits of frequent slaughter to note the development of pathological changes. Training in histology and pathology is essential for such examinations. For work in animal genetics, biometry is an essential accompaniment, while such sciences as histology and embryology, calculus, and further work in mathematics may be needed according to the field of specialization chosen. The applications of physical chemistry to biological problems make desirable at least an elementary knowledge of calculus, as, for example, in quantitative work on ferments and digestion. Further work in mathematics would be useful in the treatment of quantitative data and in the graphic representation thereof, involving at times a knowledge of the method of least squares, of the mathematical basis of curve fitting, and the like. This indicates the range of special fields into which problems in animal husbandry might lead.

Training in animal husbandry which may be considered of university grade must be based on a good knowledge of the fundamental sciences, developed for graduate work. Without freedom of access to such advanced courses and the requirement that it be taken advantage of, it is doubtful whether animal husbandry could be considered a proper field for a major subject for an advanced degree.

Dairy industry.—In the field of dairy industry it would be practically impossible to make headway in graduate work without access to highly developed courses in bacteriology and in organic chemistry,

and chemistry of foods. For some lines of work it is important that the student should follow courses in plant physiology, plant and animal nutrition, histology, and physics.

Economic entomology.—Entomology, in all of its phases, is built upon a broad knowledge of the world forms of animal life and activities comprehended in the science of zoology. In order to interpret and understand the action of poison and contact insecticides, a knowledge of the organs of animals, of the intimate structure of animal tissues, and of the principles of animal behavior, the relations of animals to climate and to their surroundings, underlie any real progress in economic entomology. Again, the interrelations of predacious and parasitic enemies of insects to each other and to their hosts bear a fundamental relation to economic entomology. A knowledge of these underlying principles of zoology can be obtained only in an institution where thorough advanced work is given in this science.

The development of insecticides demands an extended knowledge of organic chemistry, and especially of physical chemistry. A technical knowledge of the chemistry of solutions and their effect on the foliage of plants, as well as on the insects, underlies advance in the artificial control of insect pests. To those engaged in the investigation of insect physiology and morphology, and of insect parasitology, a knowledge of organic chemistry is very essential.

The forms of plant life, especially the host plants of insects and certain fungi which live upon insects, bear an important relation to economic entomology, and a knowledge of these forms is necessary for successful work in this field. Moreover, the principles of plant physiology are intimately related to the successful use of insecticides, especially of gases used in the fumigation of plants to destroy insect pests.

Investigations of the relation of insects to diseases of man and of domestic animals call for special training in histology, pathology, bacteriology, and hæmatology, as well as in general entomology.

RURAL ECONOMICS AND SOCIAL STUDIES

It should not need to be said that graduate study and research in the economic and social problems of agriculture and country life depend for their full and safe prosecution on access to substantial development of courses in economics, political science, sociology, anthropology, psychology, historical and mathematical science, and biometry, with the addition of some work in biological science, including physiology and genetics, for certain social problems. Since man is a spiritual being, students specializing in departments which deal with man and man's life should also have a good grounding in

philosophy in order to apprehend values with which the sciences do not deal. The extent to which any of these fields needs to be followed is to be determined by the student's major interest. The slow and uncertain progress of the rural phases of economic and social science has been due in considerable degree to the comparatively few persons who have taken the time to acquire a thorough grounding in both undergraduate and graduate courses in these fundamental fields before attacking the difficult and complicated rural economic and social problems. In rural education, advanced knowledge of economics and sociology is basic to all problems in curriculum making in agriculture, and to the critical evaluation of educational organization in either the administrative or the teaching aspects. Students can not do satisfactory graduate work in any of these fields without instruction in the underlying sciences quite beyond that ordinarily offered to undergraduates in the technical or applied fields of agriculture.

PROGRESS DEMANDS WELL-DEVELOPED PURE SCIENCE DEPARTMENTS

From the foregoing few examples it is evident that the sine qua non of graduate study and staff research of a thoroughly worthwhile character is association with workers in general science departments which have attained a high degree of specialization, and in which the members of the staff are themselves engaged in research to extend the boundaries of knowledge and of method. Advanced work in agriculture, in which much of the real progress for the industry is made, can not be properly maintained where limitations are placed on the freedom of access to highly developed basic science courses. To restrict the basic sciences to the level necessary for undergraduate instruction in applied fields would be a sure way of sterilizing both graduate study and staff research in the applied fields. Experience seems to show that not only is it impossible to maintain the agricultural departments on a graduate basis, but also it is questionable whether their efficiency can be maintained for a high grade of undergraduate instruction where the workers in pure science are excluded from graduate study and staff research. In educational matters it is false economy for a State to economize on research. It is not possible permanently to divorce investigation and inquiry from teaching and to maintain the vitality and efficiency of the instruction. The whole effort in agricultural education and research must be to move constantly toward higher ground, where action can be based on a fuller and more dependable knowledge of all the elements and factors affecting any agricultural problem or operation.

Aside from the direct gains which come from productive work in the related sciences, the indirect results are of great value. The scholarly atmosphere created by earnest research workers in the science departments is likely to have a profound influence on colleagues and on the student body, especially the graduate students, infusing them with a love of science, both pure and applied. This by-product is of high worth in any institution.

It would be a fallacy to consider that the standards of graduate study which this argument presupposes are nowadays important only for those who are to become teachers or investigators in research institutions. Commercial industries related to agriculture are increasingly seeking persons who have pursued studies leading to the doctorate. A chief officer in one of the largest commercial agencies serving agriculture recently remarked: "Give your agricultural students all the training you can in the fundamental sciences and they will pick up the practical operations very quickly when they come into our plants." The whole range of agricultural interest gains from scholarly work done in the agricultural institutions.

Chapter IV

THE RELATION OF THE SCIENCES TO ENGINEERING EDUCATION

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The most widely accepted definition of engineering is that made a century ago by Tredgold as "the art of directing the great sources of power in nature for the use and convenience of man." In a broad sense, it is one of the oldest of the professions, for it was by using the forces of nature that men first raised themselves from the savage state and began to make progress in civilization. The mastery of fire making, the making of pottery, the smelting of iron, the invention of the wheel and axle, of the bow and arrow, all these were discoveries of epoch-making importance. They were steps in the progress of engineering from its prehistoric beginnings down to the amazing developments of the present time.

ENGINEERING AS A PROFESSION

Engineering presents a twofold aspect in that it is both a science and an art. In a science the emphasis is placed on knowing, and in an art on doing. In order to direct them to the use and convenience

of man, the engineer must know the laws, forces, and materials of nature. He must both plan and perform, both design and construct.

It is probable that all the sciences originated in the arts. Only after men had, by generations of imitation and repetition, gained skill in the use of tools and processes did they begin to reflect on the reasons underlying those processes. This is the natural order of development, both in the individual and the race. Science differs from ordinary knowledge only in degree, not in kind. It is organized, systematized knowledge. By the recognition of similarities and differences facts are grouped into classes. Finally, we ascend to the plane of the so-called laws of nature, which are, after all, only statements of the common principles in apparently remote phenomena.

The classic instance of this is perhaps that of the formulation of the law of gravitation. Galileo had, by experiment and reasoning combined, worked out the laws of falling bodies. Kepler had, by years of intense labor, finally deduced from the observations of Galileo and himself the three laws of planetary motion. Newton, by an astonishing feat of the constructive imagination, recognized and proved the unity underlying these two seemingly remote classes of facts. He then formulated the law of universal gravitation.

Gradually, as civilization has developed, the work of the engineer has become more and more scientific in character. The Chaldeans dug canals and built walled cities. The Egyptians built irrigation works and pyramids. The Greeks and Romans constructed temples and palaces, aqueducts and roads. There was at that time a considerable fund of information as to methods and materials, and a degree of skill on the part of these early engineers which must command our respect.

The achievements of the engineer were largely responsible for bringing about the close of the Dark Ages. By those great inventions of gunpowder and the mariner's compass, he began to harness the more occult forces of nature for the use of man. The invention of the printing press struck a mightly blow at the ignorance and superstition which held the world enslaved. Improvements in the construction of ships made possible the voyages of discovery to America and the Indies, which brought forth a New World. The great advances in science which mark the beginning of modern times laid the necessary basis for the later progress of engineering. The character of the work, becoming steadily more scientific, had gradually led to the recognition, from about the middle of the last century, of engineering as one of the learned professions.

THE QUALIFICATIONS OF THE ENGINEER

The engineer studies the laws of nature and also designs the means of using them intelligently and economically for the end in view.

The mere construction and operation, however skillful, of any machine or process does not make a man an engineer. He must also understand the reasons why it operates as it does; and why the form, size, and material of its parts are so designed, with the underlying scientific principles connected with its construction, before he can lay claim to that title.

Neither is the scientist, who in his study or laboratory investigates the laws of nature, necessarily an engineer. The scientist must also be able to apply his knowledge to the design and construction of useful works before he can claim that title. Engineering is not an abstract science, but a very practical affair.

The engineer, to be successful, must be qualified both professionally and personally; that is, he must possess the knowledge required for his work and also the personal qualities which enable him to apply his technical knowledge effectively and economically.

Few men possess both kinds of qualifications in the highest degree. An engineer may have great professional ability, yet fail of success because he is wanting in some personal quality such as initiative, tact, or self-confidence. Likewise, he may possess all the personal qualities for success yet fail if his professional knowledge is inadequate.

The engineer must be a man of trained judgment, and with a sense of proportion. The complex character of modern engineering construction is such that it is not possible to subject it to rigid mathematical treatmont, since many of the elements are unknown. The enginer must weigh probabilities against each other. He must be able to observe correctly, to know when he has all the essential facts of the case, the ability to reason from the balance of evidence, together with freedom from prejudice and prepossessions, which is so essentially the scientific type of mind. He must have a business sense, for engineering is not simply the application of the forces of nature, but their application economically. The engineer must do with $1 what any one might be able to do somehow with $10. The engineer, in undertaking the construction of works, or the introduction of a process, must consider costs, market, and output.

If he is to undertake the construction of a new railroad, for instance, he must study the economic conditions involved as to where and how to build or whether to build at all. If construction is decided upon, the engineer must draw up proper specifications and contracts and oversee the construction. To do this well he must have some knowledge of finance and economics.

The engineer must work with and through other men. His success depends upon his power of impressing and influencing the men with whom he is brought into contact. Of all the forces of nature

with which he must deal, human nature is by far the most complex, the most sensitive, the most difficult from which to get results. The engineer must be a man of tact, with wide sympathies and interests, able to meet other men on common ground. This is of increasing importance, now that engineers are entering so largely the executive, administrative, and commercial branches of industry.

Only those qualifications are here discussed which the training obtained in the engineering school or college can develop. Those fundamental qualities of character which are so important for the success and happiness of a man in any profession, such as courage, honesty, and unselfish devotion, are either innate, or will be acquired, if at all, in the school of experience.

THE EDUCATION OF THE ENGINEER

While many eminent engineers in the past have been self-taught, it is safe to say that, with the increasingly scientific character of the profession, these will be the exception in the future.

The college can not make the engineer. It can only offer him the opportunity to obtain the necessary mental discipline and knowledge in a briefer time and by a more direct road than he could otherwise. The problem before our engineering schools and colleges is that of finding the best and most effective way of training the young men who are crowding into them in such increasing numbers. It is to take these young men, with the kind and quality of preparation given by the present-day secondary schools, and to fit them in a reasonable time for that kind of service in the engineering field which they are best capable of rendering.

It is evident that the education of the engineer, like that of the men of all other professions, involves two fundamental principles:

First, the development of the power to think and act.

Second, the acquisition of the technical knowledge required for his professional work.

These two principles must both be kept steadily in view. They can usually be carried along together although the emphasis should be placed on the first principle in the earlier years of his training and on the second in the later years. Without the power to think clearly, logically, and incisively, the information the student acquires is of little value; his mind resembles a storeroom filled with useless lumber. With the power to observe, to think, and to reason well developed, the engineer can attack a new problem with confidence in his ability to solve it.

He must, however, lay a solid foundation for his professional career in a firm grasp of those great natural laws and principles which underlie all engineering work.

Fortunately, the studies which enable him to lay this foundation are also those which experience has shown are best adapted to discipline his powers of thought.

THE FOUNDATION SCIENCES IN ENGINEERING EDUCATION

The basis of all engineering work lies in a mastery of mathematics, physics, and chemistry.

Mathematics is at once the greatest instrument which science has invented for unlocking the secrets of nature, and the finest discipline in the processes of deductive reasoning to which the human mind can be subjected. The engineer must have at his command all the branches of mathematics up to and including the calculus, and beyond that if he wishes to undertake research.

The students must guard against the error of supposing that mathematical analysis can furnish us with the fundamental data or assumptions on which a scientific problem rests. These can be furnished only by observation and experiment. But mathematics builds on them a logical structure, which may terminate in new theorems of greater physical significance than the data from which they were derived. These new theorems may simplify and embody in one far-reaching generalization many diverse phenomea. This enables the engineer to devise rules for design and gives valuable suggestions for experimental investigation. Engineering is full of instances of this sort.

Mathematics trains the mind in habits of logical reasoning; to mathematics we owe our first ideas of a connected body of truth, one growing out of the other, each implying all the rest. From a few fundamental facts we are able to explain and predict, as in the case of eclipses, far-distant phenomena.

If the mathematical sciences give the student his finest training in the discovery of truth by deductive reasoning, the study of physics and chemistry shows him, in equal perfection, the other method of arriving at truth, by observation and experiment. Their value is twofold: First, in the intellectual discipline which he gets from his drill in scientific experiment. He must learn to observe accurately; to take precautions in excluding every agency but that which is the subject of the experiment, or to allow for the disturbing agencies if present; to approach the experiment with an open mind and to record honestly what he observes. Second, he must reason inductively on his results and draw conclusions. He comes to realize the fallibility of our senses, and the necessity of repeated check observations before his results are confirmed. More than this, he is brought into contact with the finest flower of the scientific method when he learns that nothing in science is to be accepted

on the arbitrary authority of another; that the order of nature is invariable and that a scientific result arrived at by any one person can and will be verified by others before it is accepted into the body of scientific truths.

All this is of the highest value as a discipline for engineering as well as for life; for if legal, social, and political questions could be approached in this spirit our progress would be more satisfactory. The cultural effect of scientific studies on the mind of the young engineer is one of its most permanent and beneficial results.

The whole spirit of modern science is opposed to the existence of the superstitions and fears which have weighed down the mind of man since he first emerged from his lowly origins. Formerly every natural phenomenon was attributed to an invisible personal being which controlled it more or less capriciously. Man was at the mercy of mysterious forces over which he had no control. This either produced a spirit of fatalism, or else he took refuge behind the priest or medicine man who could propitiate the angry powers.

Science has taught men that the universe is pervaded by a rational order, and that it is intelligible, although we are yet far from comprehending it fully. It sets men the inspiring task of finding the laws which govern it. It teaches men that they are not pawns in a game played by higher powers but that their destiny is within their own hands. The progress from Franklin's kite to the fixation of nitrogen by electric discharges is proof that the most mysterious, capricious, and terrible of natural phenomena is capable of rational explanation and human control.

In his study of these fundamental natural sciences the student begins to get some insight into the constitution of nature. He learns something of the elements of which the material world is composed and of the laws and principles which formulate their interactions. Amazing new conceptions, such as energy, atom, ether, open up a new world of thought to him. He learns of the great generalizations which science has made, such as the conservation of matter and energy. The reaction of the student of these studies is almost a test of his fitness for the engineering profession.

Besides this, the mental discipline obtained by the training he gets from them is of very great value. He learns to observe and to experiment; to reason both inductively and deductively; to apply mathematics to his physical problems and to interpret the result he gets.

The engineer should be thoroughly grounded in the fundamentals of mechanics. In mechanics the student is introduced to actual engineering problems. He learns to form his mathematical equation from a physical description of the problem. Modern science has

demonstrated that all the phenomena of nature, including heat, light, and electricity, are modes of motion, manifestations of energy. Mechanics which studies the laws of motion in masses, molecules, or ether waves is, then, the fundamental science on which engineering depends.

The engineer must be thoroughly familiar with the strength of materials and the elastic properties of bodies. All his construction involves the use of some of the materials of nature; these vary in kind, quality, and suitability for different purposes. He must know how to direct and interpret the tests, both physical and chemical, of these materials on which a proper choice must be based.

This has sometimes been called the era of manufactured power since the generation of power in enormous quantities from natural sources, such as fuels and waterfalls, is the basis on which modern industry and transportation rests. Hence the engineer must have a knowledge of power engineering, and thermodynamics should be one of the sciences in which the student is trained.

The different branches of engineering each require more or less of various other sciences which need not be discussed fully here. For instance, civil engineering involves some knowledge of astronomy in higher surveying; of biology in water supply and sewage disposal; of geology in canal building and railway construction. Some of these sciences can only be given in an introductory form to undergraduates in our four-year engineering courses. The crowded condition of the curriculum makes it impossible to do more. The engineer who wishes to specialize in some special branch of his profession must continue his studies beyond the undergraduate stage. He can pursue a graduate course; or he can, with the foundation which he has already laid, carry on his studies individually. He must realize that his education is never finished and that he must be a student for the rest of his life if he is to keep up with the rapid growth of his profession.

SCIENTIFIC RESEARCH AND ENGINEERING PROGRESS

The fundamental relation of scientific research to the progress of engineering is becoming more evident every day. Our social and economic system rests to a large extent on an industrial basis and the progress of industry is conditioned by the progress of engineering. The generation of power from coal, oil, and waterfalls and its transmission electrically to great distances has revolutionized the life of the world. The modern factory system, with its dangerous social problems, involving the relation of labor and capital, is a direct outgrowth of the generation of cheap power. Through the enormous

development of transportation the world has become interlinked to an extent unknown in any previous age. Of those nations in which the industrial development has been carried farthest, the United States, alone, is still able to produce the food which feeds its people, the importation of food being largely paid for by the export of the products of the factory and the mine. The competition for the disposal of the surplus of manufactures in the markets of the world will become more intense in the years just ahead of us. That nation will best survive in this struggle which has placed its industries on the highest scientific basis. The history of the last 100 years is a proof of this statement.

England, by a series of great inventions, such as the steam engine and the power loom, had obtained an industrial lead which she easily held up till 50 years ago. America with her immense natural resources came next. The necessity for improved methods of production was not felt since we were developing a virgin continent.

Germany arrived late on the scene. The most desirable portions of the earth open to colonization had been preempted by other nations. She was a country poor in natural resources as compared with the United States, and without the accumulated capital and experience of Great Britain. Ye[illegible]30 years she became the formidable industrial rival of both. The progress of German industry in the generation before the great war was the marvel of the world, and it was largely due to its intimate relation with scientific research, developed to an extent unknown before. Great industries sprang to maturity in a few years under the guidance of men trained in the universities. The German chemical industries are an outstanding example of this union of scientific research and industrial skill. The Badische company spent $5,000,000 and 17 years of time in developing artificial indigo before receiving any return. German industries are depressed following the war, but to this same fertile resource does she look for their ultimate recovery. In the United States the era of crudely exploiting our rich natural resources is over. Many of our industries are aware of this fact and have organized and supported scientific research. This is especially true in the electrical field. Here the intricacy of the problems involved has required the highest scientific and engineering skill available. The great advances in electric light and power development have been worked out by men armed with all the resources of science.

It was estimated more than 10 years ago by the engineers of the General Electric Co. that by the introduction of the tungsten filament lamp, a saving of $240,000,000 annually, compared with older types of incandescent lamp, had been effected. This lamp is entirely a product of the research laboratory.

The chemical and metallurgical industries are now rapidly developing their contacts with research, both in their own and the university laboratories of the country.

The development of alloyed steels has made possible the increase of strength and reduction of weight necessary in the modern automobile and airplane. The high-speed tool steels have doubled the output of our machine shops.

The photographic film, the petroleum-refining, and copper-refining industries all owe their great recent advances to the work of the research scientist. So in every branch of industry there must be accurate and exact knowledge of intricate industrial processes, if success is to be had in the era of intense competition which we now face. The introduction of more economical methods, the development of new materials, the discovery of processes which make valuable materials which formerly were worthless—all of these things will result from the encouragement of research.

The establishment of engineering experiment stations at some of our State universities and colleges is a long step in advance. It is to be hoped the number of these will increase and that they will be steadily supported in their pioneer work. Some of the larger industries have also started research work on problems in their own fields.

It is hoped that research men will not be restricted too narrowly to investigations which promise immediate practical results. The spirit which must animate the scientific investigator is the search for truth. When Faraday made his famous researches in electricity he did not think much of the immediate practical use. He knew that there is no discovery, however remote, but will some time somewhere find its application, for in nature there is an interpenetrating unity and all things are connected together. He knew that human progress depends upon the ability of man to understand and control nature; and that depends upon the growth of the human mind. "Where there is no vision, the people perish."

The presence of these research laboratories in connection with our engineering schools is certain to have a good effect on the work of the school. The spirit of the investigator is communicated by contact; his methods by example. More of the undergraduates will be encouraged to do one or more years of graduate work, or to take up research work in those laboratories supported by the large industries. The teacher should also be an investigator if he wishes to keep his teaching fresh and inspiring. A research laboratory is more compatible with the spirit of an engineering school than is a stadium, which there seems little difficulty in raising funds for in recent years.

Engineering rests on science as its foundation. The discipline of scientific studies forms the mind and develops the powers of the

student. The facts and methods of science are those which he must use in developing and directing the industries. The researches of science furnish the new knowledge which keeps engineering a vital living art.

Chapter V

THE ARTS AND SCIENCES IN RELATION TO HOME ECONOMICS

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THE EDUCATION OF THE FOUNDER OF HOME ECONOMICS

"Put the whole girl to school" was the firm belief and conviction of the founder of home economics. Ellen H. Richards, who was graduated from Vassar in 1870 and from Massachusetts Institute of Technology in 1873. Mrs. Richards's philosophy was to live well in order to work well. For years she turned out of her laboratory "missionaries to a suffering humanity." Her dominating motive was to better the home. She was tireless with her pen and with her voice in teaching healthful living, proper use of leisure, and a larger life for the whole family. Her great motto "think on" became crystallized in the minds of enough women to make possible both the American Home Economics Association and the application of scientific thinking to the problems of the home.

WOMAN'S CONTRIBUTION TO THE PROGRESS OF EDUCATION

The interests of men are naturally taken up with earning a living. The energies of women, on the other hand, turn to social progress, industry, and preparation of the children for school. Education does not consist wholly in the learning of a trade or profession, but in the development of the intellect and the broadening of the mind. It is the wife and mother in the average American home who has the leisure for looking after the literary training of her children and the cultivation of their tastes for the finer things of life. For such duties the mother needs the most liberal education, not only for herself, but for the most effective physical, intellectual, and spiritual development of the child.

THE RELATION OF THE PHYSICAL SCIENCES TO HOME ECONOMICS

The demand for teachers in the early days was so much greater than the supply that home economics instruction often fell short of

the fine ideals first conceived for it. In this respect, home economics education is perhaps not distinctive. However, during the past decennium much progress has been made in the home economics curricula of high schools and teacher-training institutions, including land-grant colleges. The early emphasis on production, the practical sciences, and laboratory practice has certainly shifted considerably to the humanities. Courses in fancy cookery, fancy stitches, and embellishments generally have died a natural death, and have been buried with satisfaction. In their places have risen strong courses in the natural, physical, biological, and social sciences and in the humanities. Less and less do we find adulterated science courses in home economics, unless they are plainly labeled as such. Therefore the educational rather than the informational value of chemistry, for example, is stressed. The mental development of the student is of the utmost value, hence the principles of chemistry should be emphasized. The facts of chemistry as related to home economics should be taught only as illustrations or applications of these principles.

