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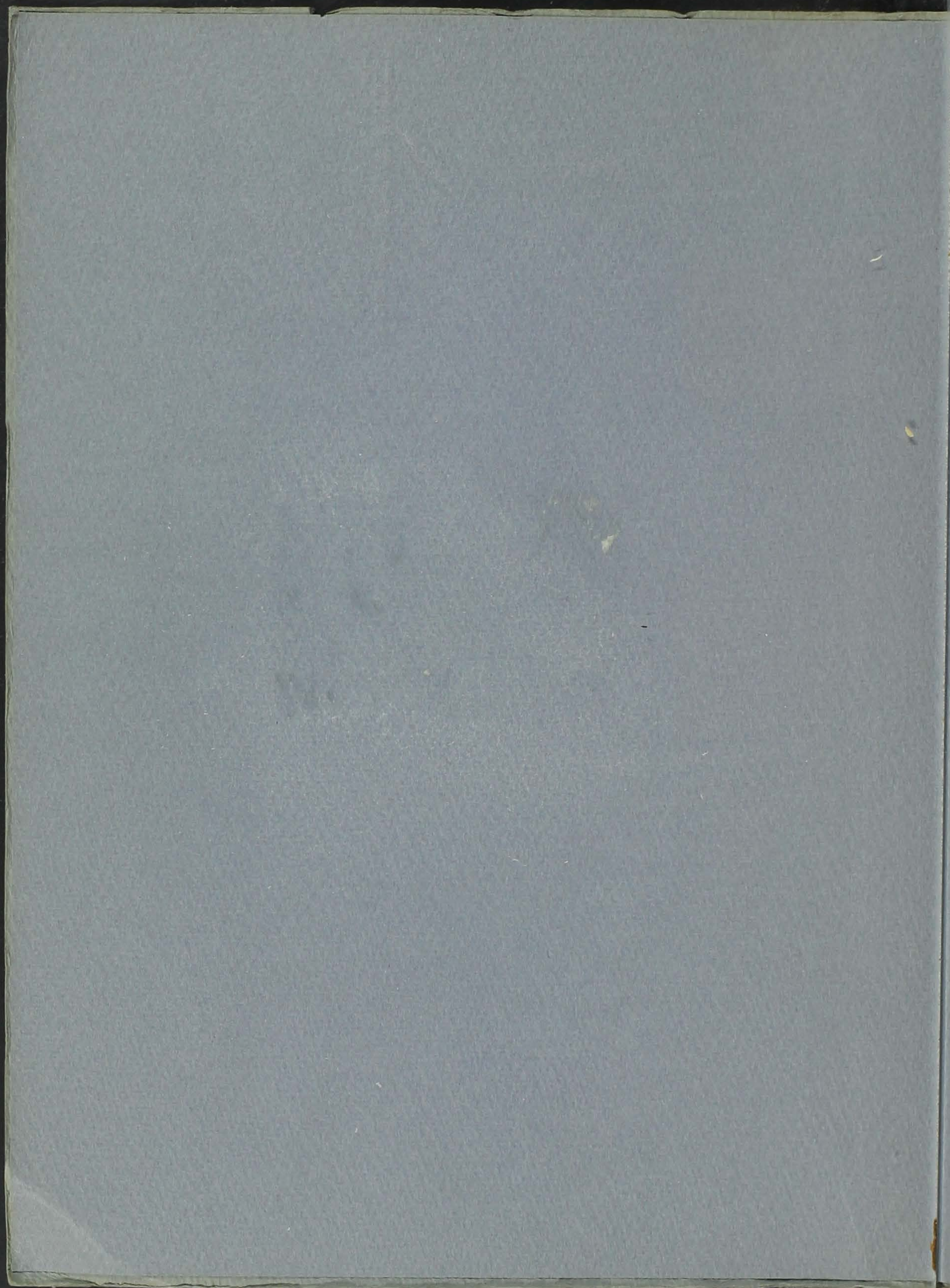