Indeed, the sciences related to home economics are well advanced, and are destined to become as effective in our hands as they are in those of the trained practitioners of medicine. In fact, the service of trained women in home economics is at present the most valuable asset in our public-health service, including particularly health education in the public schools. Child care and welfare courses are destined to become a part of all high-school and college curricula.

Training in the natural and biological sciences gives the home economics woman not so much technical skill as a broad and general knowledge of race preservation. While the cause of contagion is delegated to the physician, and the handling of it to the nurse, yet the confining of it and protection from it are the task of the homemaker, who has realized for some time that she must have a full understanding of "bacteriological cleanliness," so that it might no longer be said that infectious diseases "radiate from, and are kept going, by her." Practically all the women in home economics who have taken their doctorate have received it in physiological chemistry, and there are a large number of home economics women with one year or more of graduate work in the chemistry of nutrition. Aside from the very useful information contributed by the sciences, they have a very valuable contribution to make for education.

RELATION OF THE SOCIAL SCIENCES TO HOME ECONOMICS

At present the pendulum is beginning to swing noticeably to the social science groups. This may be due to many forces in society hastened by the war. Home economics leaders appreciate that a knowledge of the sciences not only enable us to use the world of

nature for helpful purposes, but that they may also assist in the destruction of man. The emphasis in education to-day is clearly in the direction of a better understanding of how to deal with humanity.

The home economics curricula in the land-grant colleges have for some time, and certainly during the decennium included in this report, grouped the related sciences and the technical studies of their field around what is known as a "major" and two "minors." It is well known that every year there is greater expansion for the sake of depth, and the social sciences have had no small part in bringing about this change. At the beginning of the decennium it was realized that home economics was merely social economics applied to the home, and that sociology and household science are blood kindred. "Household science without sociology would be a body without a soul," declared Dr. George Elliott Howard in 1910, before the American Home Economics Association.

The history of the evolution of the family and the psychological training of children are at present included in many home economics courses. It is freely predicted that others will be added, for it is clear that the relations of the members of the family to one another should be of a character to constitute a good home. This matter is, indeed, parallel in importance with adequate nutrition, proper clothing, and sanitary housing.

According to The Iron Man in Industry, by Arthur Pound, the rising generation reaches its highest economic utility early in life, and, relatively speaking, very soon arrives at the economic status of old age. If youth is not taught early, even in the kindergarten, the lessons of "thrift," pauperism has an excellent opportunity to spread and even to overtake us. Economics ought to have a place in every grade in our school system, from the kindergarten up. Every child needs to know the value of saving money, but it needs to know even more of the use and the saving of leisure. Pound says:

> History, literature, science, art, music—all these give to life meaning, and to leisure, inspiration; a reasonable concern in all that man has done, is doing, or is about to do upon this planet—with such equipment, any fool could use leisure aright. To sow that seed is the first duty of educators; now as always, now more than ever. Since work is coming to be no longer a primary interest for the child of the masses in civilized lands, it is incumbent upon us to provide, in so far as they can be provided, other primary interests through which the individual can justify his existence, interests which, rising out of, and sustained by, his background shall flourish like the green bay tree all the days of his life. * * * We hear less of vocational training than we did—for good reason, since its utility is passing. Presently we shall hear more of avocational training, which shall give every youth destined for the mill or office a hobby for the center of his garden of leisure.
>
> * * * Machinery is undeniably one of the prime intellectual interests of the American masses; in leisure an informed generation would continue inventing, perhaps invent faster than ever. Therefore let us give youth all

it can stomach of the sciences, deepened and broadened to the uttermost. But by no means should we submit to the specialist's obsession that, with the key to universal knowledge in his hand, he travels down a walled alley, shut off from the humanities, from philosophy, from religion, from life.

It is true that the right use of leisure is an antidote for sloth. It helps to make healthy minds and bodies and, therefore, should occupy a large place in our educational system. Every woman needs a hobby to busy herself with in this age of growing leisure.

THE PLACE OF LITERATURE IN HOME ECONOMICS EDUCATION

Home economics courses in the land-grant colleges include all of these problems and more. They include training for the welfare of the child and the esthetic nature of man. Even Matthew Arnold, "the apostle of culture," is called upon to prescribe for our "flurried and worried democracy." We have emerged from the Victorian era, and what was once the privilege of an "arrogant aristocracy" is the staff of life of an "arrogant democracy." This leisure demands self-restraint which can only be found in education of the broadest kind in the natural, in the physical, in the social sciences, in the classics, in music, and in literature and art.

Literature gives us the noblest part of human history: the classical thoughts of the great and gifted. We are studying their masterpieces as we have never studied them before, not alone for their cultural value, but in order to place our social forces on a scientific plane. We go to literature to "serenade our souls," to get away from the earthly creatures of the dust, to become acquainted with the heroes of the ages, to receive sympathy, and to enter an atmosphere, wholesome, bracing, spiritual, free alike from sentimentality and from all morbidness.

ART IN HOME ECONOMICS

Art also contributes inspiration to leisure. Further, through its creative quality, it forms a means of self-expression. This creative desire is one of the greatest motivating forces in the history of mankind. Creative thinking is responsible for all changes, and is considered the highest form of self-expression, whether it is the designing of a city, the development of a play, the discovery of high explosives, or the modeling of a piece of sculpture. The love of beauty, order of appropriateness and of excellence, are among the best modern investments an individual can choose.

The understanding of beauty is perhaps the greatest universal gift to man as it insures a permanent and enduring greatness in nations. There has been an increasing tendency in home economics art courses from the purely practical and useful to esthetic appreciation. The useful is not necessarily beautiful. Hegel, in his

Philosophy of Art, cautiously warns that wood, stone, metal, canvas, even words are in themselves but dead stuff. What art creates upon this dead stuff belongs to the domain of the spirit and is living as the spirit is living.

According to the late Doctor Dow, the so-called practical and useful arts alone will not give us a secure foundation for effective and efficient art teaching. We must go deeper until we reach the creative powers. True relationship of line, dark and light, and color give us fine art in architecture, painting, sculpture, the crafts, and art industries. The personal power and choice over these basic principles in art is the essence of art which greatly affects our environment.

This larger conception of art training should result in greater progress in human intelligence and refinement, in orderliness of thought, and even in the production of a finer quality of commercial goods.

MUSIC IN HOME ECONOMICS

Unconsciously, the masses realize the socializing influence of music. Scarcely any gathering is complete without it. Dr. P. P. Claxton, former United States Commissioner of Education, when asked the value of music, replied: "What does music do? It stirs the human soul deeper than any thought can ever go. Intellectual movements are little ripples upon the surface of the sea, but the emotions aroused by music are like a great tidal wave which stirs the sea to its greatest depth."

Along with literature and art, music stands as a means of the worthy and wholesome use of leisure.

Music has a physical, vocational, intellectual, cultural, moral, and spiritual value. For that reason, it should be free to all, particularly in a country whose traditions are so deeply rooted around education for "all the children of all the people"; and, further, music should have a prominent place in the home. The equipment of an American home is incomplete without the cultivation of musical appreciation. In some land-grant colleges, but not in all, home economics women are urged not to neglect this study so valuable in democratizing the ideals and feelings of humanity.

There may be a question as to the possibility of giving such broad cultural training in home economics education as is outlined in this paper. The answer to such a query is that such training is at present the rule rather than the exception. Any other doubter can be satisfied with the information that a little more than two-fifths of an undergraduate course in home economics is devoted to technical subject matter while the other three-fifths is devoted to the arts and sciences.

More and more, as home economics is developed in the high school and not repeated in the college, will time from technical studies be

released for emphasis on the broader curriculum. Home economics is cosmopolitan and singularly homogeneous in its motives.

In conclusion, the aim of home economics education, generally expressed in the land-grant colleges and other teacher-training institutions, is to direct women's education along the paths of greatest self-development.

Chapter VI

DEVELOPMENT OF THE WORK IN AGRICULTURAL ECONOMICS, FARM MANAGEMENT, AND ALLIED SUBJECTS IN LAND-GRANT COLLEGES

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The development of land economics, farm management, and allied subjects in our land-grant colleges is closely related to, and can not be considered apart from, the economic development of our country. To-day it is evident that the economic problems in the production and marketing of our agricultural products are receiving serious and well-considered attention. No doubt this has been due, in a large measure, to the unfavorable situation in which the farmer finds himself as a result of postwar conditions. However, to those who are acquainted with the development of American agriculture, it is evident that these economic problems were destined to develop, to take on added importance, and receive added consideration. In the first place, our early agriculture was simple in character. The farmer produced all, or practically all, that was essential for his subsistence. Farm products were produced primarily to be consumed on the farm and not for the market. During this period of what has been called self-sufficing agriculture, the farmer was not confronted with any difficult or complex economic problems. Under modern conditions, the farmer finds it more advantageous to produce only a few stable products which he can exchange for a great variety of manufactured commodities. This system has increased the contacts with others, with the result that serious economic problems relating to the production and marketing of farm products have made their appearance.

Unfortunately for the farmer and the American people generally, the circumstances which attended the transition from the self-sufficing to the more complex agriculture were not conducive to clear thinking on the economic problems by those most interested in agriculture. The problems which were uppermost in the minds of the American people during that period were the development of our natural resources, speculation in land, etc. The result was that the

economic problems which arose in connection with the production and marketing of agricultural products were not recognized as such, with the still further result that remedies were often applied which aggravated rather than relieved conditions. Thus it happened that the experiment stations which were established during the latter part of the nineteenth century attempted to correct the evils resulting from overproduction by putting forth every effort to teach the farmer how to grow more and better crops, instead of instructing him in the fundamental principles governing the production, consumption, and distribution of agricultural products. The economic ills, however, did not respond to this treatment and it became gradually apparent that their character had not been correctly diagnosed. Their recognition of this fact led to the development of a new line of work in our land-grant colleges dealing with the farmers' economic problems. The first results of this work were not satisfactory, due to the fact that the men engaged were drafted primarily from the natural sciences and were not well equipped for the new and difficult task.

DEVELOPMENT OF COURSES

Since these early efforts the work in agricultural economics, farm management, and allied subjects has developed rapidly. In the academic year 1909–10, 82 courses, averaging 3.3 credits, were offered in 40 of our agricultural colleges, while in the academic year 1919–20, 308 courses, averaging 3.4 credits, were offered, or an increase of 275 per cent in the number of courses offered. Instruction in farm management increased rapidly, as indicated by the fact that the number of courses offered increased from 42, averaging 3.6 credits, in 1910 to 85 courses, averaging 3.9 credits, in 1920. This shows an increase of 102 per cent in the courses offered in this subject. The courses offered in agricultural economics increased from 22, averaging 3.1 credits, to 56, averaging 2.9 credits, or an increase of 155 per cent for the period 1910 to 1920. Courses in marketing were not introduced until 1911, in which year two courses were offered. The growth in this subject has been rapid, and to-day land-grant colleges are offering 42 courses. All other courses besides farm management, agricultural economics, and marketing have increased from 18 to 125 per cent. (See Table 1.)

FINANCIAL SUPPORT BY FEDERAL AGENCIES

Research in this field has never been provided for as has been the case with the natural sciences.[1] However, money has been used in

[1] The Purnell bill, introduced into Congress under date of Apr. 11, 1921, was for the purpose of remedying this situation. For details, see H. R. 2243, 67th Congress, first session.

increasing amounts ever since the importance of studying the farmer's economic problems has been recognized. The data presented in Table 2 are sufficient to give an idea of the financial support accorded this work by the land-grant colleges. In 1910, 19 land-grant colleges were spending an average sum of $917 for instruction, 4 an average sum of $1,725 for research, and 3 an average sum of $433 for extension. The number of colleges giving this work increased steadily. In 1915, we find 27 colleges spending an average sum of $2,173 for instruction; 17, $2,689 for research; and 23, $2,278 for extension. The total funds provided for all classes of work increased from $37,625 and $187,426 for the period of 1910 to 1915. Increased financial support was accorded this work during the period between 1915 and 1921, as evidenced by the fact that 34 colleges reported that they were spending an average sum of $6,723 for instruction, 30 an average sum of $6,973 for research, and 31 an average sum of $6,202 for extension. These data indicate clearly that the State colleges of agriculture are recognizing more and more the importance of fundamental studies in this field. This recognition has not come too soon as a basis for intelligent action on the part of farmers and others interested in agricultural development, who must rely in large measure on the data furnished by the land-grant colleges.

STAFF

It is well understood by those who are charged with the responsibility of directing research work that liberal financial support is necessary. It has also been recognized that the thing of fundamental importance is the character of those charged with the immediate conduct of the work. In this connection it is encouraging to note the increase in the number and quality of those engaged in carrying on research in the field of agricultural economics and farm management. Thus, in 1910, 22 colleges employed 28 instructors of all classes (professors, assistant professors, instructors, etc.) on a part-time basis, while in 1915, 31 colleges were employing 49 instructors on a part-time basis, or an increase for the period of 75 per cent. (See Table 3.) During this same period, 6 institutions employed 11 instructors of all classes on a full-time basis, whereas in 1915, 14 colleges employed 46 instructors on a full-time basis, or an increase of 318 per cent. For the academic year 1920–21, 30 colleges reported 79 instructors on a part-time basis and 26 colleges 104 instructors on a full-time basis. For the period 1915 to 1921, therefore, there was an increase of 61 per cent of part-time instructors and an increase of 126 per cent of full-time instructors.

Since 1910 there has been a marked increase in the training of those engaged in this work. In 1910, 16 colleges reported 20 instructors having the degree of B. S., 10 colleges with 10 instructors having the degree of M. S., and 5 colleges with 6 instructors having Ph. D. degrees. In addition, 6 colleges reported that 8 of their instructors had received special training in economics. During the period 1910-1915, there was an increase of 140 per cent of those having B. S. degrees, 110 per cent of those having M. S. degrees, 183 per cent of those having Ph. D. degrees, and 138 per cent of those receiving special economic instruction. In 1921, 29 colleges had employed 70 instructors having B. S. degrees, 27 colleges 60 instructors with M. S. degrees, 21 with 41 instructors having Ph. D. degrees, and 21 colleges reported 51 instructors having special training in economics. There has been, therefore, a steady and healthy growth in the training of men engaged in research, with the result that to-day there is a body of men fairly well equipped both by experience and training to carry on fundamental research and to aid in solving problems relating to agricultural production and marketing.

STUDENTS

The development of the work is indicated by the number of students who have interested themselves in this field of activity. While it is impossible to give absolute figures regarding the training of students taking agricultural economics, farm management, and allied courses from 1910 to date, yet the reports indicate that the increase has been very great. At the present time 33 land-grant colleges reported a total of 6,908 regular, 3,109 special, 294 short-course, and 268 postgraduate students, making a grand total of 12,770 students engaged in this work. These figures indicate a considerable body of college men who are receiving training in the economics of the production and marketing of agricultural products, and as these students will exert a tremendous influence in many communities scattered throughout the United States, it is reasonable to suppose that the economic problems relating to agriculture will receive more intelligent attention in the future than has been accorded them in the past. Special significance is attached to the number of postgraduate students now taking this work. These students will doubtless form the nuclei of many important investigations throughout the United States from whom we may expect leadership and positive results.

FIELD STUDIES

Few field studies were conducted prior to 1910, and even in that year only six studies were made, five of which were farm-manage-

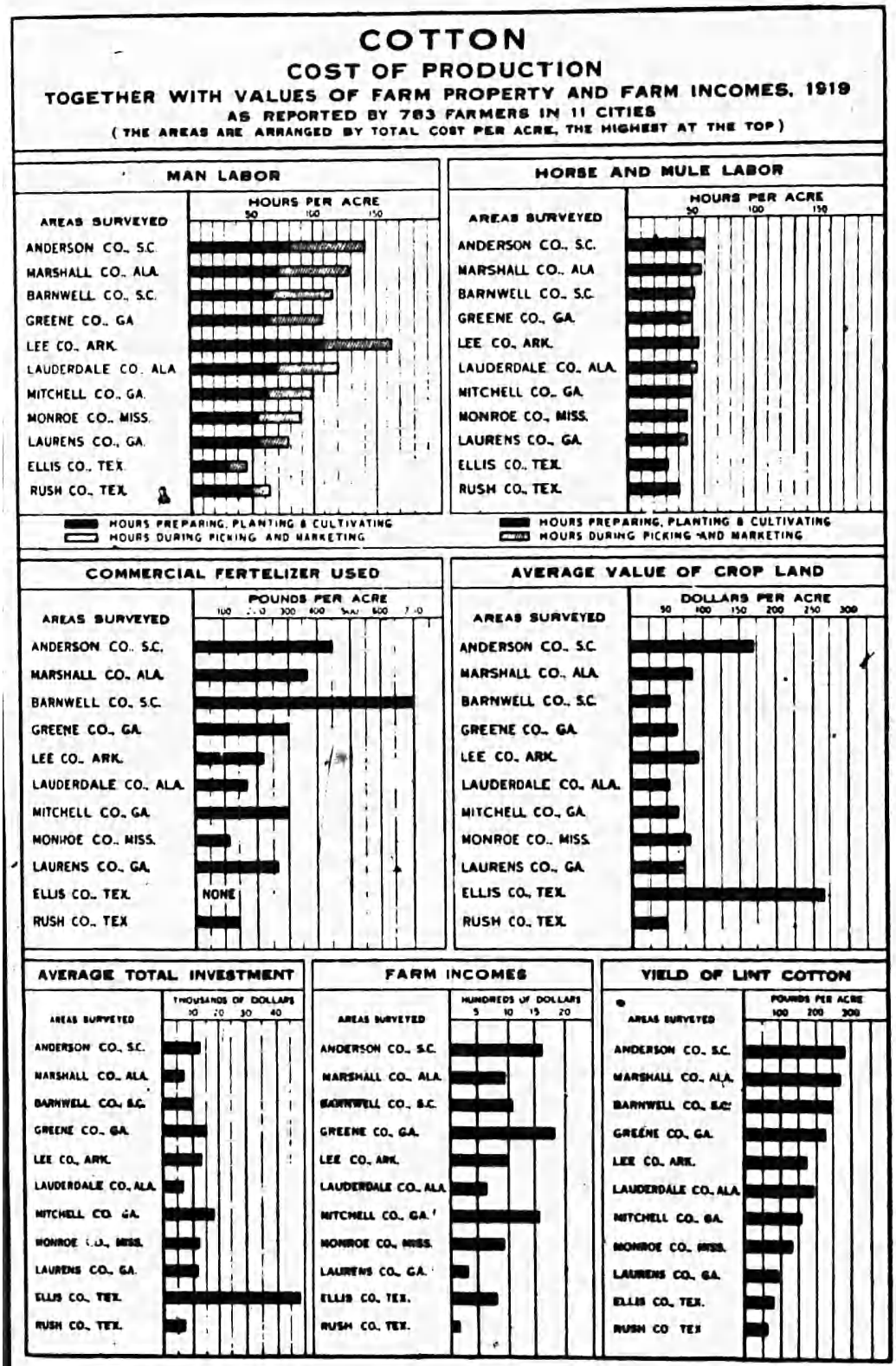

FIG. 1.—Results of a field study made in cooperation with a land-grant college.

ment surveys.[1] These studies constitute practically the early efforts on the part of the land-grant colleges to determine the fundamental principles involved in production. The purpose was to furnish data to aid the American farmer in organizing his farm for more efficient production.

In the five years following 1910, rapid progress was made so far as field studies were concerned. By 1915, 59 field studies had been completed, 47 of which, or 80 per cent, were farm-management surveys. The field of activity, however, was widened, as indicated by field studies other than those in farm management. During 1915 2 studies were made in tenancy, 3 in credit, and 7 in marketing. The field work was developed still further by 1921, in which year 132 field studies were made, of which 66, or 50 per cent, were in farm management; 17, or 13 per cent, in land economics; 5, or 4 per cent, in credit; 30, or 23 per cent, in marketing; and 14, or 10 per cent, miscellaneous in character. In short, there was an increase in the total field studies made of 6 to 132, which must be considered a remarkable growth and an achievement of considerable importance.

PUBLICATIONS

It is not an exaggeration to say that the early publications resulting from field studies were epoch-making in character and created considerable interest among students of the subject. The early publications, however, with a few exceptions, indicated a lack of technique and of clear understanding of the economic principles involved. The fundamental importance of methods of conducting the study and the necessity of having a background in the fundamental principles in order to explain the results were not recognized. The lack of training in the fundamental principles of economics and statistical and accounting methods resulted in a considerable number of studies being made and bulletins being published which were more or less stereotyped in form and sterile in their results. That a beginning has been made in the correction of this defect is evidenced by the increasing attention which is being given to general economics and to statistics and accounting methods. For example, in 1910, few if any of the land-grant colleges required their students to take general economics as a prerequisite to farm management, agricultural economics, or allied subjects, and no land-grant college reported a course in statistics prior to 1911, in which

[1] As early as 1909 G. F. Warren began gathering agricultural data by the survey method. The results of this first year's work were unsatisfactory, as the field covered was too extensive. The following year the name of the work was changed and the scope confined to a purely farm-management survey. The results of this early work were published in Bulletin 295 of the Cornell College of Agriculture.

year one course was given. The number, however, has increased until five courses are being offered. While this does not show so rapid a development in statistical methods as is essential to the proper development of the field, it is with considerable pleasure that one observes that courses in accounting methods have increased from 5 in 1910 to 41 in 1920. This record, however, needs explanation, for it is not evident that all of these courses teach the fundamental principles involved; but many doubtless are superficial in character, and while they are essential to practical agriculture, they do not help to develop the field. On the whole, one may say that there is a growing recognition that the student, if he is to undertake fundamental research in agricultural economics, farm management, or allied subjects, must master the fundamental principles of economics and become familiar with and be able to employ statistical and accounting methods.

SUMMARY AND FUTURE DEVELOPMENTS

It is not within the scope of this article to outline in detail the program for future work. It is evident, however, from a study of the work now being conducted by the land-grant colleges, that much more can and will be done in aiding the farmer to solve the important economic problems of agricultural production and distribution of farm products.

In the past, work of a stereotyped nature has been done without a realization of the importance and nature of the problem involved. To overcome this weakness, it is essential that more attention be given to thorough mastering of the subject matter of economics, and to the development and utilization of statistical and accounting methods applicable to economic research in this field. This also means more careful training on the part of those entering the field and a clear understanding on their part that the farmers' economic problems are the result of forces and conditions not unlike those operating in the commercial world.

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TABLE 1.—*Courses in agricultural economics, 1910–1920*[1]

Title of courses	1909–10				1914–15				1919–20			
	Number of credits	Hours per credit	Hours per week per credit	Number of States reporting	Number of credits	Hours per credit	Hours per week per credit	Number of States reporting	Number of credits	Hours per credits	Hours per week per credit	Number of States reporting
I. Agricultural or rural economics	22	49.4	3.1	14	44	54.3	3.1	32	56	48.9	2.9	41
II. Farm management	42	57.4	3.6	33	70	54.1	3.3	47	85	63	3.9	47
III and IV. Bookeeping records, and cost accounting	5	33.6	3	5	26	48.8	3	20	41	51.3	3.5	31
V. Marketing					14	45	2.7	13	42	48.6	3.1	28
VI. Agricultural or rural credit					3	36	2.3	3	5	43.2	2.8	5
VII. Agricultural law	1	36	2	1	1	36	2	1	4	36	2.3	4
VIII. Agricultural finance					2	39	2.5	2	3	54	3	3
IX. Forest economics	4	58	3.7	4	10	49.5	2.6	9	6	40.5	2.8	5
X. Rural sociology	1	60	5	1	2	42	3	2	6	45	2.7	6
XI. Statistics									5	55.8	3.1	5
XII. Agricultural history	1	54	3	1	6	45	2.5	5	3	42	2.3	3
XIII. Land economics					2	54	2	2	9	47.8	2.5	8
XIV. Resident seminars or problems in agricultural economics	3	48	2.5	2	7	72	4	6	16	81.8	3.9	9
XV. Resident seminars or problems of management	2	54	3	1	11	61.2	3.7	6	21	72	3.9	14
XVI. Miscellaneous	1	36	3	1	3	36	3	3	6	40.5	2.5	6
Total	82	52.6	3.3	40	201	52.1	3.1	48	308	55.4	3.4	48

[1] Agricultural economics is used in generic sense.

TABLE 2.—*Available funds*

Items	1910			1915			1921		
	Number of colleges reporting	Amount expended	Per cent of total	Number of colleges reporting	Amount expended	Per cent of total	Number of colleges reporting	Amount expended	Per cent of total
Instruction	19	$17,425	68	27	$58,680	37	34	$228,573	36
Research	4	6,900	27	17	45,710	28	30	209,180	33
Extension	3	1,300	5	25	56,953	35	31	192,264	31
Total	20	[1] 37,625	100	34	187,426	100	40	633,584	100

[1] Not all colleges reported in detail, so that the total does not equal the sum of the three groups.

TABLE 3.—*Instructor's time*

	1910						1915						1921					
	Part time		Full time		Total		Part time		Full time		Total		Part time		Full time		Total	
	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported	Number of colleges reporting	Instructors reported
Professors	21	23	6	9	27	32	27	33	12	24	37	57	27	50	24	62	41	112
Instructors	5	5	1	1	6	6	6	7	7	15	11	22	9	11	13	26	18	37
Assistants			1	1	1	1	7	9	2	7	8	16	14	18	7	16	19	34
Total	22	28	6	11	28	39	31	49	14	46	39	95	30	79	26	104	41	183

TABLE 4.—*Degrees of instructors*

Degrees	1910		1915		1921	
	Number of colleges reporting	Number of instructors	Number of colleges reporting	Number of instructors	Number of colleges reporting	Number of instructors
B. S.	16	20	27	48	29	70
M. S.	10	10	16	21	27	60
M. S.					3	5
Ph. D.	5	6	12	17	21	41
Economic instructor [1]	6	8	11	19	21	51
Per cent of total receiving economic instruction	19	22	21	22	26	29

[1] Represents the number of instructors having received special training in economics before entering the field.

TABLE 5.—*Field studies and publications* [1]

Subjects	1910				1915				1921			
	Field studies		Publications		Field studies		Publications		Field studies		Publications	
	Number of colleges reporting	Studies reported	Number of colleges reporting	Publications reported	Number of colleges reporting	Studies reported	Number of colleges reporting	Publications reported	Number of colleges reporting	Studies reported	Number of colleges reporting	Publications reported
Farm-management or farm-organization surveys	5	5	1	1	16	47	6	6	21	66	18	35
Tenancy and land economic studies	1	1			2	2			11	17	3	3
Credit					3	3	2	3	4	5	2	2
Marketing					4	7	3	6	10	30	7	14
Miscellaneous									8	14	8	10
Total	5	6	2	2	19	59	9	15	28	132	25	66

[1] Relation between number of field studies and number of publications not very reliable, because frequently colleges reported studies by years, and publications as a total number; not always possible to assign publications to any one project, so it may appear in the total only.

Chapter VII

RURAL SOCIOLOGY

By C. J. GALPIN,

Economist in Charge of Rural Life Studies, United States Department of Agriculture

While it is true that from 1894 to 1909 a few scattered courses treating social conditions in American rural life were offered in American universities, it is probably also true that not until 1911

did a land-grant college employ a teacher to give his whole time to rural sociology. Had Theodore Roosevelt not become interested in the farmer and his wife as human beings, rural sociology might have failed to enter the curriculum of a land-grant college for another generation. Fortunately, however, Roosevelt while President discovered the problem of American country life and brought to the attention of the nation, out of deep obscurity, the human and social needs of the American farm population. He said:

If there is one lesson taught by history it is that the permanent greatness of any State must ultimately depend more upon the character of its country population than upon anything else. No growth of cities, no growth of wealth, can make up for loss in either the number or the character of the farming population.—*Semi-Centennial of the Founding of Agricultural Colleges in the United States, May, 1908.*

Agriculture is not the whole of country life. The great rural interests are human interests, and good crops are of little value to the farmer unless they open the door to a good kind of life on the farm. This problem of country life is in the truest sense a national problem.—*Letter to Dean L. H. Bailey, requesting him to accept a place on a Commission on Country Life, August, 1908.*

No one at all familiar with farm life throughout the United States can fail to recognize the necessity for building up the life of the farm upon its social as well as upon its productive side.—*Special message to the Senate and House of Representatives in transmitting the report of the Commission on Country Life, February 9, 1909.*

If the country life is to become all that it should be, if the career of a farmer is to rank with any other career in the country as a dignified and desirable way of earning a living, the farmer must take advantage of all that agricultural knowledge has to offer, and also of all that has raised the standard of living and of intelligence in other callings.—*Introduction to the book form of the report of the Commission on Country Life, July, 1910.*

The report of the Commission on Country Life, in 1909, recommended that—

Agricultural colleges * * * should be brought into cooperation for this great work of investigating with minute care all agricultural and country life conditions.

Liberty Hyde Bailey, chairman of the Commission on Country Life, in 1909, wrote:

The farm is a part of the community and Commonwealth. The farmer is a part of society. These economic and social relations must be studied from the farm point of view. These subjects are practically untouched, although the terms "rural economics" and "rural sociology" are coming into the curricula of colleges of agriculture. * * * These subjects are in many ways the most important that fall to the field of a college of agriculture. The entire effort of a college of agriculture is devoted to the elevation of country living; that is, it eventuates into social and economic studies.—*Cyclopedia of American Agriculture, 1909.*

From 1909 to 1916 was a time of probation for rural sociology. It was challenged to win its place in the land-grant college curriculum by proving out in a few of the leading colleges. At the close of the year 1916–17, however, the period of probation may be said to have passed and full curriculum rights were conceded to the subject. From 1911 to 1922 rural sociology was admitted into 40 of the 48 colleges, and full-time professors were employed in teaching rural sociology in 15 colleges.

Teaching of rural sociology

Land-grant colleges	Date of beginning	Undergraduate courses	Graduate courses	Credit hours undergraduate work	Semesters	Research work	Extension work	Full-time teachers
Alabama	1918	1	0	3	1	No	No	0
Arizona	1920	2	0	4	2	No	No	0
Arkansas	(1)	1	(1)	4	1	No	No	0
California	(1)	2	0	6	2	No	No	0
Colorado	1917	2	0	7	4	No	No	0
Connecticut	(1)	1	0	3	1	No	No	0
Delaware	1918	1	0	3	1	No	No	0
Florida	(1)	1	0	3	1	No	No	0
Georgia	1918	1	0	4	2	Yes	Yes	0
Idaho	(1)	1	0	3	1	No	No	0
Illinois	1911	1	0	(1)	2	No	No	1
Indiana	1917	1	1	3	2	Yes	Yes	1
Iowa	1913	5	3	13	5	Yes	Yes	3
Kansas	(1)	3	3	5	3	Yes	Yes	1
Kentucky	(1)	1	0	3	1	Yes	Yes	0
Louisiana	0	0	0	0	0	No	No	0
Maine	(1)	1	0	2	1	No	No	0
Maryland	0	0	0	0	0	No	No	0
Massachusetts	1907	9	14	27	2	Yes	Yes	1
Michigan	1912	1	0	5	1	No	No	0
Minnesota	(1)	1	2	(1)	1½	Yes	Yes	1
Mississippi	1911	1	0	3	1	No	No	0
Missouri	(1)	4	6	10	6	Yes	Yes	2
Montana	(1)	1	0	6	2	No	No	0
Nebraska	1917	2	2	10	4	Yes	Yes	1
Nevada	0	0	0	0	0	No	No	0
New Hampshire	(1)	1	0	2	1	No	No	0
New Jersey	0	0	0	0	0	No	No	0
New Mexico	(1)	3	0	3	1	No	No	0
New York	1918	4	4	12	6	Yes	Yes	3
North Carolina	1920	2	2	6	2	Yes	Yes	1
North Dakota	(1)	6	0	16	4	No	No	1
Ohio	1914	4	1	7	2	Yes	Yes	1
Oklahoma	1921	2	1	6	2	No	No	0
Oregon	(1)	2	1	7	2	No	No	0
Pennsylvania	1918	4	3	11	5	No	Yes	1
Rhode Island	(1)	0	0	0	0	No	No	0
South Carolina	1917	3	0	6	2	No	No	0
South Dakota	(1)	1	0	4	1	No	No	0
Tennessee [1]								
Texas	1917	4	4	12	4	Yes	Yes	1
Utah	(1)	2	0	4	1½	No	No	0
Vermont	0	0	0	0	0	No	No	0
Virginia	0	0	0	0	0	No	No	0
Washington	(1)	1	(1)	3	1	No	No	0
West Virginia	(1)	1	0	3	1	Yes	Yes	0
Wisconsin	1911	1	1	2	1	Yes	Yes	1
Wyoming	(1)	1	0	9	2	No	No	0

[1] No report.

There is yet a lack of uniformity in the terms employed to designate rural sociology. Such terms as "rural life," "rural organizations," "rural institutions," "rural community problems," and "rural

social studies" are used by some colleges. Rural sociology is to be distinguished from home economics.[1]

Courses in rural sociology, for the most part, are still of an undergraduate character. They are largely elective, and while designed for juniors and seniors are frequently open to sophomores.

Graduate courses, it will be observed from the table, are offered in a few land-grant colleges where the facilities are present for graduate work in allied subjects. Rural sociology as a major works in with general economics, agricultural economics, general sociology, general education, rural education, as minors.

Already a considerable number of masters' degrees have been granted to students majoring in rural sociology. A few doctorates, moreover, have been won in rural sociology, upon very creditable theses.

There is still considerable diversity as to the department of the college with which rural sociology is associated and in which it is administered. In some colleges rural sociology forms a department by itself related directly to the dean of the college. This, however, is yet exceptional. In several colleges the subject is linked with rural or agricultural education. In some of the larger colleges rural sociology falls into the department of agricultural economics. In several cases rural sociology and rural or agricultural economics are taught together either as one course or by the same teacher in close connection with one another.

A few pioneering textbooks in rural sociology have assisted materially in giving body and coherence to these first courses in the subject. As soon as these textbooks shall have been enriched with the many field studies now in progress in the United States, rural sociology will take its place, it is to be expected, alongside the older subjects of the curriculum. The popularity of rural sociology is foreshadowed by the fact that one or more courses are being given in the year 1921–22 in 453 American institutions, either of university, college, or normal-school rank.

In the land-grant colleges where rural sociology has had a place for the longest time, research projects and extension enterprises among the farm communities of the State have become more and more matters of fixed policy. Several exceedingly interesting and significant bulletins have been issued by colleges carrying on these researches. Between 1919 and 1922, 14 colleges have cooperated with the division of farm life studies, United States Department

[1] There will arise no confusion in the mind of anyone over the relation of rural sociology to home economics if it is borne in mind that rural sociology is not concerned with the technical aspect of home management or of woman's work in the farm home or in the care of children. Rural sociology, however, does comprehend an interpretation of the social rôle of farm women and the social valuation of the farm home.

of Agriculture, in formal research projects. Typical of these may be mentioned the one illustrated on pages 49–50, dealing with a survey of farm-life conditions in the southeastern section of Missouri.

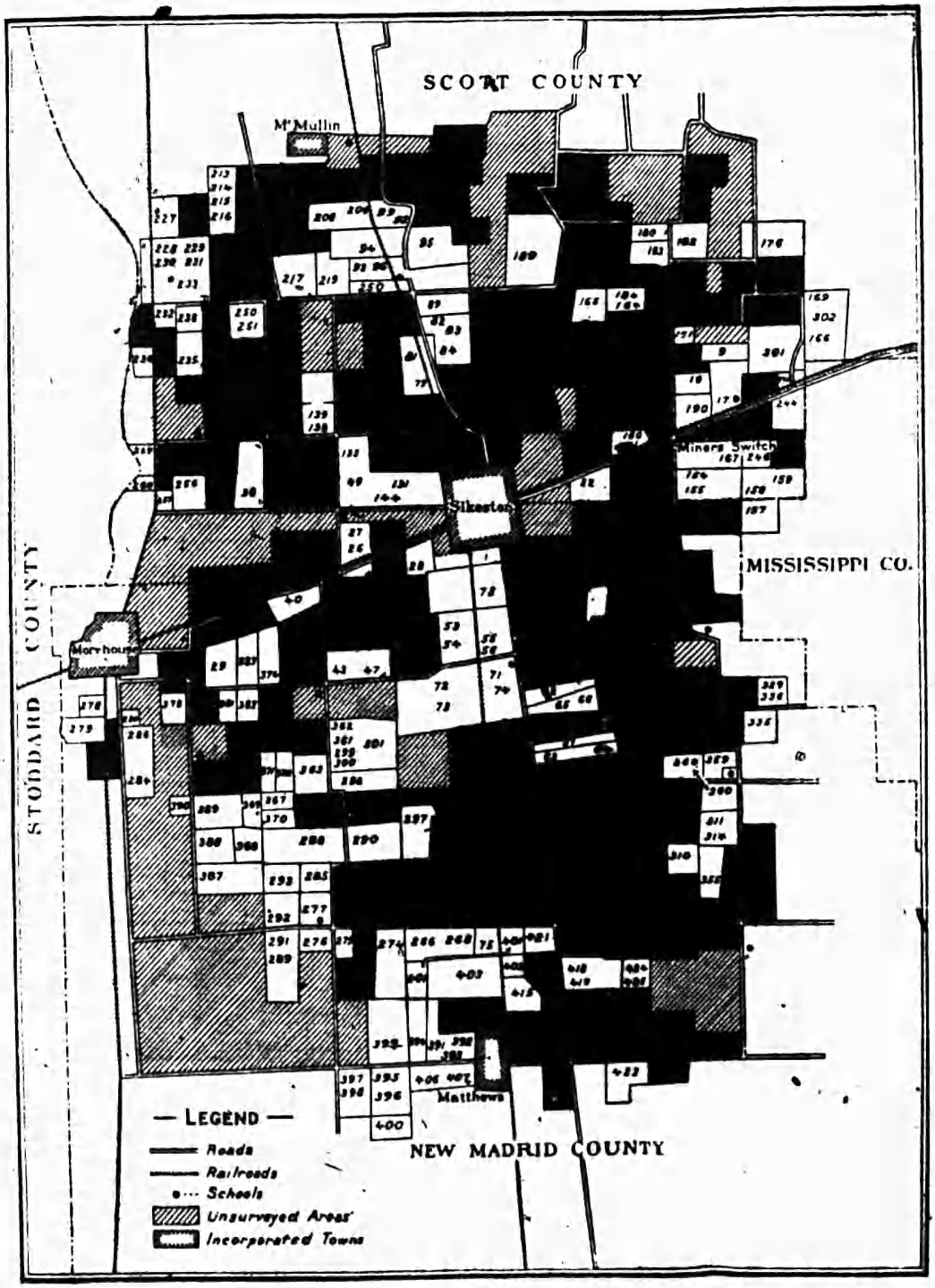

FIG. 2.—Black areas indicate farm lands owned by farmers residing in Sikeston

In Figure 2 the black areas indicate all the farm lands in this community of several hundred farms, owned by farmers who reside in the community town (Sikeston) rather than on their farms. In

Figure 3 the black areas indicate all the farm lands owned by farmers who reside on their farms.

Extension projects in rural social problems, while not so well worked out and convincing as the research projects, seem to be

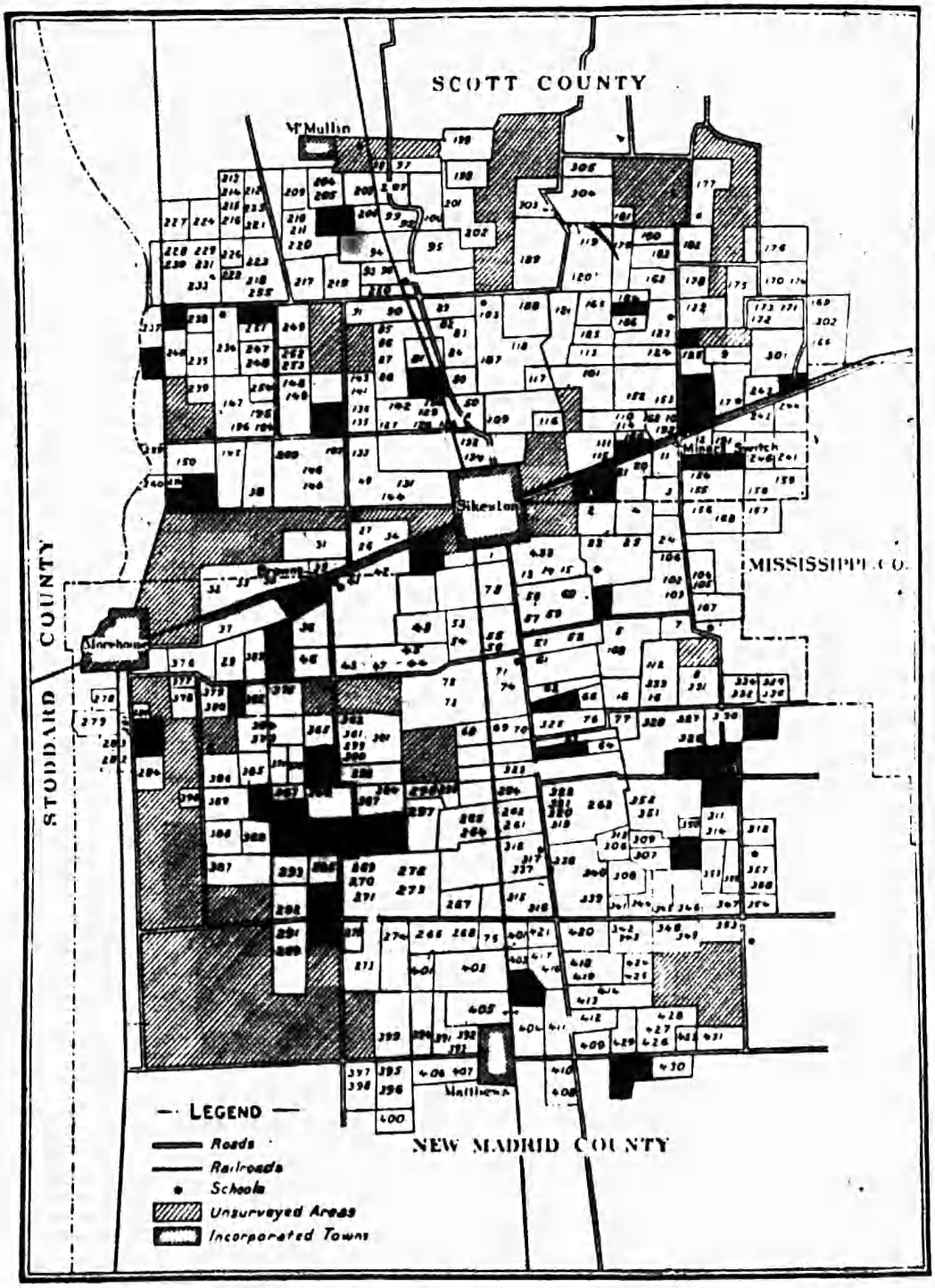

FIG. 3.—Black areas indicate farm lands owned by farmers living on their farms

waiting only for a surer and more practical message drawn from a knowledge of the facts of farm and community life.[2] Rural life

[2] Home demonstration work and boys' and girls' club project work are not considered in this paper as extension projects in rural sociology.

conferences are established events at many land-grant colleges during Farmers' Week. In a few colleges, rural life conferences of a special nature, such as for rural clergymen or for rural teachers, are regular parts of the summer session.

Rural sociology in land-grant colleges, under the influence, perhaps, of agricultural economics, is gradually adjusting itself more completely and definitely to the farm population. Hitherto the subject has labored under the handicap of attempting to cover the problems of village populations as well as of the farm populations. This has tended to blur the real problems of each type of population. The farm population is so large, its national importance so basic, and its occupational psychology so unique that there seems to be justification for separate treatment, especially in land-grant colleges. The day may come when rural sociology will divide into farm sociology and village sociology.

The whole country-life movement, as well as rural sociology, has gone forward under the strain of a great weakness, viz. the lack of exact statistics of the farm population of the United States. It is scarcely to be wondered at that agricultural economics has developed a more convincing body of information and theory than rural sociology. The agricultural census has furnished agricultural economics with the materials for basic statistics—acreage, crops, animals—while the United States Census on population has never given by county the farm population. When this weakness is once overcome, through a full count of farm people by county and State, and by an analysis of the composition and characteristics of these people, rural sociology may work its way into rank with other agricultural sciences.

One other defect in the development of rural sociology is the lack of a clear-cut statistical relation between the living facilities of the farmer, viz. all the elements into which his farm profits are annually converted, and his producing power and production. The influence of standards of living upon producing power, whether applied to farm families, farm communities, or farming regions, will certainly require statistical expression before legislatures will accord to the human aspects of farm life the financial concessions they so strongly deserve. This lack can be made up by rural research as soon as a basis of sound statistics is forthcoming. In all likelihood it will then appear that to know the farmer as a consumer is as important economically as to know him in the rôle of producer and distributor.

When rural sociology gains a secure place, not merely in a majority of the land-grant colleges but in every land-grant college, being recognized fully by the State experiment station in projects of re-

search and by the extension division in projects of extension, it will become the duty of the rural sociological staff in each college to know the composition and characteristics, the ins and outs, of the farm population of its State. Nothing short of this achievement will pass muster. This knowledge will justify all its cost, there is no doubt, by its economic assistance not only to the other departments of the college, but to the agriculture of the State.

Chapter VIII

EDUCATION FOR INDUSTRIAL JOURNALISM

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Industrial journalism, meaning journalism dealing primarily with agriculture, engineering, home economics, and other applied sciences, has had its principal growth as a subject of instruction in American land-grant colleges during the past 10 years. It is now offered in 31 institutions of this type, with the semester hours open varying from 1 to 43.

The work in industrial journalism is directed to two ends: To prepare students to become professional writers on subjects related to the various applied sciences, and editors of periodicals or departments of periodicals dealing with these subjects; to give students of agriculture, engineering, and similar fields such practical training in writing as will enable them to contribute to newspapers, technical journals, and other publications readable and accurate articles dealing with their respective vocations.

Both ends are of marked importance. For example, the agricultural press alone is a much larger enterprise than most persons imagine. It comprises more than 500 publications, all of them demanding skill in writing and knowledge of agriculture. The larger farm journals have circulations approaching a million each. There are approximately 4,500 trade and technical journals, many of which are devoted to fields closely related to engineering, home economics, industrial chemistry, and similar subjects. In addition, the daily and weekly newspapers and the general magazines are giving constantly more attention to agriculture, the industries, and science. This situation produces large opportunities for specially trained editors and writers and also for the occasional contributor on subjects associated with his vocation.