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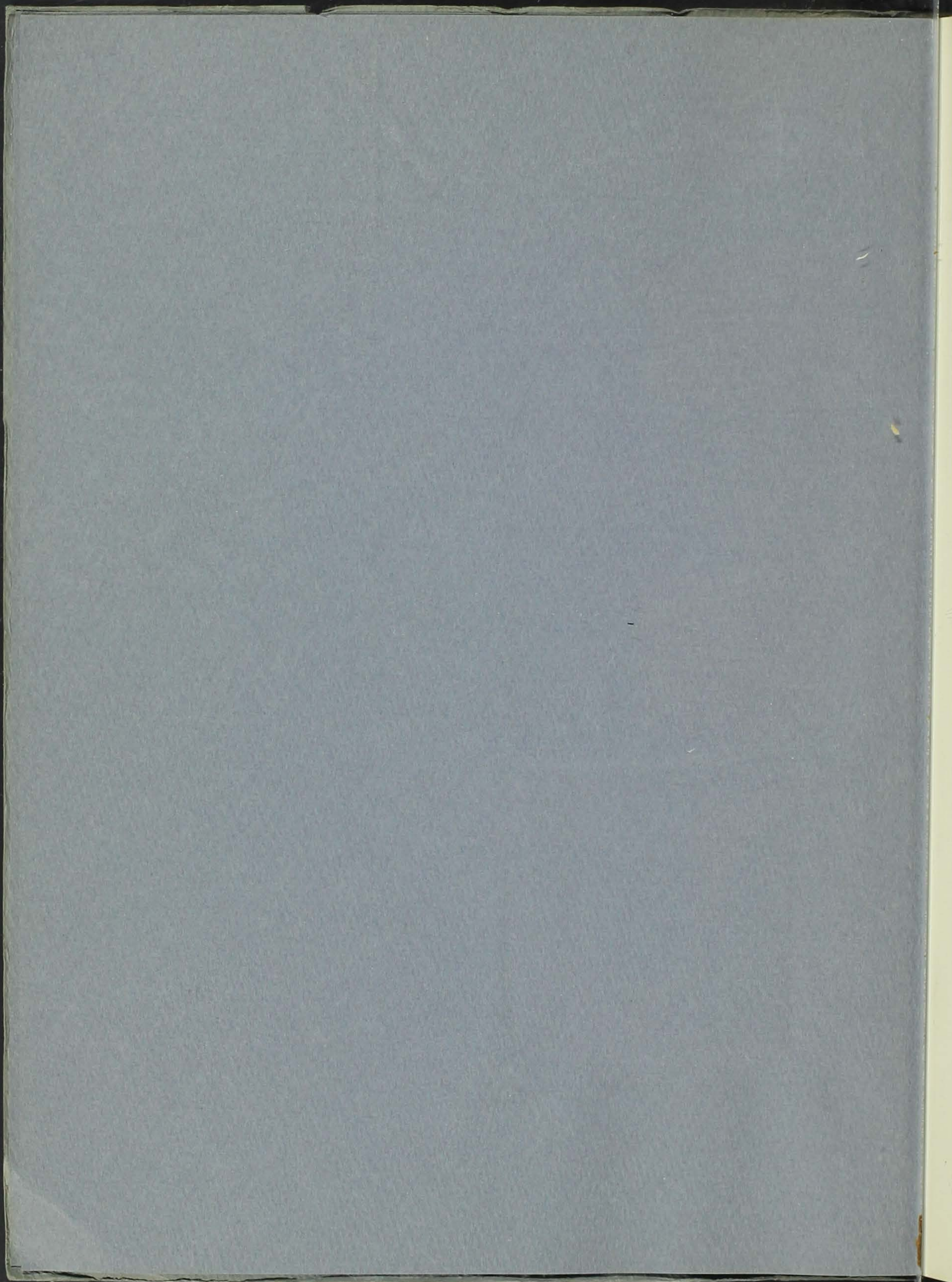