There is, moreover, a specific service to be rendered by these means. Agriculture has suffered much in the past, and is suffering

much to-day, partly because of the inarticulateness of the agricultural population. Courses in agricultural journalism are tending to produce articulateness for the farming industry. In cases where opposition to instruction in this subject has arisen, there is reason to believe that it has been inspired largely by a desire to prevent the farmer from becoming articulate, a wish to "keep him in his place."

There is also much popular misunderstanding of the other applied sciences, which is being corrected as men and women trained in these sciences write readable material for the press.

As has been pointed out, the various land-grant colleges vary widely in their instruction in industrial journalism. Many of them offer only a course or two. These institutions make no endeavor to train for professional industrial journalism, but confine their efforts to helping their agricultural and other students prepare for occasional writing.

In States where the university includes a college of agriculture and a college of liberal arts in the same town or city, the tendency is to offer the preliminary work in journalism in the college of liberal arts (or a school of journalism if such exists separately), while the specialized training in agricultural and other industrial writing is given in the college of agriculture, or in the school of journalism by specially qualified instructors in this field. For example, the University of Wisconsin maintains a department of journalism in the college of letters and science with a four-year curriculum, while there is a separate department of agricultural journalism in the college of agriculture. The latter department gives instruction in home economics as well as in strictly agricultural journalism. In the University of Missouri, on the other hand, courses in agricultural and technical journalism are offered, as all other journalism courses, in the school of journalism, but are taught by instructors devoting their attention exclusively to this field.

Two land-grant colleges—the Kansas State Agricultural College and the Iowa State College of Agriculture and Mechanic Arts—offer four-year curricula in industrial journalism. The older of these curricula is in Kansas. It was established in 1911, following a long period of journalistic development begun with the introduction of instruction in printing in 1874. In the curriculum in industrial journalism, which leads to the degree of bachelor of science in industrial journalism, requirements include English composition and literature; 18 hours in the natural sciences; 20 in the social sciences, including history; 34 hours in professional journalism subjects; and 18 hours in agriculture, home economics, engineering, or some other field of applied science. The rest of the course is chiefly

elective. The enrollment in the four-year curriculum for 1922–23 was 128.

The department of agricultural journalism in the Iowa State College was established in 1905 through the aid of John Clay, an endowment by whom now yields scholarships to the most deserving upper-class students. The four-year curriculum, leading to the degree of bachelor of science in agricultural journalism, was instituted in 1921. It differs primarily from the Kansas course in being strictly agricultural, rather than including possible specialization in other types of industrial journalism, although the department offers work open to students in home economics and engineering. The number of requirements is greater and the number of electives less than in the Kansas course. The requirements in the natural and the social sciences are, respectively, 22 and 17 semester hours. Twenty-nine hours of professional journalism subjects and 30 hours in agriculture and related fields, with 15 in one major line, are required. There is no foreign language requirement. A unique specification provides that each student must during one summer do practical farm work on an approved farm following his sophomore year, and during one summer he must do practical journalistic work on an approved farm journal or newspaper following his junior year.

The courses in journalism in both curricula are substantially alike. The general principles of journalism are taken up and are constantly applied to writing on industrial subjects. Students work on the agricultural, engineering, and other publications issued by the institutions, and are encouraged also to submit copy to newspapers, farm and trade journals, and general magazines. News writing, feature writing, copy reading, editorial writing, advertising, and the editing and management of technical publications are the principal subjects presented. Courses in printing are required in both curricula. The ethical side of the profession is strongly emphasized.

In both institutions there are courses in industrial journalism open to students in all other curricula. Students in these courses, who are preparing for occasional writing on industrial subjects, constitute a large proportion of the class enrollment.

In other land-grant colleges the work in industrial journalism is generally offered as an elective in courses in agriculture, home economics, and other technical fields. In the State College of Washington a student in agriculture may major in the agricultural journalism group. Several institutions require a specific number of hours in industrial journalism for degrees in other fields, upon the premise that ability to express oneself in writing in the field of one's vocation is essential to the leadership that college graduates should undertake.

These requirements in the various land-grant colleges are as follows: Colorado, 2 semester hours [1] required of students in agronomy; Kansas, 1 hour required of juniors in the curriculum in agriculture; Michigan, 2 hours required of students majoring in foods or textiles; Mississippi, 2 hours required in Division II, School of Business and Industry; New Hampshire, 2 hours required of senior engineering students and of all senior agricultural students except those in the teachers' training course; New Jersey, 2 hours required of all sophomores in agriculture; New Mexico, 2 hours required of seniors in agriculture, home economics, and engineering.

In most institutions students interested in the various technical fields take work in industrial journalism for the most part in the same classes. In some institutions, however—notably the University of Wisconsin—segregation is practiced on the basis of subject matter specialization.

The courses commonly offered in land-grant colleges deal with news writing, special article writing, and bulletin writing. In a considerable proportion of the institutions the work is in the department of English, though there are numerous journalism departments and, in some instances, the instruction is given in the department of rural sociology or some other less common location. Where any substantial number of courses in industrial journalism is given, the subject usually, if not in a department of its own, forms a special division of the English department and is presented by an instructor who devotes all, or practically all, his time to it. In several instances, where only a course or two are offered, the editor for the college and experiment station teaches them—ordinarily, for convenience, in the department of English. In some few cases the instruction in journalism appears to be given by an instructor in English who has not had journalistic experience or training—a practice which is certain to produce ineffectual results.

The number of semester hours in industrial journalism, exclusive of printing, offered in the land-grant institutions, and the departments in which they are offered, are as follows:

State	Semester hours	Department
Alabama	4	English.
Colorado	4	Do.
Connecticut	4	Agricultural editing.
Florida	6	Agricultural journalism.
Illinois	3	English.
Indiana	3	Do.
Iowa	32	Agricultural journalism.
Kansas	43	Industrial journalism.
Louisiana	2	Journalism.
Massachusetts	22	Languages and literature.

[1] For convenience all figures have been reduced to the semester-hour basis for the purpose of this study.

State	Semester hours	Department
Michigan	6	English.
Minnesota	8	Publications and rural journalism.
Mississippi	2	Public discourse.
Missouri	9	Journalism.
Nebraska	3	Agricultural editing.
New Hampshire	4	English.
New Jersey	2	Do.
New York	6	Extension teaching.
North Carolina	2	English.
North Dakota	6	English and philosophy.
Ohio	8	Journalism.
Oklahoma	12	English.
Oregon	14	Industrial journalism.
Rhode Island	1	English.
South Dakota	4	Agricultural journalism.
Texas	6	Rural sociology.
Utah	14	English.
Virginia	2	Do.
Washington	25	Do.
West Virginia	4	Agricultural journalism.
Wisconsin	21	Do.

[1] In addition, 6 hours of advertising in the department of marketing.

A number of land-grant colleges are connected with State universities. In such cases courses in journalism are common in the college of arts and sciences of the school of journalism. Whether courses in industrial journalism are available or not, the courses in general journalism are usually open, under some restrictions, to students in agriculture, home economics, and the other applied sciences. The hours of general journalism offered in such institutions are as follows: Arkansas, 6; California, 3; Idaho, 4; Illinois, 25; Kentucky, 29; Louisiana, 20; Maryland, 2; Minnesota, 20; Missouri, 110; Nebraska, 17; Nevada, 12; Ohio, 23; Pennsylvania, 6[2]; Vermont, 1; West Virginia, 21; Wisconsin, 42.

Students who have taken degrees or have majored in industrial journalism commonly go, upon graduation, to farm or trade journals; to newspapers, city or country, seeking staff members familiar with the problems of agriculture, the home, or the industries; into agricultural and food advertising; or into agricultural publicity work. The most marked development of recent years in the field is the increased desire of newspapers—especially country dailies and weeklies—to represent adequately in their columns the principal industry of their communities—agriculture.

In many cases the publicity work for land-grant institutions is in charge of the department of industrial or agricultural journalism. The department, insuring that the copy sent out shall be accurate, interesting, and useful to the public, rather than mere advertising for the college, performs thus an important interpretative function.

[2] While the Pennsylvania State College is a land-grant institution not bearing the name of a university, it fulfills many of the functions of a State university, and its instruction in journalism is of general rather than industrial type and is offered in the school of the liberal arts.

Practically all bulletins dealing with industrial journalism have been published by land-grant colleges. The most extensive work in this field has been done by the Kansas Agricultural College, which issues an industrial journalism series. So far seven numbers have been published. The Iowa State College, the New York State College of Agriculture at Cornell University, and the South Dakota Agricultural College have issued valuable bulletins on industrial journalism.

The developments in industrial journalism in the last 10 years lead one to believe that the subject will shortly become an integral part of the curriculum, required or elective, of each of the land-grant colleges. There is a growing tendency to require some industrial journalism in nonjournalism curricula, so useful has it been found by practical experience. Certainly such a requirement should be made at least for those who are preparing to become county agents or home demonstration agents or to hold positions involving similar contact with the public. An opportunity should also be afforded to engineering students to pursue courses in industrial journalism. In spite of the stress laid by practicing engineers on the importance of adequate training in writing in college, the engineering curricula frequently involve so many technical requirements as to eliminate industrial journalism as a subject of study.

Another probable development in instruction in industrial journalism is the expansion of the courses in the subjects in several of the larger institutions so as to make either a separate curriculum, as is now the case at Iowa and Kansas, or a major in one or more of the existing curricula.

The situation, with rapid expansion likely, requires one word of caution. Care must be exercised in choosing teachers if the work is to continue effective. Adequate training and practical journalistic experience are essential to successful instruction in any phase of journalism.

Chapter IX

MILITARY TRAINING IN LAND-GRANT COLLEGES

By C. R. MANN

Director of American Council on Education, and Chairman of Civilian Advisory Board, General Staff, War Department

and

COL. F. J. MORROW

Former Chief of Reserve Officers' Training Corps Branch, General Staff, War Department

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The history of military training in land-grant institutions during the past 10 years naturally divides itself into three periods, viz: (*a*) The training conducted previous to September, 1916; (*b*) the training during the World War period, 1917–18; and (*c*) the training conducted since the armistice, November, 1918.

Previous to September, 1916, such training was conducted under the broad provision of the Morrill Act of July 2, 1862, as supplemented by the act of 1883, the Morrill Act of 1890, and the Nelson Amendment of 1907. General Order No. 70, 1913, of the War Department, prescribed the regulations governing the application of those laws for the last three years preceding the establishment of the Reserve Officers' Training Corps and is still applicable to schools that have not entered the Reserve Officers' Training Corps.

Under a condition of threatening war, the Congress, in September, 1916, passed the national defense act, which reorganized the Army, and among other things created a definite system of civilian military training in schools and colleges under the designation of Reserve Officers' Training Corps.

Land-grant institutions were specifically provided for in this act, and they had begun to affiliate themselves with the Government under this more definite system when the country entered the World War in April, 1917. The war made such excessive demands on the permanent military establishment that the War Department was unable to seriously continue the development of the Reserve Officers' Training Corps until after the armistice, November, 1918.

As the war progressed the number of available candidates for officer commissions rapidly declined. In the summer of 1918 it was found that after all existing sources of officer material had been exhausted, there would still be about 90,000 officers lacking of the number required to command the military organizations that had been authorized. Therefore the President of the United States directed the creation of the Students' Army Training Corps, under the provisions of the selective service act, approved May 18, 1917,

as amended by the act of August 31, 1918. Its purpose was "to utilize effectively the plant, equipment, and organization of the colleges for selecting and training officer candidates and technical experts for service in the existing emergency."

The colleges responded loyally. Military units were established at 526 institutions of higher education. On October 1 about 165,000 young men were simultaneously mustered into the service of their country. Within one month the corps began to deliver candidates to central officer training camps. Nearly 9,000 were so transferred before the fateful 11th of November. Had the war continued, the Students' Army Training Corps would have more than supplied the needed candidates for officer training.

The Students' Army Training Corps was administered by the committee on education and special training, which consisted of three Army officers and an advisory board of five civilian educators. Several hundred college presidents and professors became active members of its full organization. By their labors more than 600 educational institutions were united in national service. They found and developed leaders when the supply seemed well-nigh exhausted.

Besides amply achieving the military objective for which it was created, the Students' Army Training Corps rendered a second service of inestimable value to national life. In spite of the many crudities due to its rapid creation and short existence, it gave the colleges a real opportunity for service which saved the major portion of them from disruption and bankruptcy. All pending contracts were settled and the colleges returned to their normal routine by the end of that school year. The United States emerged from the war with its system of higher education practically intact.

Immediately after the demobilization of the Students' Army Training Corps, in December, 1918, the War Department resumed the development of the Reserve Officers' Training Corps. While the processes of demobilization of the Students' Army Training Corps were under way the Reserve Officers' Training Corps began growing and has progressively continued through each succeeding year.

The national defense act, of September, 1916, and the amendment of 1920, in establishing the Reserve Officers' Training Corps, provided an organization consisting of two main subdivisions, viz: A senior division, to be composed of units of the several arms, corps, or services established primarily in collegiate institutions; and a junior division, to be established in other public and private educational institutions. Land-grant institutions are specifically mentioned in the organic act as constituting a group to be incorporated in the or-

ganization. In the development of the system it has been ruled by the War Department that the land-grant and other colleges may maintain one or more units of the senior division in the collegiate departments and a junior unit in the preparatory department.

The law requires that at least 100 physically fit male students be maintained in the Infantry, Cavalry, and Artillery units and at least 50 in all others.

One of the leading features in the organization of the Reserve Officers' Training Corps that distinguishes it from all the previous forms of military training in educational institutions is the provision for establishing units corresponding to all the arms, corps, or services of the Army. Previously, the training was the more rudimentary form of the Infantry branch and it lacked scope and variety. The experience gained during the World War in training the vast numbers of young men, some 200,000, who were required as commissioned officers, made it evident that college men were not only capable of assimilating a more comprehensive, theoretical, and practical course of instruction than they had formerly received, but that the young collegians and the college authorities would not be content with the former elementary drill-ground courses.

The War Department accordingly established it as a basic principle of policy in the upbuilding of the Reserve Officers' Training Corps after the armistice that the courses of training should be decidedly educational in nature as well as practical in the use of arms; that the courses should be so developed as to be worthy of being rated educationally with those of the academic departments. This would result in not only producing a better educated type of officer but would so elevate the standing of the military department in the institution as to make it worthy of receiving greater academic consideration. The scientific developments during the war have made it evident that the officer who is to instruct and lead the future military forces of our country must be essentially an educated man. Only educated men are able to cope with and to direct the scientific means that are employed in modern warfare.

There is no other profession which has a more thorough and comprehensive system of postgraduate instruction than that provided by the Regular Army for its officers, and only men of education are prepared to profitably avail themselves of it. Therefore, the educational element, military and civil, is the most important one in developing the prospective officer, and the Reserve Officers' Training Corps courses have been so arranged as to properly balance the theory and the practice of the military art.

Another feature in the courses of training and instruction for members of the Reserve Officers' Training Corps which did not

form a part of such training before the World War is that pertaining to the summer camps.

The War Department's regulations prescribe two six-weeks camps for each student of the senior division, viz. one for students of the basic course, which is optional; and another for the advanced course students, which is compulsory. Six camps were held in 1919, 12 in 1920, and 18 in 1921. Six thousand four hundred students attended the camps of 1921.

The students are segregated in the camps according to the type of the unit in which they have been trained, and the programs for the respective camps are so drawn as to supplement with practical field work the training previously given at the institutions.

The fulfillment of such a program required a more liberal allotment of military instructors, commissioned and noncommissioned, to the colleges than had ever been made before. In 1916 the total number of officers on duty at 106 schools and colleges, of which 52 were land-grant institutions, were 63 active officers and 32 retired. In that year 35,091 students were enrolled in the military departments of those 106 institutions. It is estimated that there were 20,000 in the land-grant colleges.

In January, 1922, there were 773 active and retired officers and 696 noncommissioned officers, active and retired, so detailed to all the units of the Reserve Officers' Training Corps. In addition there were 577 other enlisted men employed in the care of animals, material, etc. This personnel was required for the training of approximately 96,000 students, of whom 57,419 were college men. Of the latter number, 35,284 were in the units of the land-grant colleges.

It became evident in April, 1922, that this system of civilian military training will successfully accomplish the main purpose for which it was created, viz, the development of reserve officers for the Army of the United States, which by the act of 1920 comprises the Regular Army, the National Guard, and the Organized Reserves.

During 1921 some 1,100 young men were qualified for the Officers' Reserve Corps and received such a commission or a letter of qualification. In April of 1922 there were 2,877 college men enrolled in the second year of the advanced course, of whom 1,618 were in land-grant colleges. Virtually all these men will be reported to the War Department as qualified for reserve commissions. Estimates indicate that 4,000 graduates will be found qualified for commissions at the close of the 1922–23 college year.

These appointees are primarily intended for service with the National Guard or the Organized Reserves, but provision is made in the Army regulations governing the appointment of second lieutenants in the Regular Army that each "distinguished college" may

designate 5 per cent of its students who are in the second year advanced course as "honor graduates," and as such they will be regarded as qualified for appointment without mental examination, provided they are otherwise eligible, etc.

With the passing of years the officers of the Reserves who have had experience in the World War will gradually withdraw and their places must be taken by young men developed since that war.

The Reserve Officers' Training Corps will constitute the leading source from which to secure such officers, and the obligation of the educational institutions to insure that their graduates will be worthy and capable of assuming the trust of leading the Nation's forces in time of great emergency will be correspondingly greater.

In view of the fact that the Reserve Officers' Training Corps is an integral part of the national program for preparedness through its function in the development and supply of officer personnel, and because it is the standing policy of the Government to conserve the interest and the affiliation of the colleges to perform this public service, the colleges, particularly the land-grant institutions, should realize a peculiar obligation and a unique opportunity to render an important service to the Nation.

Statement of land-grant institutions, January 31, 1922

KEY.—AS.=Air Service. Cav.=Cavalry. CA.=Coast Artillery. CAC.=Coast Artillery Corps. DC. Jun.=Dental Corps Junior. Eng.=Engineers. FA.=Field Artillery. Inf.=Infantry. Inf. Jun.=Infantry Junior. MC.=Medical Corps. Ord.=Ordnance. QMC.=Quartermaster Corps. Sig. C.=Signal Corps. Vet.=Veterinary.

Institutions	Students enrolled in R. O. T. C.	Officers detailed to R. O. T. C.	Warrant officers detailed to R. O. T. C.	Enlisted men detailed to R.O.T.C		Units established
				Noncommissioned officers	Other enlisted men	
Alabama Polytechnic Institute	643	7	0	6	16	Inf., FA., Eng.
University of Arizona	252	4	0	2	15	Cav.
University of Arkansas	219	2	0	2	0	Inf.
University of California	1,651	10	0	7	2	Inf., CAC., AS.
Colorado Agricultural College	463	4	0	7	19	FA.
Connecticut Agricultural College	169	2	0	0	0	Inf.
University of Delaware	222	2	0	3	0	Inf.
University of Florida	404	5	0	2	0	Inf.
University of Georgia	457	7	0	7	17	Inf., Cav., QMC.
University of Hawaii	123	2	0	2	0	Inf.
University of Illinois	2,602	22	0	16	39	Inf., FA., Sig. C., AS., Eng., Cav.
Purdue University	1,130	7	0	7	19	FA.
Iowa State College	1,134	11	1	8	14	Inf., FA., Eng., Vet.
Kansas State Agricultural College.	819	7	0	8	1	Inf., CAC., Vet.
University of Kentucky	471	5	1	3	0	Inf.
Louisiana State University	392	4	0	2	1	Inf., QMC.
University of Maine	471	4	1	2	0	Inf.
University of Maryland	280	4	0	3	0	Inf.
Massachusetts Agricultural College.	201	4	0	5	15	Cav.
Massachusetts Institute of Technology.	1,349	10	0	6	1	CAC., Sig. C., Ord. Eng., AS.
Michigan Agricultural College	533	8	0	9	16	Inf., CAC., Cav.
University of Minnesota	1,844	14	0	11	1	Inf., CAC., Sig. C., MC., DC. Jun.
Mississippi Agricultural and Mechanical College.	667	5	0	6	1	Inf., CAC.

Statement of land-grant institutions, January 31, 1922—Continued

Institutions	Students enrolled in R. O. T. C.	Officers detailed to R. O. T. C.	Warrant officers detailed to R. O. T. C.	Enlisted men detailed to R.O.T.C.		Units established
				Noncommissioned officers	Other enlisted men	
University of Missouri	1,069	11	0	7	21	Inf., FA.
Montana State College	172	1	0	1	0	Inf.
University of Nebraska	1,210	8	1	5	0	Inf. Jun.
University of Nevada	162	3	0	1	0	Inf.
University of New Hampshire	365	3	1	2	2	Inf., CAC.
Rutgers College	460	5	1	4	0	Inf.
New Mexico College of Agriculture and Mechanic Arts.	134	2	0	1	0	Inf.
Cornell University	1,804	17	0	11	22	Inf., FA., Sig. C., Vet., Ord., MC.
North Carolina State College of Agriculture and Engineering.	629	6	0	3	0	Inf.
North Dakota Agricultural College	176	1	0	1	0	Inf.
Ohio State University	2,534	19	1	13	17	Inf., FA., Vet., Sig., C., MC., DC.
Oklahoma Agricultural and Mechanical College.	371	4	0	4	0	Inf. Jun.
Oregon Agricultural College	1,245	19	0	12	32	Inf., FA., Eng., QMC., Cav.
Pennsylvania State College	1,370	6	1	5	0	Inf.
University of Porto Rico	129	2	0	1	0	Inf.
Rhode Island State College	204	2	0	2	0	Inf.
Clemson Agricultural College	730	6	0	3	0	Inf.
South Dakota College of Agriculture and Mechanic Arts.	243	3	0	2	0	Inf. Jun.
University of Tennessee	384	6	1	3	1	Inf., Eng., QMC.
Agricultural and Mechanical College of Texas.	1,161	13	0	9	42	Inf., Sig. C., FA. Cav., AS.
Agricultural College of Utah	193	2	0	3	2	CAC., QMC.
University of Vermont	273	4	0	3	0	Inf.
Virginia Agricultural and Mechanical College, etc.	655	7	0	7	2	Inf., Eng., CAC.
State College of Washington	596	4	0	4	0	Inf., Eng. Jun.
West Virginia University	628	4	0	3	0	Inf., Eng.
University of Wisconsin	1,465	9	0	8	9	Inf., Sig. C., FA., Ord.
University of Wyoming	99	2	0	2	0	Inf.

Statement of the financial support and academic credit allowances accorded the R. O. T. C. in land-grant institutions, compiled January, 1922, by Maj. L. R. James, professor military science and tactics, University of Maine

Institution	Budget for military department	R. O. T. C. enrollment	Academic units required for graduation	Academic units allowed					
				Basic course		Advanced course		Camp	
				First year	Second year	First year	Second year	Basic course	Advanced course
Alabama Polytechnic Institute	$900	669	82	2	2	3	3	.....	.....
University of Arizona	.....	279	.....	2	2	4	4	.....	.....
University of Arkansas	250	239	208	3	3	9	9	.....	.....
University of California	11,350	1,919	124–150	3	3	6	6	3	3
Colorado Agricultural College	1,400	317	160	6	6	10	10	.....	.....
Connecticut Agricultural College	400	161	140	3	3	3	3	.....	.....
University of Delaware	300	204	[1] 122	0	0	0	0	.....	.....
University of Florida	.....	451	61	1	1	2	2	.....	.....
University of Georgia	600	510	66–84	([2])	([2])	([2])	([2])	.....	.....