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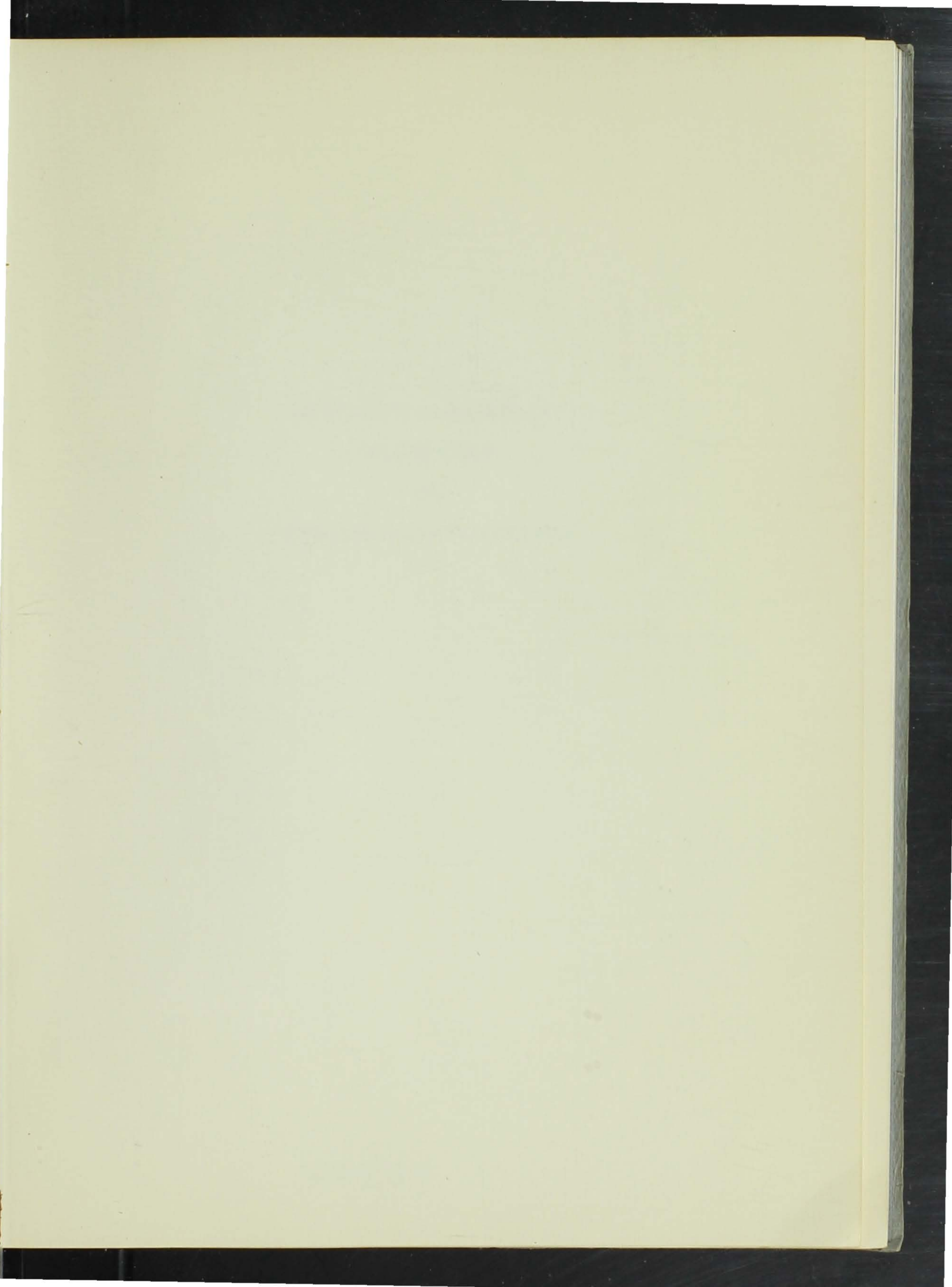