[1] Academic units required for graduation: Arts and sciences, 120; civil engineer, 158; mechanical engineer 154½; electrical engineer, 158½; chemical engineer, 142; agricultural engineer, 138.

[2] Three for two years' basic; nothing for one year; three for two year advanced. Substitutive for other subjects.

Statement of the financial support and academic credit allowances, etc.—Con.

Institution	Budget for military department	R. O. T. C. enrollment	Academic units required for graduation	Academic units allowed					
				Basic course		Advanced course		Camp	
				First year	Second year	First year	Second year	Basic course	Advanced course
University of Hawaii	$0	116	154	4	4	8	8		
University of Idaho	2,170	368	128	4	4	6	6	(4)	(4)
University of Illinois	24,630	2,905	(5)	2	2	3	3		
Purdue University		1,164	160	3⅓	3⅓	7⅓	7⅓		
Iowa State College	6,200	1,150	217	3	3	9	9	(6)	(6)
Kansas State Agricultural College	900	777	135	2	2	6	6		
University of Kentucky	1,024	485	(7)	2 6	2 6	4	4		
Louisiana State University	(8)	392	72	2	2	2	2		
University of Maine		480	125-150	2	2	8	8		
University of Maryland	500	282	204-222	6	6	9	9		
Massachusetts Agricultural College	1,608	220	(9)	9	9	15	15		
Massachusetts Institute of Technology	3,000	1,342	(9)						
Michigan Agricultural College	6,000	587	258	6	6	9	9		
University of Minnesota	7,000	2,000	180			9	9		
Mississippi Agricultural and Mechanical College		676	160	4	4	6	6		
University of Missouri	5,000	1,111	9 124	4	4	4	4		
Montana State College	187	182	(9)	3	3	3	3		
University of Nebraska	2,700	1,135	125	2	2	6	6		
University of Nevada	2,000	166	124-148	2	4	4	4		2
University of New Hampshire	300	382	215	4½	4½	9	9		
Rutgers College	212	489	124-146	2	2	3	3		
New Mexico College of Agriculture and Mechanic Arts	750	143	216	10 6	10 6	9	9		
Cornell University	14,245	1,887	120			11 4	11 4		
North Carolina State College of Agriculture and Engineering	700	619	166-174	6	6	8	8		
North Dakota Agricultural College	3,000	210	215	6	6	9	9		
Ohio State University	10,000	2,746	120-136	(12)	(12)	(13)	(13)		
Oklahoma Agricultural and Mechanical College	800	375	28	14 1	14 1	14 3	14 3		
Oregon Agricultural College	900	1,214	207	6	6	9	9		
Pennsylvania State College	5,095	1,372	120-165	2	2	6	6		
University of Porto Rico	(15)	126	(16)	2	2	2	2		
Rhode Island State College		216	160	4	4	8	8		
Clemson Agricultural College	8,150	820	144-160	4	4	7	7		
South Dakota College	500	360	204	3	3	9	9		
University of Tennessee	1,720	391	132	3	3	3	3		
Agricultural and Mechanical College of Texas	500–900	1,206	168	4	4	8	8		
Agricultural College of Utah	175	196	180	10 9	10 9	9	9		
University of Vermont	1,500	400	(9)	2	2	3	3	17 2	17 2
Virginia Agricultural and Mechanical College, etc	10,000	900	228	33	3	6	6		
State College of Washington	400	614	128	2	2	3	3		
West Virginia University		658	(9)	2	2	2	2	(18)	(18)
University of Wisconsin	7,000	1,700	128	2	2	14 3	14 3		
University of Wyoming	300	134	189	4½	4½	10½	10½		

[7] Asking for four.
[4] Answer not understood.
[5] Infantry unit, 8; Engineer unit, 34; Field Artillery, 13.
[6] Varies in different colleges.
[7] No regular budget.
[8] Not operated on unit system.
[9] Academic units required for graduation: Arts and science, 124; agriculture, 128; engineering, 130
[10] In addition to required credit hours.
[11] Two in engineering college. None in law and premedical.
[12] Four for two years.
[13] Six to twelve, depending on college.
[14] Per semester.
[15] Budget for military department, none. Expenses paid as needed.
[16] Two semester hours' credit each semester.
[17] Substitutive in special cases.
[18] Credit allowed in certain instances in engineering colleges. Amount not stated

Chapter X

MILITARY TRAINING IN THE LAND-GRANT COLLEGES

By WILLIAM BENNETT BIZZELL,

President Agricultural and Mechanical College of Texas, and Chairman of the Committee on Military Education and Policy of the Association of Land-Grant Colleges

John Milton, in his famous Tractate on Education, summarized the objectives of education in the following words: "I call, therefore, a complete and generous education that which fits a man to perform justly, skillfully, and magnanimously all the offices, both private and public, of peace and war."

This statement was the inspiration which led Senator Justin S. Morrill to conceive and carry to a successful conclusion the land-grant act of 1862. In commenting upon these new institutions and the place they were to occupy in the educational system of the several States, Senator Morrill declared that it was the intention of the act of Congress to establish them—

> upon a sure and perpetual foundation, accessible to all, but especially to the sons of toil, where all the needful sciences for the practical vocations of life shall be taught; where neither the higher graces of classical studies, nor the military drill our country so greatly appreciates, will be entirely ignored; and where agriculture, the foundation of all present and future prosperity, may look for troops of earnest friends, studying its familiar and recondite economies, and at last elevating it to a higher level, where it may fearlessly invoke comparison with the most advanced standard of the world.

The statement of the law itself, with reference to the content of courses, is expressed in the broadest possible terms. Section 4 of the original Morrill Act declares that it is intended to provide for the—

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

The foregoing phraseology does not indicate very clearly the relative importance of military tactics in the course of study, but the language of the statute leaves no doubt as to the obligation of the land-grant colleges to give military instruction.

The educational objective, as it was seen by John Milton, contemplates the training of the Nation's citizenship to perform skillfully the ordinary pursuits of private life, to meet all requirements when called to position of public responsibility and, in the event of war, to be able to assume the full responsibility of good soldiers. It seems that Senator Morrill had this same comprehensive conception of the work of the land-grant college. But the phraseology used by Senator

Morrill indicates that he did not give so much importance to military training as to agriculture and the mechanic arts.

MILITARY TRAINING IN LAND-GRANT COLLEGES PREVIOUS TO THE WORLD WAR

Previous to the World War there was much diversity in the several land-grant colleges with reference to the emphasis placed on military instruction. These institutions may be roughly divided into two groups on the basis of military training during this period: (1) In the first group are to be included those institutions which merely tolerated instruction in military science and tactics; (2) the second group of institutions included a relatively small number of land-grant colleges that attempted to fulfill all the requirements of the law by giving large emphasis to instruction in military science and tactics.

The War Department had been authorized and directed by Congress to provide instructors and some equipment for military training, but the failure of Congress to supplement the Morrill Act with a more definite policy of military training made it impossible for the War Department to accomplish very tangible results from the training that was offered. The number of instructors was generally inadequate and the amount of equipment totally insufficient for accomplishing results similar to those attained in the other subjects of the college curricula. During the 50 years following the passage of the Morrill Act, Congress never attempted to define the objective of military training in the land-grant college. The Army officers on detail at these institutions were never given express authority to control the military training which they were employed to direct, and were never officially advised as to the aims of their instruction. Under these conditions it is not surprising that many institutions were indifferent toward military instruction, and that the officers and faculties assumed a tolerant rather than a sympathetic attitude toward it.

The training period in these institutions varied from one to four years. Military drill was the principal form of instruction. Little time and attention were given to theory. The students were usually indifferent to it and, in many cases, used many subterfuges to get excused from the performance of military duties.

While the land-grant colleges have varied greatly in the emphasis placed on military training, the experiences resulting from the World War fully justify the policy pursued by those institutions that had entered seriously upon the task of training men for military service. No preference was shown by the War Department, and no special recognition was given the land-grant colleges in the beginning of

the war. All institutions of higher learning were placed upon exactly the same basis, but the value of the military training that had been given in the several land-grant colleges was clearly demonstrated in the training camps. The men who had had from two to four years' training in military science and tactics soon demonstrated the effectiveness of that training, and most of them were awarded commissions. Very early in the war period they became training officers, or assumed direction of Army units in the combatant forces. These men were usually given relatively higher rank than were those from other institutions. The superior training they had received enabled them to render large service in preparing recruits for active duty and resulted in the rapid advancement of practically every man who had received this training.

MILITARY TRAINING IN LAND-GRANT COLLEGES DURING THE WORLD WAR

Previous to the entrance of the United States in the World War, the Association of Land-Grant Colleges took steps to provide for more uniform instruction in military science and tactics in the several land-grant colleges. The association in 1913 directed the executive committee of the organization to use its influence with Congress to this end. The beginning of the European War in 1914 directed the attention of the American people to the military unpreparedness of the Nation and caused Congress to act. On June 3, 1916, the Hay-Chamberlin bill was passed, embodying the essentials of a military policy for the Nation. Certain features of this bill embodied substantially the suggestions of the executive committee of the Association of Land-Grant Colleges.

As a result of the declaration of war, all of the young men of the United States who were physically able to perform military duty were called to the colors under the provisions of the selective service act. Immediately after the declaration of war, disorganization in the colleges and universities set in. Large numbers of students withdrew from these institutions, as they did from all other institutions of higher learning, before the close of the sessions in May and June of 1917 and entered the training camps. Commencement exercises were suspended and, in a few cases, diplomas were presented to the graduates at the several training camps.

In the spring of 1917 the War Department submitted plans for the administration of sections 40–47c, national defense act, which relate to military training in civil educational institutions. In the summer of 1917 the land-grant colleges made application for the establishment of Reserve Officers' Training Corps units under the provisions of the new law and in conformity with special regulations relating thereto, and most of this group of institutions began

the fall term of that year under the new plan of military training. The administrative officers of the land-grant colleges and the officers of the War Department who were designated to administer this new phase of military training were immediately confronted with a number of difficulties. War conditions made it impossible to provide in all cases the number of officers required to carry out the course of instruction formulated by the War Department. It was impossible to secure uniforms and other equipment on account of an insufficient supply and inadequate funds. This caused some dissatisfaction, but it was generally understood that these difficulties would be overcome in time. However, before the new system could be adjusted, war conditions made it necessary to discontinue the Reserve Officers' Training Corps units in the several colleges.

In the summer of 1918 military instruction under the provisions of the national defense act was discontinued in the land-grant colleges. The demand for an increase in officer personnel to command the combatant forces overseas and the necessity for training rapidly a great number of skilled men for various technical activities in connection with the war caused the President of the United States to authorize the establishment of a Students' Army Training Corps in the colleges under the provisions of the selective service act. The purpose of this new activity was "to utilize effectively the plant, equipment, and organization of the colleges for selecting and training officer candidates and technical experts for service in the existing emergency." An appeal was made to the college officials of the country, and they responded promptly. Not only the land-grant colleges, but practically every institution of higher learning in the country placed its facilities at the disposal of the Government in connection with this type of training.

The complete redirection of the educational activities of the land-grant colleges, as well as of other colleges and universities, created many problems for administrative officers. The regular curricula of the institutions were entirely discontinued, and courses were hastily improvised in order to meet the requirements of the War Department. The facilities of the institutions were in most cases overtaxed. The health of the communities in which the colleges were located was unfavorably affected because of the crowded conditions and the inability to supply proper sanitary and hospital facilities. In addition, the personnel in attendance in the colleges became of an entirely different character, and the same opportunity was not given to the members of the faculty to direct the activities of those in attendance at the colleges. The larger responsibility assumed by military officers that was made necessary by war demands resulted, in some instances, in more or less friction between the administrative officers of the

colleges and War Department officials who were assigned to duty in the institutions. It is believed, however, that the disagreeable and unprofitable side of the Students' Army Training Corps was more than offset by the results obtained. The Students' Army Training Corps activities in the colleges and universities were discontinued immediately after the armistice was signed and most of the colleges resumed military training by reestablishing units of the Reserve Officers' Training Corps in the early months of 1919.

MILITARY TRAINING IN THE LAND-GRANT COLLEGES SINCE THE WAR

The assurance of peace by the signing of the armistice on November 11, 1918, resulted in many students withdrawing from the colleges, as many of them had entered without adequate college preparation and only for the purpose of preparing for activities in connection with the war. Many students who had withdrawn from the colleges in order to enlist in the Army began to return in the early spring of 1919 and resume their studies. The regular courses of study were reestablished on a peace-time basis to meet the needs of the requirements of civilian students. But the readjustments in courses of study and student enrollment made the work of the colleges rather unsatisfactory throughout the spring term following the close of the war.

The problem of military training in land-grant colleges also presented a number of difficulties at the time. Many of the students who reentered the colleges had had many months of war training and experience. Most of them were disinclined to continue their work in military training. Some of these men were not eligible for training under the provisions of the national defense act. The basis of exemption of students from military training was not uniform in the several land-grant colleges, but, as a general thing, students who had had the equivalent of the Reserve Officers' Training Corps courses in connection with war activities were exempted from military training. This situation caused a large reduction in the number of students enrolled in the military departments of the several land-grant institutions.

The short period that the Reserve Officers' Training Corps was in effect previous to the outbreak of the war was not sufficient time within which to establish and determine the results of the system. The experience of many college officials with the Students' Army Training Corps caused them to hesitate to assume the obligations incurred in connection with the Reserve Officers' Training Corps. But an important conference between War Department officials and executive officers of the land-grant colleges was held in connection with the Association of Land-Grant Colleges in Baltimore, in November of 1919. As a result of this conference a satisfactory agree-

ment was reached regarding the future policies of military training in the colleges. The success of this conference was largely due to the tact and fine spirit of Col. F. J. Morrow, of the War Plans Division of the General Staff of the Army, who had just been appointed to direct the civilian military training activities under the provisions of the national defense act.

Many of the problems connected with military training on the basis of the new plan were worked out during the summer of 1919, and all of the land-grant colleges began the fall term of that year with an adequate officer personnel and equipment necessary for conducting the several courses in military training as outlined in Army regulations for the several units. The result has been unusually satisfactory. The fact that at last a definite military policy had been established for the Nation, and clearly conceived objectives had been set up for military training, made it possible for the colleges to set about their task with a full understanding of what was expected of them.

The following tabulation indicates the available appropriations, the number of officers on duty, and the output in reserve officers for the four years since the war:

Appropriation and reserve officers

Year	Appropriations	Officers on duty	Reserve officers produced
1919-20	$4,000,000	377	163
1920-21	3,000,000	480	1,093
1921-22	2,896,000	773	2,570
1922-23	3,100,000	766	[1] 3,500

[1] Estimated.

The test of the results of the Reserve Officers' Training Corps is in the number of reserve officers actually produced by the colleges. The above figures show very encouraging results.

THE BENEFITS OF MILITARY TRAINING UNDER THE PRESENT PLAN

The benefits resulting from the present plan of military training may be appraised from the standpoint of (1) the advantages accruing directly to the colleges and to the students themselves; and (2) the larger benefits resulting from a definite plan of training a reserve force to meet the Nation's needs under any emergency.

The benefits to the several colleges and to the students themselves may be summarized as follows:

(1) The detail of a large number of officers selected from among the best officers of the War Department, entirely without expense

to the institution, adds to the corps of instructors and tends to increase the prestige of the institution.

(2) The supply of valuable equipment by the Government, which is utilized by the Department of Military Science and Tactics for the training of students taking the courses in military science and tactics, is a valuable asset. This equipment enables the student to observe the latest arts and facilities, particularly with reference to the latest methods of national defense.

(3) The large amount of money expended by the Government in commutation of uniforms and rations is of vast benefit to the individual student, and, in many cases, students are enabled to remain in college and complete their education by virtue of this assistance who otherwise would not be able to continue in school.

(4) The opportunity of attending training camps for a short period during the summer months is of inestimable value to the students, not only in acquiring practical knowledge of the art and science of war, but in gaining many new experiences that will prove of inestimable value in the normal pursuits of life.

The benefits of this training to the Nation may be summarized as follows:

(1) A nation's strength is measured by the physical vigor of its manhood and the integrity of its citizenship. The Reserve Officers' Training Corps has for its immediate objective the physical development of an adequate number of men to meet the abnormal demands of preparation for war in the shortest possible time.

(2) The Reserve Officers' Training Corps makes available to the Nation an increasing number of men with specialized training corresponding to the several Army divisions that can be called to active duty on short notice.

(3) The training of a reserve officer personnel in land-grant colleges and other civil institutions, under the existing plan, insures better coordination of effort between the regular Army establishment and the National Guard. The Reserve Officers' Training Corps organization, therefore, supplies a natural connecting link between the several units of the United States Army and the corresponding units of the National Guard in the several States.

RELATION OF JUNIOR TO SENIOR RESERVE OFFICERS' TRAINING CORPS UNITS

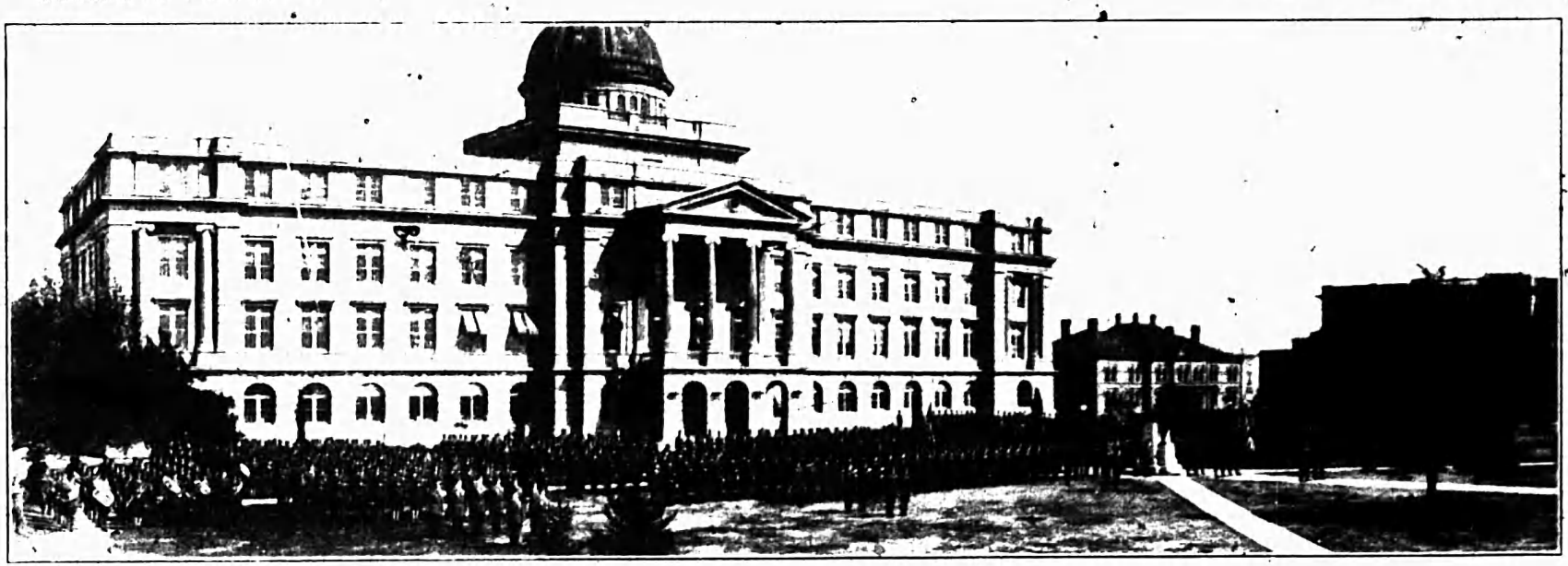
Several questions of coordination, articulation, and nomenclature have arisen in connection with the Reserve Officers' Training Corps system. The national defense act provides for the establishment of junior Reserve Officers' Training Corps units in secondary schools and academies. The War Department has designated two classes

of institutions in which junior units may be established, as follows: (1) The essentially military institutions which do not confer a degree, in which the average age of the student on graduation is less than 21: (2) institutions not included in the above class—high schools, and other secondary schools not essentially military institutions.

Soon after the establishment of the Reserve Officers' Training Corps system the question of college credit for military training in secondary schools where junior units are maintained arose. This question received the consideration of the committee on military education and policy of the Association of Land-Grant Colleges in 1921, and a recommendation which was adopted by the executive body of this association provided that students from junior Reserve Officers' Training Corps units must be allowed credit not to exceed two-thirds the credit value of the basic college course.

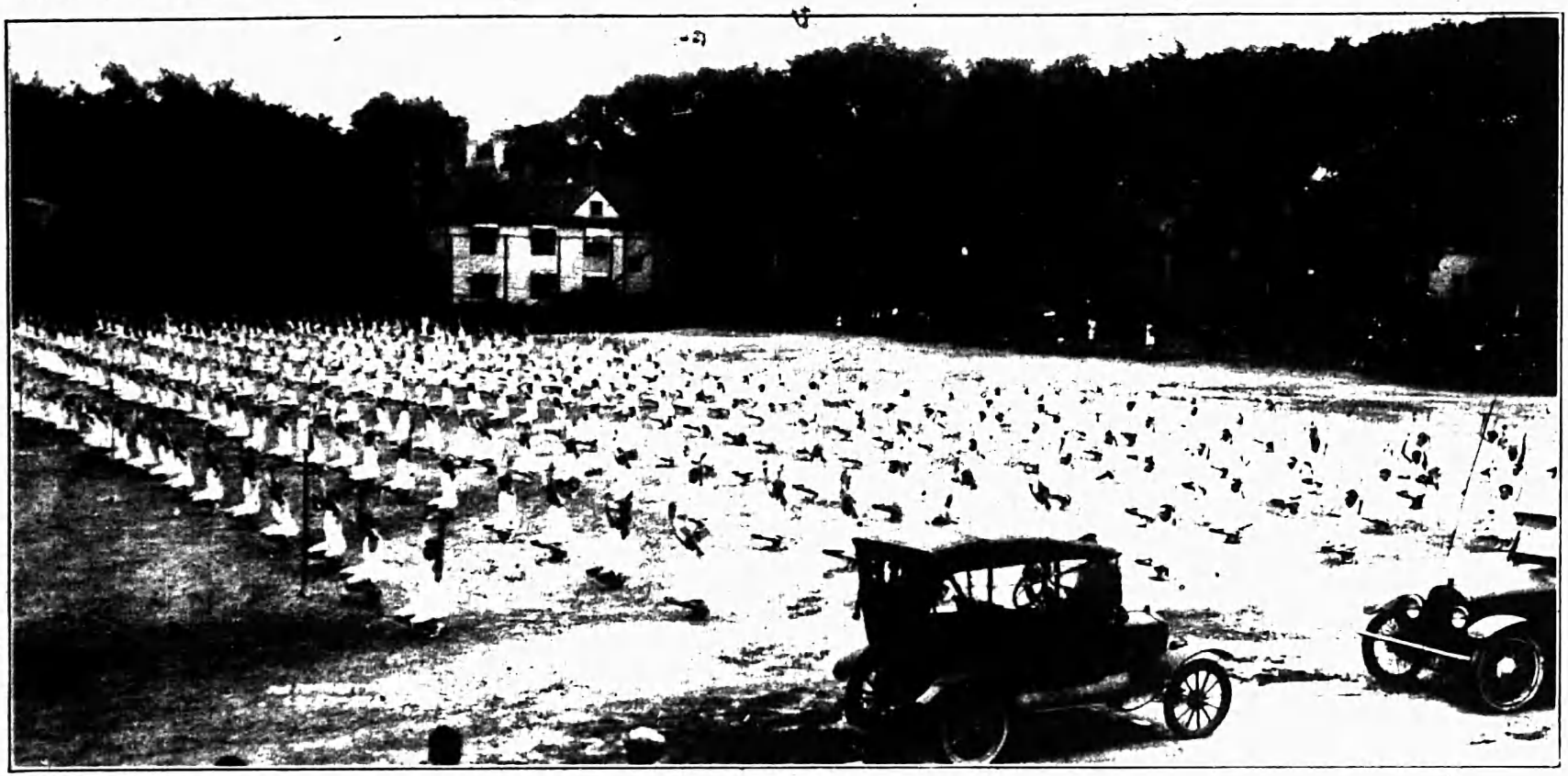
The more careful consideration of all the factors involved now clearly indicates that the designation of military training in secondary schools as Reserve Officers' Training Corps units is hardly appropriate. The objectives of this training can not be, by nature or circumstance, the training of reserve officers. The age of graduates of institutions having junior Reserve Officers' Training Corps units is generally not over 18. Under the provisions of the national defense act, reserve commissions can not be awarded to these students, as the minimum age at which a commission is granted is 21. It seems, therefore, highly desirable to change the name of the military organizations in secondary schools, and perhaps it is equally important to reorganize the courses in military science and tactics to harmonize with the more appropriate objective of citizenship training.