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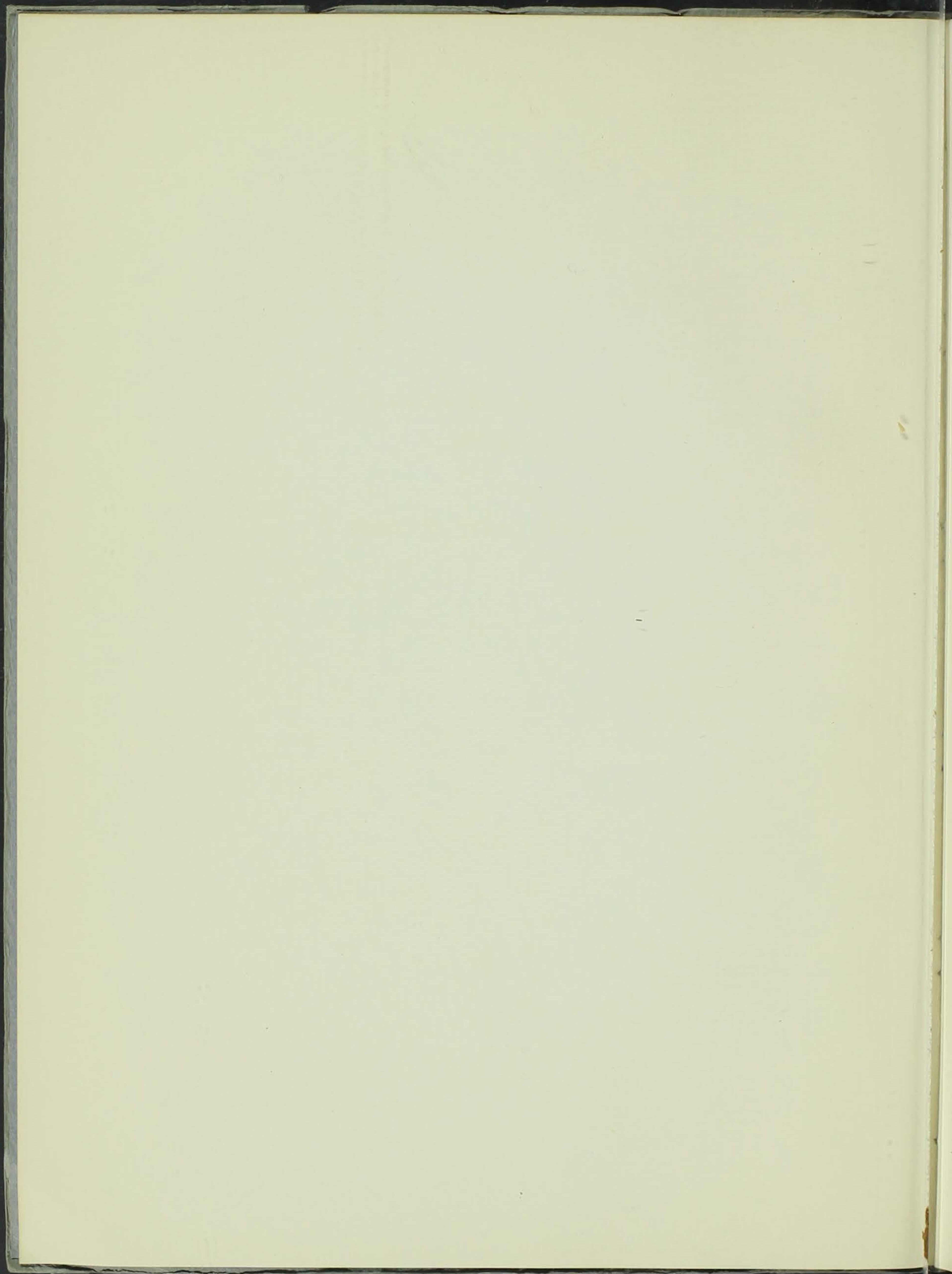










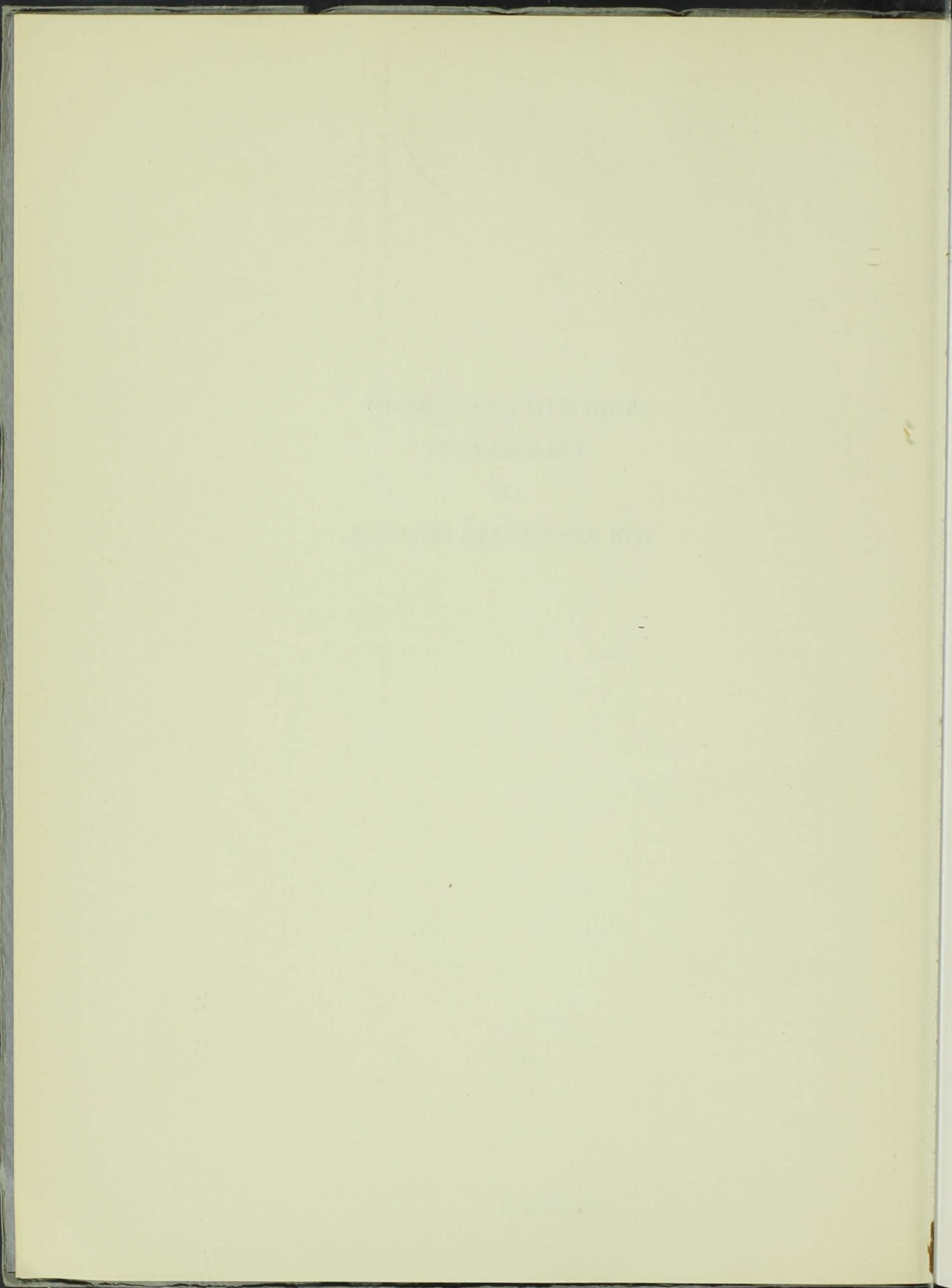