There is no doubt that military training has a place in secondary education if the nature of the training is in harmony with sound pedagogical principle and in accord with correct principles of citizenship training. About 1,000,000 boys reach high-school age annually. There are approximately 900,000 male students in 14,206 secondary schools, of which 12,003 are public high schools. While it is obviously impossible for the Federal Government to provide adequate funds for the maintenance of junior Reserve Officers' Training Corps units for all of these boys in this number of schools, it is possible for most towns and cities to provide the necessary number of men with adequate military training to provide the essential instruction in military science and tactics. It is clearly the obligation of the communities at least to bear the larger share of the expenses connected with this instruction. If this plan were substituted for the junior Reserve Officers' Training Corps, it would probably enable the War Department to provide the supervision necessary to make the

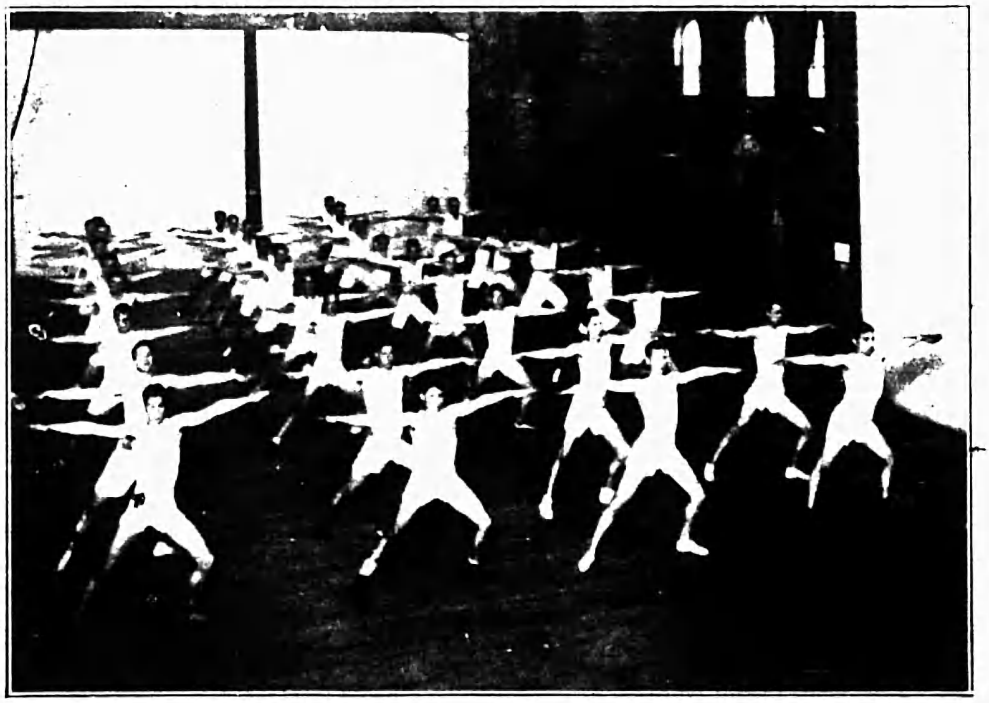


CADET CORPS OF AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

In regulation formation in front of administrative building of college



GYMNASTICS AT UNIVERSITY OF WISCONSIN, 1923



A. CLASS IN GYMNASTICS, UNIVERSITY OF WISCONSIN, 1923

B. PHYSICAL DRILL OF FRESHMEN R. O. T. C. STUDENTS, AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

A. EXTENSION CLASS IN PSYCHOLOGY, DANVILLE, KY.

Conducted by Dr. J. J. Tigert, former President of University of Kentucky, and Dr. P. K. Holmes, Head of Department of Hygiene, University of Kentucky

B. EXTENSION CLASS IN HYGIENE, CYNTHIANA, KY.

Conducted by Dr. P. K. Holmes, Head of Department of Hygiene, University of Kentucky

instruction satisfactory without diverting too large a number of Army officers from service with the various Army units.

It might be possible for the War Department to provide military training in secondary schools under the provision contained in section 55C of the national defense act. This contemplates the War Department supplying a certain amount of equipment and the local institution providing for the instruction. The ability of the War Department to carry out this plan on a large scale would depend, of course, upon the willingness of Congress to provide the necessary funds. This probably offers the best solution to the problem of military training in secondary schools, if funds can be secured for the purpose.

CONCLUSION

It must be obvious to every well-informed citizen that the existing policy of national defense gives every promise of success. This plan of training an officer reserve enables us to sustain our traditional policy of a small standing army, while insuring an adequate officer personnel in case of unexpected war. The land-grant colleges of the United States have entered upon their task of training this Army personnel with all seriousness. Never before has there been such a spirit of cooperation between the War Department officials and land-grant college authorities as there has been since the establishment of Army training units under the provision of the national defense act. Never before have students enrolled upon their task with so great fidelity and earnestness of purpose as under this new plan. With the more clearly defined objectives, faculty members in all of the land-grant colleges in larger numbers than ever before have assumed a sympathetic attitude toward this type of institution. These combined influences seem to give every assurance that military training will justify the existing military policy and supply the Nation's need for an adequate number of trained men to direct its industrial and commercial endeavors in time of peace, and to assume leadership in the training of an Army of sufficient proportions to defend the country under all circumstances in case of invasion by foreign forces.

Chapter XI

PHYSICAL EDUCATION IN LAND-GRANT UNIVERSITIES AND COLLEGES

By THOMAS E. JONES
Director of Athletics, University of Wisconsin

ORGANIZATION

A study of physical education in the land-grant colleges during the decade 1910–1920 shows a period of reorganization, when this phase of activity passed from the status of athletic associations, which only considered the activity of intercollegiate teams, to the establishment of departments of physical education with the following aims:

(1) To contribute to the students' growth and development; (2) to instill good physical habits; (3) to provide an incentive and opportunity to secure at least one hour's physical activity daily as a balance to the sedentary demands of college life; (4) to conserve the social and moral values of games and sports; and (5) to secure to every student the fullest opportunity for their practice.

Many institutions aim also to train physical educators and play leaders.

In most of the best institutions the work is organized in four working divisions under one head, as follows:

1. *Required work for men and women.*—All men are required to take at least two hours a week of physical education during their freshman and sophomore years. Credit toward graduation is given for this work and the requirement is administered strictly. Men in these institutions have an additional three periods a week for military drill.

Since most of these colleges are coeducational, there is required work for women. This constitutes four periods a week for the freshman and sophomore years.

The required work of the department of physical education is supported by the State through its regular budget. In most instances the members of the staff have a regular appointment as faculty members ranking from instructor to full professor.

Student health departments have been organized in a number of the colleges. All students are required to take physical examinations and are graded into three classes—A, B, and C. Class A are permitted to enter any strenuous sport, B are limited, and class C are put in special classes for corrective work.

2. *Professional course.*—The demand for trained physical educators, play, recreation, and athletic directors has become increasingly insistent because of the new recognition of health problems. It is the aim of the professional course to qualify men and women for these responsible positions.

During the last decade many of the larger institutions, such as Wisconsin, Illinois, Ohio State, California, Missouri, and Minnesota, have established such courses as a regular part of their curricula. These courses are not merely practice courses, but have, as their foundation, work in education and the fundamental sciences which gives the individual a basis for the application of the technical work. In addition to the work in education and sciences, courses in language and history and other academic subjects are included to afford the broad background so essential to individuals who expect to hold the large positions in this particular field. Such courses are for four years' duration and lead to a college degree.

Extension courses have also been established in several institutions, the aim being to promote play and recreation and instruct in the method of coaching the principal interscholastic sports.

3. *Intercollegiate athletics.*—Intercollegiate athletics during this period have gained rapidly in popularity. In the 54 land-grant colleges during the last year of the decade more than 3,000,000 spectators attended the football contests. Careful study has been given to the rules that are used in all intercollegiate competition. Rules are published annually in each sport under the control of the National Collegiate Athletic Association.

There are outstanding developments during this period in the matter of equipment. Many well-equipped gymnasia and mammoth stadiums have been constructed. Schools that have constructed or started to construct stadiums during this decade are Ohio, Washington, Illinois, Wisconsin, California, Indiana, Texas, and Missouri. The interest is so intense that, even with this increased equipment for comfort of spectators, many people are turned away from important contests because of lack of facilities. These stadiums, in most instances, have been built from alumni contributions, while others have or are being built entirely from gate receipts.

These institutions are well equipped with playing facilities in the way of athletic fields. It is of interest to note the size of some of these recreational or athletic fields. Illinois has 100 acres; Indiana, 40; Minnesota, 90; Ohio, 102; Wisconsin, 33; and Missouri, 70 acres.

During this decade many intercollegiate conferences have been organized which assist greatly in the control of sport. Athletics in these institutions are under faculty control through athletic boards or athletic councils, the personnel of which usually comprise students,

alumni, and faculty, with the controlling power in all the best institutions in the hands of the faculty. This body has jurisdiction over all intercollegate contests; makes rules to govern its games, subject to the approval of the faculty; makes its own budget; and authorizes expenditure of its gate receipts, which in most institutions are disbursed through the business office by requisition from the director of athletics. Representatives from this body meet with representatives from other colleges belonging to the same conference at stated periods.

College authorities responsible for intercollegiate athletics are agreed and have established during this decade the freshman rule, and in most instances where land-grant colleges are concerned have discountenanced intercollegiate contests between freshman teams. The three-year participation rule has been established, and there is a strict enforcement of the amateur rule and of scholastic standing. Every effort is made to suppress a tendency toward professionalism and the "win at any cost" policy. Long trips are discouraged and athletic schedules are confined to cruising range of undergraduates.

Even with these attempts at regulations, many educators view with alarm the present condition and feel that intercollegiate athletics are approaching a crisis which will determine whether they shall be regarded as commercial, spectacular combats, or whether they shall be organized and administered as a part of student collegiate education.

Since war is a youngs man's business, college athletics dwindled to small proportions. Because of the military training offered, the land-grant colleges were the first to throw themselves with full force into service. The call of the officers' training camp found ready material in the college athletic teams, and our college athletes almost instantly adapted themselves to discipline, and the spirit of accuracy with which they carried out orders illustrated very clearly the results of the team play which they had learned in college athletics. The British and French officers were amazed at the quickness with which this group of men adapted themselves to military life.

When war was declared many of the institutions discontinued intercollegiate athletics because of the feeling that their conduct would interfere with the military interest of the country, until President Wilson's message recommending to the colleges that athletic sports be continued. The following message was given by President Wilson on May 22, 1918, to all the colleges:

> I hope the sports will be continued as a real contribution to national defense, for our young men must be made physically fit and exhibit the vigor, alertness which we are proud to believe to be characteristic of young men. I would be sincerely sorry to see the men and boys in our colleges and schools give up their athletic sports, and I hope most sincerely that the course of col-

lege sports will be continued as far as possible, not to afford diversion to the American people in the days to come when we shall no doubt have our mental depression, but as a real contribution to national defense.

A limited schedule of intercollegiate sports was carried on in most institutions under Student Army Training Corps conditions, every care being taken not to interfere with military training. The training table was discontinued, there was no preseason coaching, and professional coaching and all other expenses were reduced to a minimum.

4. *Intramural athletics.*—During this decade distinct progress has been made along this phase of activitiy. The late war was a great impetus to mass and intramural athletics. The promotion of intramural athletics is an attempt to get everybody into the game—to afford recreation for all by the promotion of a wide variety of athletic activity in an effort to reach every student interested in sport and to afford all opportunity for team experience. The departments aim through such activity to foster the aims and ideals of true sportsmanship and fair play and to create an interest in sport. Activities are carried on through regularly organized leagues such as interfraternity, interboarding house, intercollege, intermilitary company, interclass, and unit leagues which include all nonfraternity men. Games are played in accordance with rules, each league having its rules regarding the men who are eligible for competition.

In most instances the intramural program is promoted by an intramural athletic committee of the student board, a body chosen by student vote and consisting of representatives of the various sports. In some of our leading institutions a director of intramural athletics is appointed whose duty it is to promote and encourage on the campus all forms of intramural sport. This activity is supported in some institutions by State appropriation, in others by donations from intercollegiate athletics, and in others by receipts from interclass athletic activities.

The scope of the intramural program and the amount of interest taken in sport are indicated by the following participation figures of three of the larger land-grant colleges of the Western Conference. There are of course many duplications because the same men take part usually in seasonal sports: Ohio State, 10,200; Michigan, 8,600; Wisconsin, 8,628.

Physical efficiency tests.—During this period considerable effort has been made by the staffs in these colleges to conduct physical efficiency tests in every type of activity, the aim being to stimulate interest, to determine physical ability or weakness as a basis for classification and organization, and to measure improvement, adapting the work to the season and conducting it both indoors and out-

doors. These tests constitute principally track events, though they have included such activities as climbing, games, swimming, life saving, knowledge of first aid, and resuscitation.

All students are urged by those responsible for student health to secure at least one hour of recreational exercise each day, the facilities of the entire department being open for this purpose whenever not required for prescribed activities.

Chapter XII

EDUCATION IN NEGRO LAND-GRANT COLLEGES

By R. S. WILKINSON

President State Agricultural and Mechanical College for Negroes, Orangeburg, S. C.

In an attempt to cooperate with and aid effectively the several States in their efforts toward industrial education, Congress passed the Morrill Act of 1862, which stipulated that funds provided thereby were to be used for instruction in those branches that were "related to agriculture and the mechanic arts in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." Later it was "held that instruction in the industries for women is included in instruction in agriculture and the mechanic arts." Colored people did not at first share in this liberal educational progress, but the Morrill Act of 1890 provided an equitable share of the Federal funds for land-grant colleges to be founded for them in States having separate schools for the races.

This was the beginning of the colored land-grant colleges. At first some of these institutions were founded as distinct units; later others came into existence under the fostering care of denominational schools already existing North and South; while still others were founded with no specific intention of carrying out the agricultural and mechanical programs provided for in the Morrill Act, a mistake due, however, to misapprehension of the purposes involved.

The two oldest of these colored land-grant colleges were organized as far back as 1857, namely, the Agricultural and Mechanical College for Negroes at Normal, Ala., and the Agricultural and Normal School at Pine Bluff, Ark. Most of them, however, have been in existence since 1895. Among the colored leaders connected with these early attempts at organization were Hiram R. Revels, former United States Senator from Mississippi; John M. Langston, Member of Congress from Virginia; R. R. Wright, of Georgia; William H.

Councill, of Alabama; and Thomas E. Miller, Member of Congress from South Carolina.

Prior to 1910 very few of these land-grant colleges had made any great progress in physical plant and equipment. As late as that it was very evident that the best equipped of these institutions were those under private and denominational control. It should be noted, however, to the credit of those concerned that a few Southern States had made some beginning toward adequate provision for these institutions, with modern buildings and suitable equipment.

Since 1910 there has been comparatively a rapid development of some of the land-grant colleges. Others have remained practically as they were. Statistics are not immediately available for an exact statement of comparison. In order to give an idea of the average progress along this line we may use the Georgia State Industrial College at Savannah, for example, as an institution which has not received adequate State support for its physical plant and equipment.

Fortunately, several land-grant colleges have been better supported. For example, the growth of the State Agricultural and Mechanical College at Orangeburg, S. C., indicates the trend for several institutions of this type, as shown in the following table:

	1910	1923
Value of buildings	$85,000	$535,300
Value of equipment	15,000	100,000
Finance Income	35,754	152,000
Number on faculty	24	63

These figures show the excellent support that has been given by the State of South Carolina in behalf of agricultural and technical education. Recent reports seems to indicate that there has been a very gradual improvement in the physical plants and equipment of these colleges during the last decade. This improvement in most institutions, however, has been very slow and markedly inadequate to their needs.

There seems to have been practically a universal increase in the number of students enrolling in these colleges. While at the outset elementary and secondary departments were maintained, these have been almost entirely eliminated to make room for a larger number of students in higher classes. Therefore, even those colleges which do not show an actual increase in enrollment may claim a larger service to "higher education." This universal increase in the number of students in higher departments is encouraging to those who believe that scientific training in agriculture, mechanics, and home economics is a very great need of the colored people of this country today. The record is especially gratifying when we remember that this development has in no instance been in harmful competition

with other types of institutions for the "higher education" of colored people.

It is also a fact worthy of commendation that the teaching personnel of these institutions is almost universally improving in quality as well as quantity. The States have not been very liberal, as we shall later show, in paying instructors in these institutions. Yet they have managed to secure a reasonable number of men trained in the best institutions of the land. On the faculty of these colleges we find men from such negro institutions as Howard, Fisk, Morehouse, Atlanta, and others. We find departments headed and directed by graduates of Harvard, Cornell, Oberlin, Chicago, and other great universities of the country. When it is remembered that all these are colored men under the direction of colored presidents, we must be prepared to agree that these colleges now represent the educational leadership of the race in this country. Yet it is only too true that the faculties are yet far too small and the proportion of well-trained teachers not yet so large as it should be.

It is becoming better realized that democratic education is a misnomer unless it includes the negro. More and more often we find southern legislatures voting sums of money for the "higher education" of negroes far in excess of what could have been hoped for 10 years ago. This changing opinion was expressed at the Conference on Negro Education, Atlanta, Ga., November 19, 1920, by Hon. Hugh M. Dorsey, at that time governor of the State: "The Southern States are committed to the policy of educating the negro people. There is a great need for improvement in buildings and equipment." The opinion of the United States Commissioner of Education that negroes should be educated as all other people of the Nation was approved by a number of southern white men present. But liberal expressions do not always convince practical people: it is, therefore, pleasing to be able to point to substantial buildings and other physical equipment placed at the land-grant colleges in Texas, North Carolina, Florida, Louisiana, West Virginia, South Carolina, and other States in recent years. These States have invested hundreds of thousands of dollars in the aggregate for improvement of their colleges.

Recent legislatures in Louisiana, Virginia, North Carolina, and South Carolina made substantial appropriations for buildings and equipment at their land-grant colleges. For instance, the Louisiana program exceeded $300,000; North Carolina, $600,000.

Not only is there a great disproportion in physical equipment but a very marked difference in salaries paid for administration and instruction in the white and negro colleges of this class. Roughly speaking, the colored professors are paid only about one-half as

much as the whites of similar training, ability, and service. These facts are mentioned only to suggest that the expanding opportunities of service opening to the negro land-grant colleges can not be met unless more is done financially by the Southern States. It is not that less should be done for the higher education of white people, but that the South must make larger investments in education as a whole, and especially in negro education, since it has so long been neglected. Our southern white neighbors have at times criticised some of our institutions for not giving practical industrial training, but these same critics have been slow to realize that those institutions were built and paid for by men of the "old school." The type of education for which these land-grant colleges stand must be supported or it will not justify itself. It can not successfully be disputed, we believe, that these institutions fill a great need of the colored people. It is still a fact that the South is an agricultural section and the negro people a large part of its population. The potential economic prosperity of this section is inevitably interwoven with the educational progress of the negro. Enlightened self-interest, therefore, would suggest that adequate support be given these schools at the earliest possible date.

Considering their facilities, these colleges have shown great desire and capacity to serve the people in many important ways. Recently every effort has been put forth to meet the crying demand for more and better teachers for the public schools in cities, towns, and rural districts. The people are woefully in need of trained teachers for their schools. It is a strategic opportunity of vast potentiality which the negro land-grant colleges are endeavoring to meet as they undertake to establish normal schools with standard courses, and summer schools for teachers. As these schools are logical heads of the various State public-school systems, it seems fitting that teachers for the State public schools should be trained in their normal schools, and come under the influence of their summer-school faculties. This need was seen and taken up at the Atlanta conference as the following resolutions will show:

Whereas it is well known that the colored schools are suffering from a shortage of teachers, and that the teachers now in service for the most part are without sufficient academic and professional training to enable them to teach successfully and thus justify the cooperation and financial support of the taxpayers, and that there is little hope of training useful citizens by such poorly prepared teachers: and

Whereas the colleges and normal schools are totally inadequate to prepare a sufficient number of negro teachers: Therefore be it

***Resolved*, That it is the sense of the special committee, appointed by the United States Commissioner of Education in connection with the conference held in Atlanta, November 19, 1920, that the following suggestions should be brought to the attention of the educational authorities of the 17 States**

represented in the conference, with the hope that they will be enacted into laws;

That all the land-grant colleges and State normal schools within the States be urged to select and prepare teachers for county training schools and for vocational courses, and that they be kept open all the year for better public service.

Other items in these resolutions urge the same course upon other colleges and universities. Thus, it is evident that the land-grant colleges are taking the lead in filling this great and pressing need for more and better teachers for the negro race in this country. No greater service could be rendered the race and American democracy than this. If it be true, as H. G. Wells remarks in the Outline of History, that "Education is the fine net with which democracy fishes for human talent," then it seems very important that those who manipulate the nets should be well trained, and that there should be a sufficient number working among the negro people that no talent should be lost here.

The summer schools for teachers conducted by most of the land-grant colleges have been very successful and have filled a long-felt need for broadening the culture and renewing the inspiration of teachers of the public schools. The various philanthropic funds and agencies have generously aided in this work and thus have made it more serviceable than it could otherwise have been.

The negro land-grant colleges have cooperated with the recent movement to introduce senior and junior high schools and senior and junior colleges into the American plan of education. The colored students have felt the same desire to get out of school early and begin life's work poorly prepared as seems to be the too general habit these days. The conference of executives and leaders of these institutions have therefore gone on record as approving these measures, and some have already rearranged their courses in line with this comparatively new idea.

In addition to adopting these plans, a definite attempt has been made to standardize as well as improve courses offered in the high-school and college departments of the land-grant colleges. At the Southern Conference on Education in Negro Land-Grant Colleges, held at Tuskegee Normal and Industrial Institute, Tuskegee, Ala., January 15–16, 1923, a committee was appointed to work out recommendations for the future standardizing and improvement of courses in these colleges. Space does not permit detailed account of the recommendations of the committee, but, in general, suggestions were made that will make the high-school work which must be done in these colleges standard as compared with that of other high schools in the different States, and, as far as possible, equivalent in educational value to the courses in all standard high schools. We

think that two quotations from the "Report of Conference on Standardizing Courses of Study for Negro Land-Grant Colleges" (Washington, D. C., November 18, 1923) will give a clear idea of the position of colored executives and Federal officials in reference to the standardized work of these institutions.

The unanimous opinion of the committee was that "a four-year high-school course should be offered by the negro land-grant colleges and that the entrance to the course in each State should be based on completion of the grades of elementary schools in the respective States; and that the completion of a standard four-year high-school course is basis for entrance to the college department of a negro land-grant college." "The requirement for a standard negro land-grant college should be the same as that outlined for a standard college by the Carnegie Foundation."

Another recent development worthy of notice is the formation of an Association of Negro Land-Grant Colleges.[1] This matter was taken in connection with the Southern Conference on Education in Negro Land-Grant Colleges, at Tuskegee Institute, January 15–16, 1923, where the committee on organization and policy reported in part as follows:

> We recommend:
>
> That there be established an association of negro land-grant colleges composed of the administrative officials of these colleges and the officials, or their representatives, of the several departments of the Federal Government administering activities connected with land-grant colleges.
>
> That the chief administrative officers of the land-grant colleges and of Hampton Institute and of Tuskegee Institute be honorary members of this association.
>
> That a meeting of this association shall be held annually, the date and place to be determined by the executive committee.

Following out these suggestions, the association was established, and the following officers were elected: John M. Gandy, president Virginia Normal and Industrial Institute; Nathan B. Young, president Florida Agricultural and Mechanical College for Negroes; executive committee, John W. Davis, J. B. Dudley, and Thomas H. Kiah.

The association is quite young, but we feel and hope that it has a long and useful life before it. Much may be accomplished by these executives and officials, who are experts in this field, working in a distinct organization for promotion of the education in which they are specialists.

We find pleasure in recording the fact that the executives of other land-grant colleges, various State and Federal administrative offi-

[1] At the Hampton Conference, held March 3 to 5, 1924, the name of this association was changed to Conference of Presidents of Negro Land-Grant Colleges.

cials, representatives of private philanthropic organizations, and officials of such institutions as Hampton and Tuskegee have cooperated with us freely to produce desired results. Without the sympathy and cooperation of these men our work would have been much more difficult, if not entirely impossible.

We include herewith a statement from the Negro Year Book of 1923 giving interesting facts about the negro land-grant colleges. In many instances. names in the statement are those of men who built these institutions and have been for many years their guiding influence.

State agricultural and mechanical colleges

Organized	Institution	President	Number of instructors	Students		Income		
				College courses	Other courses	State	United States	Total from all sources
1875	Agricultural and Mechanical College for Negroes, Normal, Ala.	T. R. Parker	23	.....	260	$15,000	$20,480	$35,480
1875	Agricultural, Mechanical, and Normal School, Pine Bluff, Ark.	R. E. Malone	22	.....	400	25,000	13,636	39,538
1895	State College for Colored Students, Dover, Del.	W. C. Jason[1]	.....	.....	.....	18,000	10,000	28,000
1887	Florida Agricultural and Mechanical College for Negroes, Tallahassee, Fla.	N. B. Young	40	63	237	12,000	25,000	40,500
1891	Georgia State Industrial College, Savannah, Ga.	C. G. Wiley	18	9	291	10,000	16,666	27,666
1886	Kentucky Normal and Industrial Institute for Colored People, Frankfort, Ky.	G. P. Russell	22	101	306	25,000	7,250	33,505
	Southern University and Agricultural and Mechanical College, Baton Rouge, La.	J. S. Clark	33	29	583	267,000	22,686	303,906
	Princess Anne Academy, Princess Anne, Md.	Thomas H. Kiah	15	.....	175	7,500	10,000	23,105
	Alcorn Agricultural and Mechanical College, Alcorn, Miss.	L. J. Rowan	31	42	545	182,542	27,269	210,811
1886	Lincoln University, Jefferson City, Mo.	Inman E. Page	32	52	458	61,000	3,200	67,200
	Negro Agricultural and Technical College, Greensboro, N. C.	J. B. Dudley	25	71	372	1,600	17,500	37,960
	Colored Agricultural and Normal University, Langston, Okla.	J. M. Marquess	26	4	370	25,000	5,000	30,000
	Colored Normal, Industrial, and Mechanical College, Orangeburg, S. C.	R. S. Wilkinson	88	48	853	115,880	30,754	152,359
	Agricultural and Industrial State School, Nashville, Tenn.	W. J. Hale	35	65	329	29,686	12,000	41,686
1881	Prairie View State Normal and Industrial College, Prairie View, Tex.	J. G. Osborne	81	138	631	266,065	12,500	344,801
	Virginia Normal and Industrial Institute, Petersburg, Va.	J. M. Gandy	64	54	836	74,835	26,996	122,831
	West Virginia Collegiate Institute, Institute, W. Va.	John W. Davis	.....	.....	.....	74,400	10,000	109,537
	Total		.....	.....	.....	210,508	269,937	1,643,725

[1] Succeeded by R. S. Grossley.

Before closing this brief presentation of the origin, service, and educational potentiality of the negro land-grant colleges, we wish to present certain views on their needs and aspirations. We feel that what has been accomplished in the past is only a very small fraction of what may be realized in the days ahead.

As a suitable preliminary statement of our general views we quote at length suggestions of the committee on education for colleges of agriculture and mechanic arts reported to the Conference on Negro Education at Atlanta, Ga., November 19–20, 1920. We include the names of the committee, as they are broadly representative of both races and activities:

We, your committee, charged with the duty of recommending a few fundamental principles by which the negro agricultural and mechanical colleges should be guided, respectfully submit the following suggestions for the consideration of the conference.

First. The masses of the negro children should be reached with efficient elementary schools. These schools should be housed in suitable buildings and taught by competent teachers.

Second. The proper development of the elementary and high schools will remove the menace of ignorance from the South, and will furnish suitable material for the agricultural and mechanical colleges.

Third. As rapidly as conditions will permit, the agricultural and mechanical colleges should confine their efforts to work of college grade; and they should confer proper degrees upon those students who complete four-year college courses. Your committee wishes, however, to enter a word of caution against a policy of confining the agricultural and mechanical colleges exclusively to college courses until such time as the elementary and high schools in the various States are in position to furnish students in sufficient numbers to support such college courses; and, also, against a policy of cheapening the standards of education by granting degrees which have not been earned by the completion of four-year college courses.

Fourth. The agricultural and mechanical colleges should train their students to work successfully in the different trades and industries in which negro men and women earn their livelihood. To this end students should be taught the science of the trade pursued, and then sufficient practice should be required in shop, laboratory, and field to make sure that the principles acquired can be utilized profitably. Your committee recommends especially that scientific and practical agriculture should be given the leading place in the agricultural and mechanical colleges. The best-prepared teachers available should be employed, and there should be provided ample equipment for the teaching of agriculture, such as laboratories, beef cattle, dairy cattle, hogs, sheep, work animals, and land implements. Since the home is the most important institution in our society, the committee recommends that the department of home economics be organized to meet fully the needs of the girls and to reach as many of them as possible.

Fifth. Your committee believes that the agricultural and mechanical colleges should stimulate their students with a desire and determination to own land and operate their own farms; and that good citizens, both white and negro, should do all in their power to make it easy for worthy negroes to acquire homes in the country.

The man who owns his home and operates his own farm is usually a good citizen and contributes to the wealth, peace, and happiness of the community. It will, therefore, serve the best interests of both races to have as many negroes as possible to become landowners and independent tillers of the soil.

Sixth. The agricultural and mechanical colleges should neglect no opportunity to teach their students the lessons of honesty, truthfulness, the square deal, and morality.

Seventh. The headquarters of all extension work among the negroes should be in the agricultural and mechanical colleges and under the direction of their presidents. The extension activities should constitute an important part of the work of the agricultural and mechanical colleges, their purpose being to carry the college to the adults with a view of showing the men how to operate their farms successfully, and the women how to make the homes comfortable and attractive.

Eighth. There should be boards in charge of the agricultural and mechanical colleges composed of able, broad-gauged men, thoroughly in sympathy with the service the schools are attempting to render and willing to give of their time and talents to the promotion of the interests of these institutions. It should be the purpose of the governing boards to fill the teaching staffs of these schools with able men and women and to support them in the development of their departments.

Ninth. All Federal funds for the support of the agricultural and mechanical colleges should be divided between the white and negro agricultural and mechanical colleges on the basis of the white and negro populations in the various States, or, if not that, upon some other equitable basis that will not discriminate against the negro schools.

Tenth. The different States should support the negro agricultural and mechanical colleges adequately, without any regard to the support received from the Federal Government.[1]

In addition to the general and comprehensive ideals suggested in the foregoing resolutions, we would place definite and hearty approval upon certain other aspirations of the negro land-grant colleges. Some of these may have been indicated in our historical sketch, but we repeat for emphasis:

1. It would seem desirable that the Southern States should greatly increase their financial support of these institutions. North Carolina, South Carolina, West Virginia, Texas, and Oklahoma have made beginnings by liberal appropriations for buildings and other physical improvements in plants and equipment. In all the other Southern States the physical plants and equipment are altogether too inadequate to meet the opportunity offered for service. There is also the large difference between salaries of teachers, instructors,

[1] Committee: T. H. Harris, State superintendent of public education for Louisiana, Baton Rouge, La.; James E. Gregg, principal, Hampton Institute, Hampton, Va.; W. J. Hale, president, Agricultural and Industrial State Normal School, Nashville, Tenn.; F. A. Thompson, farmer, member of board of trustees, Colored Agricultural and Normal University of Oklahoma, Langston, Okla.; James B. Dudley, president, North Carolina Agricultural and Mechanical College, Greensboro, N. C.; S. Phillips, Florida State department of education, Tallahassee, Fla.; R. S. Wilkinson, president, South Carolina Agricultural and Mechanical College, Orangeburg, S. C.; Clement Richardson, president, Lincoln Institute, Jefferson City, Mo.

and professors in the white and those in the colored land-grant colleges. In other words, the salaries paid in the colored land-grant colleges are not now large enough to attract sufficient numbers of teachers, nor are they able to hold the best ones in so large a proportion as they should be. We realize that this is universally true in American education to-day, but it is conspicuously true in negro colleges and especially in the land-grant colleges.

The figures below, compiled by the United States Bureau of Education in December, 1922, show the averages of 73 colleges and universities as compared with the averages at colored land-grant colleges.

Salaries in institutions for white students compared with those in colored institutions

Institutions	Presidents	Deans or directors	Professors	Associate professors	Assistant professors	Instructors
Averages of 73 colleges and universities	$8,482	$4,250	$3,392	$2,800	$2,300	$1,800
Colored land-grant college averages	3,000	1,800	1,500	1,400	1,200	1,000

2. The negro land-grant colleges should be equipped and operated so as to give as much "liberal education" as possible along with vocational training and specialized teaching. Culture and refinement should pervade these colleges, as all institutions designed for higher education. Up to the present, South Carolina is the only State in the South that has seen fit to give as much as $10,000 for a pipe organ for its agricultural and mechanical college chapel.

3. There should be provided model school buildings in connection with the normal departments. Critic teachers should be employed in all of these colleges. It is generally concluded in educational circles today-that successful teaching can best be carried on by those professionally trained. Teachers of agriculture, home economics, and the mechanic arts are not exceptions.

In many cases, under these conditions, it is impossible for these colleges to do first-grade college work. The youthfulness of these colleges and the poverty of their graduates make it impossible for the graduate associations to do much along these lines. This need should be met in part at least by larger State appropriations for this specific purpose, in order that the negro land-grant colleges may help supply the urgent demand for more and better teachers in the elementary and secondary schools, which is too important to continue unprovided for.

4. Finally, increasing attention should be given to the improvement of libraries and library equipment in all these colleges. The various Southern States have so far not usually supplied library

facilities worthy of mention for the negro land-grant colleges. Also, private philanthropy has not been overanxious to supply them, since it was assumed that the States would. Most of them are, therefore, weak in this essential item of modern college equipment. In modern American education the library of a college is perhaps the most important single part of equipment, next to a good faculty, yet these colleges are all conspicuously weak in this particular. As long as this undesirable situation holds, it will be impossible for these colleges to do first-grade college work. Their youthfulness and the poverty of graduates make it impossible for alumni associations to do much along these lines. This need should be met, in part at least, by larger State appropriations for this specific purpose.

Chapter XIII

UNIVERSITY EXTENSION IN LAND-GRANT COLLEGES

By Louis E. Reber

Dean, University Extension Division, University of Wisconsin

During the past 20 years successive reports have told of modifications and enlargement of the scope of university extension and of the conception of a state-wide campus, a student body embracing youth and adult, and the inclusion of persons of all classes and of varying degrees of preliminary education. There have been, also, reports concerning a new function of education developed which acknowledged the university's obligation to spread among the people the information gained by experimentation and research. Those institutions listed as offering university extension to this wider student body were mainly the State or land-grant colleges.

A further step in advance was recorded in 1919. Bulletin No. 84, 1919, of the Department of the Interior, Bureau of Education, makes the following sweeping statement:

> All State universities do perform such duties (in addition to the task of educating the resident students) even when they have not secured substantial funds to organize a distinct extension machinery. Most private universities and colleges recognize a similar obligation to put their resources at the service of the community.

The course of progress has been from the earlier spread of agricultural extension in State institutions having agricultural colleges or departments to a similar and constantly strengthening general extension in all State institutions, and finally to a clear evidence of

the influence of these pioneers in the changed attitude toward extension in institutions even of private endowment.

A marvelous growth in university extension has taken place in the past decade. Definite and substantial appropriations for its support are now made by many States, annual expenditures ranging from a few thousand dollars to a half million dollars. The largest appropriation for this purpose in 1922 was $215,000, and the fees charged in the same State were almost one and a half times this sum, making the yearly expenditure for extension work, exclusive of agricultural extension, about a half million dollars. In this State a large percentage of the total population is reached yearly by some form of university extension. It is the common practice of institutions to charge fees for correspondence and class instruction, wholly or partly covering the cost. Lectures and visual instruction are usually almost self-supporting. On the other hand, many, if not all, types of community improvement or welfare work are free, being entirely State-supported. All of these forms of work, especially the contribution to industrial development, through engineering and vocational training; general education, through home-study courses; and social and civic improvement, through a variety of constructive aids, have been highly specialized in the extension divisions of a majority of the land-grant colleges.

The following reports of university extension service, established in leading land-grant institutions, are compiled from recent questionnaires submitted to 53 universities and colleges. Thirty-three of these institutions report well-organized departments of correspondence and extension class instruction; 10 record well-developed lecture and lyceum bureaus, while many supply lectures from faculty upon demand; 8 describe strong departments of forum teaching and library extension, and 12 others are doing work of the latter type; 20 have introduced a visual instruction service; 12 are doing a considerable amount of well-organized work in community development; 6 have established bureaus of municipal information; and 5 are conducting postgraduate medical work. Several report cooperation of general with agricultural extension, and many carry on some form or forms of university extension without distinct organization for it.

Recent tendencies show great strides in the spread of instruction and educational entertainment by visual means, films, and slides; and a growing appreciation and adoption of the community development idea, with its many phases, including municipal information; beginnings of the study and promoting of industrial and commercial relations; new health conceptions, covering interest in health measures in legislation, assistance in putting existing and

new laws into practice, and establishment of postgraduate medical programs; influence exerted upon education and recreation, through the establishment and use of parent-teacher associations; unique methods of developing musical and dramatic ability; guidance and stimulation by means of one or two day institutes and conferences and a comprehensive general program of community service.

The following résumés cover the field of university extension in land-grant colleges. Much suggestive and interesting material has been excluded on account of the necessity for brevity, but the more important facts relative to the establishment, administration, and outstanding forms of extension service are recorded.

CORRESPONDENCE STUDY [1]

In extension teaching a correspondence-study course or an extension class is no longer thought of as a substitute for campus privileges, provided for the indigent or disadvantaged person. Extension teaching has become an instrument for reinterpreting all usable knowledge to adults and youths engaged in the supporting and productive work of the world. While the land-grant university continues, unrelenting, to develop its campus curriculum for the training of youth in the various colleges and schools preparatory for life careers, it now provides also instruction designed to bring abreast and keep abreast with the advancing knowledge of the times the workers of the office and shops and homes, the followers of the trades and crafts, the executives and managers of business and industries, and practitioners of the professions, including the profession of teaching itself, in which professional colleagues of one institution actually become students of the masters in given fields in another institution without any perceptible interruption in their daily routine except for the advancement thereof. In other words, the past decade has made a distinct and permanent beginning toward providing out of public grants, for adult educational training, an area for educational endeavor and service as great, if, indeed, not greater, than that hitherto provided first for elementary education, then for secondary education, and later for college, technical, and professional training, thus rounding out, at public expense, the provisions for preparation and instruction related to the practice of life careers. The new extension developments comprehend the great area of adult education, rounding out the requirements of life.

The work of the land-grant coleges which offer formal or systematic extension instruction other than the usual type of agricultural

[1] Prepared by W. H. Lighty, secretary, correspondence study department of University of Wisconsin.

extension service, in cooperation with the Smith-Lever grants, and which responded to our inquiry, is briefed below.

Alabama Polytechnic Institute.—The Alabama Polytechnic Institute conducts short training courses of one month duration for home demonstration agents, for teachers of vocational agriculture, and short unit courses in engineering and agriculture for ex-service men sent by the Veterans' Bureau.

University of Arizona.—The University of Arizona offers correspondence-study courses, both formal and informal. The formal courses carry regular university credit. Evening classes and lecture courses are also offered.

University of Arkansas.—The University of Arkansas offers correspondence-study work comprehending collegiate courses for credit, and noncollegiate courses. The noncredit courses comprehend studies in the secondary school requirements, and informational courses. Entrance credit is allowed for the secondary school courses, and by arrangement with local school authorities these courses may be allowed to count toward graduation from high school. Reading courses in agriculture are also conducted. No technical agricultural courses are offered for university credit. The credit courses include liberal arts and sciences, engineering, and journalism. Extension classes and short courses of several days' duration, like citizenship schools, are conducted.

University of California.—The University of California offers correspondence-study instruction in liberal arts and sciences, business administration, journalism, recreation, engineering, oral and dental hygiene; also conducts university extension classes in many parts of the State in biology, business, economics, English, home economics, hygiene, journalism, foreign language, mathematics, music, philosophy, political science, public speaking, engineering and technical studies, zoology, and special courses for nurses.

Connecticut Agricultural College.—Special two and four-day classes for adults are conducted and adult clubs developed, but no correspondence-study or extension classes in the usual significance of the term are conducted.

University of Delaware.—Certain academic extension work in classes and lectures is made available, in which college credit may be accumulated. No correspondence-study work is given.

University of Florida.—Correspondence-study courses of credit and noncredit standards are given. Correspondence-study courses comprehend agriculture, commercial subjects, journalism, secondary school studies, civil-service preparation, normal and teachers' review courses, courses in engineering and industrial studies, and collegiate subjects largely the same as those regularly given in residence. Short courses intended to give instruction to special groups, such as commercial secretaries or electrical workers, are offered from time to time. Extension class work and institutes of various kinds are conducted.

University of Georgia.—At the present time the University of Georgia is making its beginnings in correspondence-study work. The courses offered comprehend commerce and economics, education, English, history, mathematics, psychology, and sociology.

University of Idaho.—The University of Idaho offers two kinds of nonresident instruction—correspondence-study work and organized group study—which a member of the faculty actively directs. The group work is visited from time to time. Correspondence-study courses comprehend agriculture, botany, economics, English, forestry, geology, history, home economics, Latin, mathematics, mining, psychology, modern languages, and zoology.

University of Illinois.—The extension work of the University of Illinois is not organized as a separate administrative unit. In the college of agriculture academic courses are given on the method of doing extension work, but these are residence courses, and as yet no correspondence-study courses or extension class work has been systematically developed in any of the colleges of the university. A short two weeks' course in ceramics is given at Urbana, in which there is cooperation with the clay-using industries.

Purdue University.—Short courses of three days to a week are held. No correspondence-study work is given.

Iowa State College of Agriculture and Mechanic Arts.—The engineering extension service conducts short courses of instruction at various points throughout the State, also extension classes, technical institutes and exhibits, correspondence-study courses, and industrial teacher-training courses. All of this instruction has very practical interest for men engaged in various industries and trades. No correspondence-study work is offered through the agricultural extension service.

Kansas State Agricultural College.—The Kansas State Agricultural College has, since 1912, established its college extension work as a division coordinate with the other divisions of the college. At the present time this extension division is organized into eight departments, each with its own head and staff responsible to a dean. The correspondence-study courses for college credit, for vocational purposes, special courses for teachers, and emergency courses are given through correspondence-study. In addition, extension centers are established, where extension classes are conducted under the personal direction of members of the college faculty. The courses comprehend agriculture, engineering, home economics, general science, secondary school courses, and vocational studies.

University of Kentucky.—The department of university extension of the University of Kentucky is organized as one of the main coordinate divisions of the university, administered by a director. Correspondence-study courses, both university credit and noncredit, are offered. The courses of college grade comprehend the liberal arts and science, hygiene, mechanical drawing, mining, road building, and courses in high-school subjects. Theoretically any of the courses offered by correspondence or any course in residence may be available through extension classes where a sufficient demand exists.

University of Maine.—Extension classes in education are conducted in several cities of Maine. The classes are met weekly by some one of the teaching staff of the department of education. Correspondence-study courses in agriculture are made available.

University of Maryland.—The University of Maryland offers correspondence-study courses, but these courses are not advertised, because of lack of facilities.

Massachusetts Agricultural College.—The Massachusetts Agricultural College offers a large number of correspondence-study courses giving instruction in agriculture, home economics, and country life problems. It also conducts extension schools. The agricultural extension schools are organized by instructors of the college, who conduct the school for a period of five days, in morning and afternoon sessions. Three-day schools in community planning are also given, in which instruction in education, agricultural organization, community programs, civic improvement, public health, community recreation, and home making are given. These three-day schools conduct morning, afternoon, and evening sessions.

Massachusetts Institute of Technology.—This institution does not offer correspondence courses direct but cooperates with the division of university

extension in the Massachusetts State Department of Education in its comprehensive home-study work. Massachusetts Institute of Technology is also cooperating with an association of eight Massachusetts colleges and universities for extension teaching.

University of Minnesota.—The University of Minnesota offers in local communities more than 250 evening classes in liberal arts and business and engineering subjects, conducted by members of the general university faculty. It also offers a large number of correspondence courses in liberal arts and sciences, education, economics, business, and engineering. A majority of the courses offered in evening classes and by correspondence lead to credit toward a university degree. A certificate is granted to those who complete certain prescribed courses which are the equivalent of one year of work in residence. Short courses of one week, consisting of an intensive series of lectures and demonstrations, and courses of from 2 to 12 weeks' duration, leading to a certificate, are offered to various professional groups. As yet no correspondence-study courses are offered in agricultural subjects.

Mississippi Agricultural and Mechanical College.—This institution offers correspondence-study courses and has projected comprehensive developments and affiliated itself with the National University Extension Association, with the understanding that university extension work for the State should be largely developed in that institution.

University of Missouri.—The University of Missouri offers correspondence-study courses and extension classes. Among the correspondence-study courses offered are a number in technical agriculture which may be applied for credit in the two-year course and also in the regular four-year course in agriculture. Teachers' courses in agriculture are also available through correspondence. In addition to these, a number of courses are given in liberal arts and sciences, education, home economics, engineering, preventive medicine, and business and public administration.