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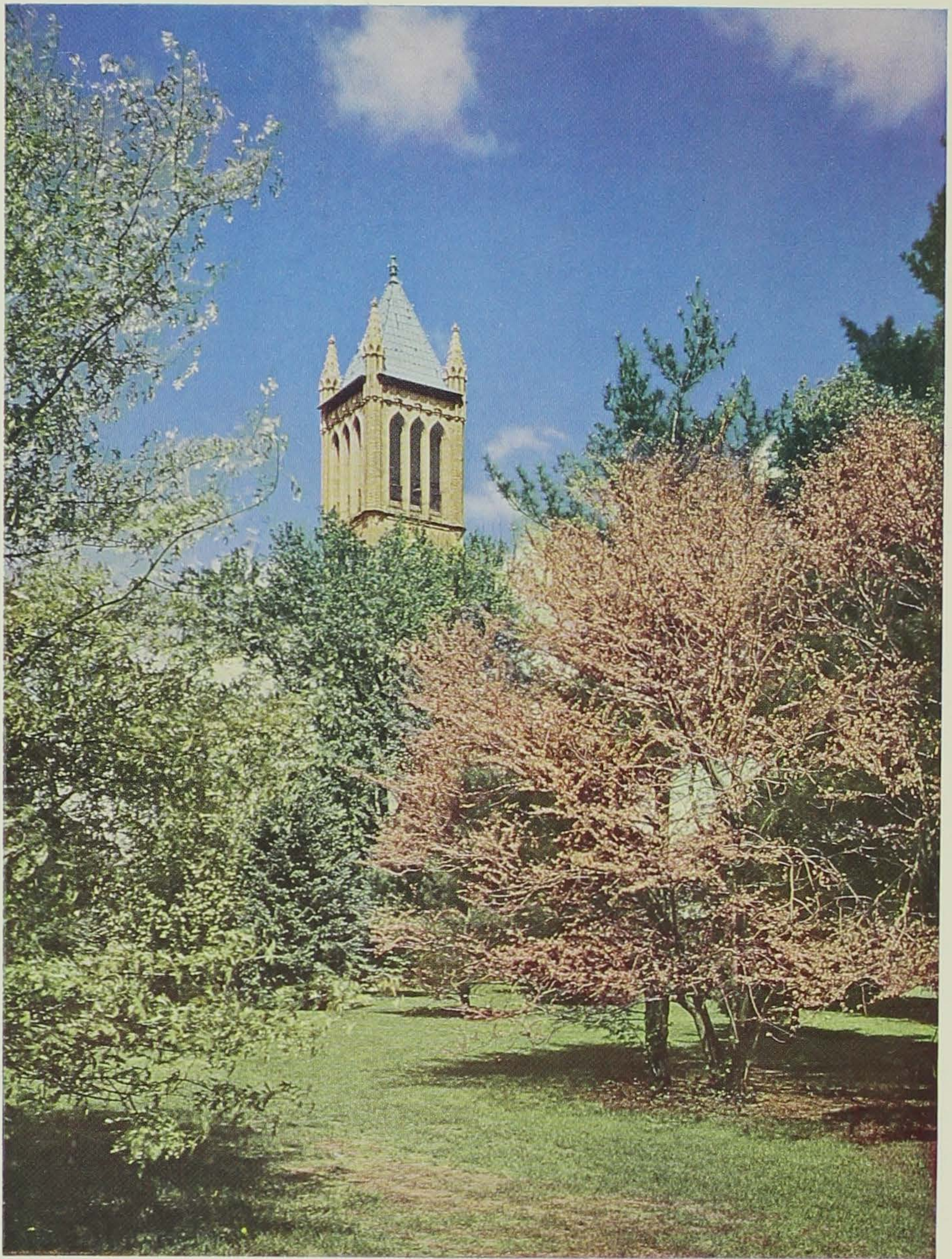