Montana State College of Agriculture and Mechanic Arts.—The Montana State College of Agriculture and Mechanic Arts offers correspondence-study courses and conducts short-term consecutive instruction through movable schools and better farming trains.

University of Nebraska.—The University of Nebraska extension work was reorganized in 1909 along the lines of development that were formulated at that time in the University of Wisconsin. A special educational service or school relation service is administered through the extension division, involving school inspection and secondary school relations. In the extension work of this institution is included correspondence-study courses, extension classes, short-course schools of several days duration, carrying out a program of instruction for citizenship, scout masters, athletic coaches, and study clubs. This formal extension work comprehends instruction in agriculture, engineering, business administration, the liberal arts and sciences, and professional courses of the teachers colleges.

Rutgers College, New Jersey.—Rutgers College conducts extension classes in the liberal arts and sciences.

Ohio State University.—The Ohio State University has under consideration plans for the broadening of its extension work.

Oklahoma Agricultural and Mechanical College.—The Oklahoma Agricultural and Mechanical College conducts a school of correspondence study in which a large number of courses in agriculture, engineering, home economics, liberal arts and sciences, education, commerce and marketing, and physical education and recreation are offered.

Pennsylvania State College.—Pennsylvania State College offers correspondence courses and extension classes. It maintains night schools and apprenticeship schools in many industrial centers throughout the State. Pennsylvania State College was one of the pioneers, if, indeed, not the pioneer, among the land-grant colleges in offering correspondence courses in technical agricultural studies. While continuing extension work through correspondence and class instruction, both of college credit grade and noncredit grade in a large number of studies, the outstanding development of the recent years has been its engineering extension work. The school of engineering of the State college has developed extensive cooperation agencies with industries in industrial centers, transportation companies, school boards, Young Men's Christian Associations, and municipal utilities for conducting local classes and schools. The school of mines and the school of liberal arts offer work in class instruction and teacher training throughout the State. The work of the school of mines is secondary, while the work of the school of liberal arts is of college grade.

Rhode Island State College.—The Rhode Island State College has for a number of years given encouragement and instruction in nature study which has been not only of interest to teachers and children of school age but has served more general purposes as well.

In recent years engineering extension work has been developed. The short course given at the college has been discontinued, and classes have been conducted in various places in applied engineering and industrial studies. The extension work of the college has also promoted extension work designed to give general culture to young men and young women.

Clemson College, South Carolina.—Study centers have been organized and conducted by the teachers' training division of Clemson College.

South Dakota State College of Agriculture and Mechanic Arts.—Very little work along this line is being carried out at the present time.

University of Tennessee.—The University of Tennessee conducts afternoon and evening classes for teachers in service, and short coures in highway engineering and classes in industrial subjects and industrial teacher training in the various cities in the State of Tennessee.

Agricultural College of Utah.—The Agricultural College of Utah conducts correspondence study of both college credit grade and noncredit grade. Extension classes of college grade are conducted by residence faculty members and are organized in near-by communities. Plans are under way for making such classes also available to localities distant from the campus.

State College of Washington.—The State College of Washington offers correspondence-study work comprehending collegiate courses for credit and noncredit or informational courses. The credit courses include liberal arts and sciences and journalism. Extension classes are also conducted.

University of Wisconsin.—The University of Wisconsin offers upward of 400 correspondence-study courses, a large number of which may be taken for university credit. Some courses of high-school and elementary standards are also offered. An outstanding development, however, of the past 15 years in extension teaching in Wisconsin is in informational and vocational courses, involving a recasting of the knowledge in suitable form for application to the ends of immediate practice by adults. This has resulted in the development of special texts, many of which have been published by the university. Extension classes for credit and for information or general cultural ends are given in communities where there is sufficient demand. This instruction may be given in weekly courses, or concentrated into short-term or even one or two day schools, conducting morning, afternoon, and evening sessions. Such

instruction may be planned for artisans on the one hand or for trained and practicing professional men on the other. The extension teaching in Wisconsin is carried on in a division with a dean and a faculty of coordinate standing with other colleges of the university.

West Virginia University.—The college of arts and sciences since 1916 has conducted, at several centers in various parts of the State, extension courses for which regular college credit has been given. The college of engineering is offering extension courses in mining in various mining towns throughout the State, and the department of vocational industrial education is conducting courses in English, trade drawing, trade mathematics, trade science, methods of teaching, and the organization and administration of vocational education in the teacher-training centers.

FORUM TEACHING AND LIBRARY EXTENSION SERVICE

A number of land-grant institutions are engaged in forms of extramural forum teaching and extension library service. This work is carried on through the preparation of bulletins, the collection and loan of package libraries, and assistance through correspondence and interviews to clubs and other organizations. Bulletins for debating societies, civic clubs, parent-teacher associations, and similar organizations have been published. The package libraries contain carefully selected materials on current problems and are loaned to citizens of the State.

University of Arkansas.—The general extension division publishes bulletins on high-school debating and mimeographed circulars on such topics, for example, as government of coal mines and immigration. Package libraries are loaned to high-school students, club women, and others. The division conducted the National Good Roads Essay Contest in 1922.

Mississippi Agricultural and Mechanical College.—The package library service was instituted in 1917. In 1921, 567 packages were sent out to 104 communities, 80 per cent of which were without libraries. The following statistics indicate the growth of the service: 36 packages in 1910, 206 in 1918, 596 in 1919, 596 in 1920, 567 in 1921, 518 in 1922 (to November).

The bureau administered the National Good Roads Essay Contest in 1922. Special efforts are made to encourage the development of local library facilities.

University of Nebraska.—The forum teaching is conducted by the bureau of debating and public discussion of the university extension division.

University of Nevada. The loan package library service reaches the communities without libraries. Assistance is given to declamatory and oratorical contests. The following statistics show the number of libraries distributed: 70 libraries in 1912-1914, number in 1915-16 not reported, 131 in 1917, 67 in 1918, 124 in 1919, 114 in 1920, 146 in 1921.

State College of Washington.—The college library furnishes bibliographies and similar information to high-school debating societies. The package library service was instituted in 1915. During 1922, 471 packages were sent out to 158 communities, most of which were without local library facilities.

University of West Virginia.—The University of West Virginia, through its library extension service, gives assistance to high schools and women's clubs.

University of Wisconsin.—The department of debating and public discussion of the university extension division has published 36 bulletins on such subjects

as parent-teacher associations, principles of effective debating, civic clubs, and consolidation of rural schools. It furnishes topical programs, lists of debating questions, and information through correspondence and conference.

The following statistics show the loan package library service: 4,375 packages in 1910–1912, 6,570 in 1912–1914, 11,136 in 1914–1916, 14,115 in 1916–1918, 16,256 in 1918–1920.

During the 1918–1920 biennium, 895 communities were served, 82 per cent of which were without public libraries. The bureau also prepares selections for declamatory and oratorical work; sends out special programs, plays, pageantry, and special-day hints. It encourages local library development by directing inquiries to the public library and by cooperating with librarians in meeting the needs of the community. In 1922, the bureau administered the National Good Roads Essay Contest. It cooperates with the High School Debating League and the Wisconsin High School Lyceum Association.

A number of other land-grant institutions have made beginnings in forum teaching, package library service, or both. At the Alabama Polytechnic Institute the English department conducts the debating league and sends out bulletins and selected loan material. In California some extension-library service is conducted through the county-library system. The University of Delaware library gives some guidance in selection of materials. The University of Georgia library lends some materials. The Massachusetts Agricultural College library conducts a loan book service. The University of Minnesota extension division gives some guidance to debaters and loans plays. The Cornell University library lends plays for examination. The library at South Dakota State College of Agriculture and Mechanic Arts answers questions and lends material for debates. The University of Tennessee maintains library service in agriculture, home economics, and rural sanitation. In 1921 loans of 275 packages were made. The Agricultural College of Utah and the Oklahoma Agricultural and Mechanical College have made beginnings in this work.

BUREAU OF MUNICIPAL INFORMATION [2]

To meet the need for information in the field of municipal government, a bureau of municipal information is maintained by a number of colleges and universities for the service of the cities of the State. These bureaus collect and furnish technical information regrading such subjects as municipal organization and administration, public works, public utilities, and public-service rates. They also give information on municipal employment, paving, parks, and playgrounds, housing, dust prevention, and other subjects of municipal interest. Municipal information bureaus collect and maintain a file of charters, ordinances, and official publications of the principal

[2] Prepared by Ford H. MacGregor, chief of bureau of municipal information of University of Wisconsin.

cities of the United States. In short, they aim to be clearing houses for municipal experiments and experiences.

MUNICIPAL INFORMATION BUREAUS IN LAND-GRANT COLLEGES

Only five land-grant colleges maintain municipal information bureaus: The University of Wisconsin, the University of Nebraska, the University of Minnesota, the University of Missouri, and the University of Illinois.

The University of California at one time maintained a municipal reference bureau in connection with the extension division, but that has since been discontinued.

In only three of the foregoing institutions is a separate and distinct municipal information bureau maintained, namely, Wisconsin, Minnesota, and Missouri. In Nebraska and Illinois the municipal information service is given by a bureau or department organized primarily for other purposes.

University of Wisconsin.—The first land-grant college to establish a municipal information service was the University of Wisconsin; it was established by the university extension division in July, 1909. The conception of the bureau grew out of the experience of the Wisconsin Legislative Reference Department, and the purpose of establishing the bureau was to furnish the same type of service to the municipalities that the Legislative Reference Department furnishes to the State legislature. The work of the bureau naturally divides itself into two general divisions: (1) The collection, analysis, and classification of material and information; and (2) the presentation of this material and information to the city officials and citizens of the State.

A working library is maintained by the bureau. No effort is made to duplicate the facilities of the university, the State historical library, and the State law libraries, which are at the disposal of the bureau, except in the collection of municipal charters, reports, and documents and material which can not be found in any of these libraries, such as magazine articles, addresses, newspaper clippings, and pamphlets on all the various aspects and problems of municipal government. A newspaper-clipping service is utilized to collect up-to-date information on the current activities of the cities of the State, the municipal improvements, and other work which is going on in each, and the problems which the various cities of the State are studying.

Various methods are used by the bureau to make its service available to city officials. There are many requests received by the bureau which can be answered by correspondence. There are many requests for information which can not be answered by letter. For

instance, if a city wishes to compare its tax rate with the tax rates of other cities, a compilation or report must be made which usually is too comprehensive for ordinary correspondence. The bureau has, therefore, followed the practice of preparing and distributing to all city officials informational reports on such subjects as the assessed valuation, the salaries of city officials, and similar subjects.

In addition to these reports, printed bulletins are published on subjects where the subject matter of the bulletin or the demand for copies warrants it. Bulletins on commission government, municipal tax statistics, the salaries of municipal officials, juvenile probation, voting machines in municipal elections, and similar subjects have been published.

Many of the inquiries received are of a technical character and cover such a wide scope that they can not be answered directly by the bureau. An important phase of the municipal information service, therefore, is to serve as a clearing house. This is accomplished through cooperation with the other departments and colleges of the university, and with the various departments of the capitol. It is a part of the work of the bureau to keep in touch with the work of the State railroad commission, the tax commission, the industrial commission, the attorney general's office, and all of the other departments which deal with problems connected with city government.

The bureau also keeps in close touch with the municipal officials of the State. The chief of the bureau acts as secretary of the League of Wisconsin Municipalities. In this capacity he edits the League Magazine and assists in the planning of convention programs.

The chief of the bureau is also connected with the department of political science and teaches the courses in municipal government in residence at the university.

University of Minnesota.—The second land-grant university to establish a Municipal Reference Bureau was the University of Minnesota. The bureau was established in 1913 and is a part of the university extension division. Since 1919 it has maintained a close cooperation with the Bureau for Research in Government. The chief purpose of the Bureau for Research in Government is to furnish research facilities for students and faculty and to conduct major researches in government. The purpose of the Municipal Reference Bureau is to serve as an information bureau for the city officials and citizens of the State. The Municipal Reference Bureau is maintained and operated on much the same plan as the municipal information bureau at Wisconsin.

As in the case of Wisconsin, the work of the Municipal Reference Bureau is closely associated with the political science department, the Bureau for Research in Government, and the League of Minnesota Municipalities. The secretary of the bureau is a member of the political science faculty and an official of the league. In general, the major research work, as well as the publication of monographs on research subjects, is done by the Bureau for Research in Government, while the strictly reference work is carried on mainly by the Municipal Reference Bureau. The Municipal Reference Bureau, however, has prepared mimeographed reports on municipal subjects and the results of minor research work. The secretary of the bureau also edits the Minnesota Municipalities, which is the official magazine of the League of Minnesota Municipalities.

As a result of close proximity to the capitol, cooperation with State departments has been developed to a considerable degree.

University of Missouri.—The University of Missouri maintains a distinct municipal reference library, which is a part of the university extension division and is housed in connection with the division. It was established in 1916 and is in charge of a municipal reference librarian.

The character of the work carried on by the library is similar to that of Wisconsin and Minnesota. The library was established primarily for the purpose of assisting the officials of the smaller municipalities of the State.

Cooperation with State departments has not been devoted so completely as in some other States because of the fact that the capitol and the university are located in different cities. Particular cases, however, requiring expert and technical advice, are referred to the proper State officials or commissions for additional information.

University of Nebraska.—There is no separate municipal information bureau at the University of Nebraska, but the law creating the Nebraska legislative reference bureau provided for the maintenance of a municipal division, the purpose of which should be to "maintain a special service upon municipal subjects for the use of city and village officials and other citizens interested therein," and to "promote the diffusion of accurate and reliable information upon questions connected with the development of civic life in Nebraska."

The Nebraska legislative reference bureau is affiliated with the department of political science and sociology and the college of law, and is under the general supervision of the board of regents of the university. The legislative reference work has overshadowed

the work of the municipal division. The bureau answers inquiries received from city officials and citizens on municipal subjects and to a limited extent conducts research work in municipal government. The bureau cooperates closely with the departments at the capitol, the engineering college, the conservation and survey division, and other branches of the State service.

University of Illinois.—At the University of Illinois there is no extension division, and such municipal reference work as is done is handled by the department of political science. The department to a limited extent conducts research work in municipal governmental lines and is also in close touch with the Illinois Mayors' Association. No separate, independent municipal reference bureau is maintained, but attention is given to requests from city officials.

VISUAL INSTRUCTION

For several years the extension divisions in a number of land-grant colleges have lent educational lantern slides, motion-picture films, charts, exhibits, and other illustrative material to schools and other institutions and organizations. This service, in many institutions, is organized into bureaus of visual instruction, which are making a thorough and systematic study of materials that may be used in illustrative teaching or in instruction through the medium of the eye, and placing such materials within easy and constant reach of all schools and other civic organizations of the State.

The following table shows the status of the work in the various land-grant colleges:

Visual instruction in land-grant colleges

Institution	Department name	Year organized	Number of slides in service—		Number of slides distributed—		Number of reels of films in service—		Total reels distributed—		Total communities (or schools served—		Per cent service to schools' class work		Total in office employed in visua instruction		Total budget	
			First year	In 1921-22	First year	In 1921-22	First year	In 1921-22	First year	In 1921-22	First year	In 1921-22	First year	In 1921-22	First year	In 1921-22	First year	In 1921-22
University of Arizona	Visual education section.	1919	646	1,400	.....	2,075	.....	81	.....	140	.....	21	.....	81	.....	1	.....	.....
University of Arkansas	Bureau of visual instruction.	1916	.....	1,700	.....	1,100	.....	20	.....	20	.....	25	.....	75	.....	3	.....	$1,200
University of California	Department of visual instruction.	1918	81	78	221	425	126	288	837	3,846	.....	502	.....	437	4	3	$10,000	9,900
University of Florida	Visual instruction bureau.	1920	750	4,500	.....	331	.....	357	.....	1,055	.....	76	90	85	1	3	2,000	2,000
Iowa State College	Visual instruction service.	1914	.....	9,000	.....	61,000	18	700	.....	11,000	.....	250	.....	.....	½	7	.....	.....
University of Kentucky	Department of university extension.	1919	.....	.....	.....	.....	60	200	400	1,000	25	100	.....	.....	2	5	7,000	10,000
University of Minnesota	Visual instruction department.	1917	10	80	75	230	1	210	14	800	11	800	.....	.....	⅓	2	.....	3,220
University of Missouri	Visual educational section.		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....
University of Nebraska	.....	1914	.....	10,000	.....	.....	20	300	20	300	.....	.....	.....	.....	.....	.....	6,000	30,000
State College of Washington	Department of educational motion-picture films and stereopticon slides.	1919	150	250	.....	.....	150	250	.....	.....	75	200	.....	.....	2	3	1,000	3,000
University of Maryland	Visual instruction department.	1919	.....	.....	.....	.....	40	75	300	522	15	25	20	40	2	2	.....	.....
Agricultural and Mechanical College of Texas.	Vocational teacher	.....	.....	.....	51	.....	148	.....	75	.....	214	.....	59	.....	.....	.....	.....	.....
Georgia State College of Agriculture.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	[1] 10,000
University of Tennessee	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(2)	.....	.....	150	.....
Cornell University	.....	.....	474	[3] 474	.....	.....	.....	.....	.....	.....	.....	.....	.....	(2)	.....	.....	1,200	1,500
Kansas State Agricultural College.	.....	.....	1,200	[3] 1,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Oregon Agricultural College				[2] 3,750											2,000	4,000
Pennsylvania State College			100									(3)				
University of Wyoming																
University of Nevada				[2] 1,200												
University of Wisconsin	Bureau of visual instruction.	1914	4,000	150,000		500,000	25		85	9,850		823	30 90	2	12	5,000	30,000

[1] In 1919.

[2] In 1920.

[3] Very small.

[4] Practically all.

LECTURES

Lectures, concerts, and lyceum courses are being conducted by the general extension divisions of a number of land-grant colleges, separate and apart from the agricultural extension. Members of the faculty and specialists in various fields are sent out as lecturers for organizations, groups, and communities. A few institutions conduct lyceum courses. Many communities that otherwise could not do so are able to secure courses because of the fact that they are furnished at cost. Careful selection of talent by the lecture bureaus insures good programs.

Only a few land-grant institutions maintain a bureau to conduct lecture work, although practically all furnish university lectures on topics other than agriculture. The following list includes those which do maintain a bureau of lectures and shows the numbers of lecture, lyceum, and entertainment engagements, where statistics are available, conducted during the decade 1912 to 1922: University of Arkansas, 180 (since 1920); Iowa State College, 471 (since 1918); Kansas State Agricultural College, 5,000; University of Kentucky; University of Minnesota, 6,300; University of Nevada, 1,000; Cornell University, 10,000; State College of Washington, 25 annually; University of Wisconsin, 13,511.

Of this number, the following conduct lyceum and entertainment courses: University of Arkansas, Kansas State College of Agriculture, University of Minnesota, State College of Washington, University of Wisconsin.

In practically all cases the expense of university lectures is borne jointly by the institution and the organization. Lyceum and entertainment courses are furnished at cost, the institution bearing the administrative expense.

POSTGRADUATE MEDICAL INSTRUCTION

The purpose of the courses offered in postgraduate medical instruction is to provide physicians, residing in a given locality, with practical demonstrations of the newer methods of diagnosing and treating diseases. Clinics are held at a hospital conveniently located, illustrated lectures are given, and opportunity is offered for consultation with specialists.

Following is a summary of what is being done in the field of medical extension in land-grant colleges:

University of Maryland (school of medicine).—Medical extension work in connection with the University of Maryland is still in its very early stages. The following is the general program for this year:

Clinical meetings are held at the school in the late afternoon for practicing physicians of the city of Baltimore and environs and are well attended.

The school has asked the county societies to signify their desire for short clinical meetings to be given, usually in the local hospital, at centers throughout the State, under the auspices of the county society, the university merely arranging to send men out from its faculty, from other schools, or from outside the State, who are capable of conducting such meetings. The type of meeting favored is an informal clinical talk, based on cases brought in by the physicians of the society.

Short courses are offered to groups of applicants in certain towns of the State.

A group one day a week in infant feeding, to be illustrated by patients brought in by doctors attending, to be given by pediatricians from the school for six or eight consecutive weeks.

In addition to the courses offered throughout the State, courses are given at the school in methods of examination of the eye, ear, nose, and throat for practicing physicians, for one month's full work, limited to 10 men; and in the out-patient department and in the wards of the university hospital, by members of the staff of the department concerned.

The extension division of the medical school serves as a bureau for obtaining speakers for the local meetings of the county societies.

The library of the school is building up a circulating reprint service, so that a practicing physician can ask for data on a certain subject and be sent a folder of loose-bound reprints dealing with the subject.

University of Minnesota (general extension division).—For two years the general extension division of the University of Minnesota has cooperated with the medical school in conducting an annual short course for physicians. During 1922 this was conducted in April and covered the subjects of pediatrics, obstetrics and gynecology, medicine and surgery. Sectional clinics were held. Students wishing to specialize in any one of the branches could do so by attending all of the sectional clinics in that branch. Clinics and demonstrations were held at the Minneapolis General Hospital and the medical buildings at the university.

University of Vermont.—Postgraduate instruction is given every year to physicians of the State who desire it. This instruction includes hospital clinics and lectures by specialists dealing with the diagnosis and treatment of various diseases.

No medical extension work has been done. At the request of physicians and the staff of the medical school, the extension division has offered to the public elementary courses in hygiene and public health. It has also sponsored the "Health Fairy" and has given lectures dealing with medical science.

University of Wisconsin (Postgraduate medical instruction).—The purpose of the courses offered in postgraduate medical instruction is to supply to physicians practicing in a given locality practical demonstrations of the newer methods of diagnosing and treating disease. Clinics are held at a hospital conveniently located, illustrated lectures are given, and opportunity is offered to the practicing physicians for consultations with specialists. Arrangements may be made for a single clinic and lecture or for a series of weekly, bi-weekly, or monthly clinics and lectures. Physicians enrolling for the course are charged a fee sufficient to cover part of the overhead expenses. The balance is paid from the small appropriation made for this work by the State legislature.

The three special subjects considered during the year 1921-22 were obstetrics, child welfare, and nervous diseases. A library of continental, English, and American motion-picture films has been secured to be used in connection with the lectures on obstetrics.

GENERAL COMMUNITY DEVELOPMENT

A number of land-grant institutions have been conducting various types of extension activities, independent of agricultural extension, dealing with the problem of general community development. This work has been carried on through the social or community center movement, which has been instrumental in awakening a widespread civic consciousness tending toward neighborhood organization and united community interests; the community institute, dealing with social problems, the success of which is due to the directness of its application to conditions existing in the community; the recreational institute, the immediate purpose of which is to train recreational leaders; community music and drama work, for the purpose of bringing about a new appreciation of music and the developing of such home-talent entertainments as combine group participation with community recreation; cooperation with the Federal and State organizations for conducting Baby Week campaigns and similar child-welfare education; health instruction through lectures, publications, consultations, and surveys; conferences, usually dealing with but one general problem; and general information service intended to furnish information to individuals on community problems.

All of these activities have been closely correlated with the work of debating and public discussion, the lecture and lyceum service, the municipal information work, and visual instruction.

The following land-grant institutions have been engaged in some phase of general community development: University of Arizona, University of Arkansas, University of Florida, Iowa State College of Agriculture, Kansas State Agricultural College, University of Minnesota, New York State College of Agriculture, North Carolina College of Agriculture and Engineering, Texas Agricultural and Mechanical College, State College of Washington, and University of Wisconsin.

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