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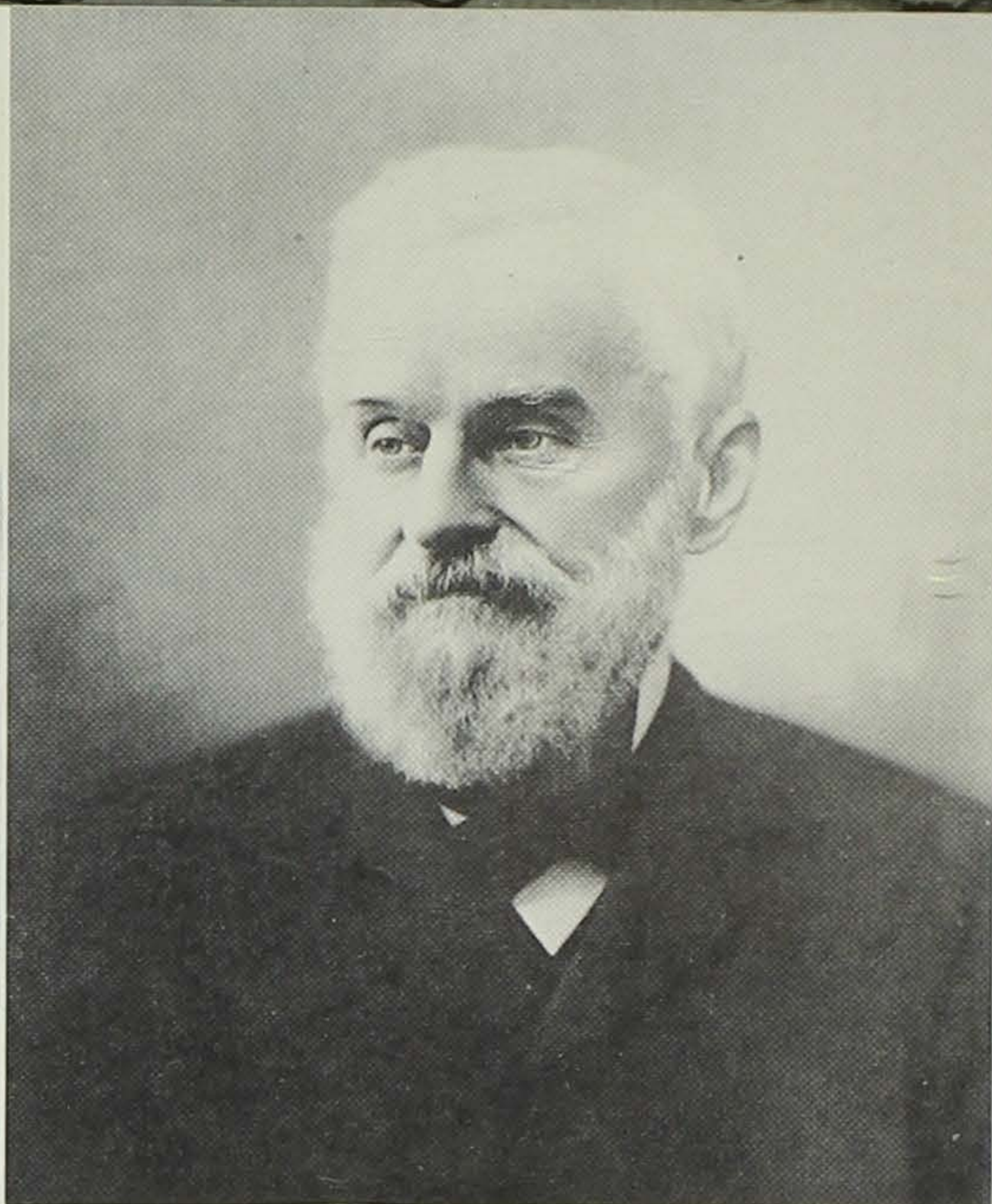
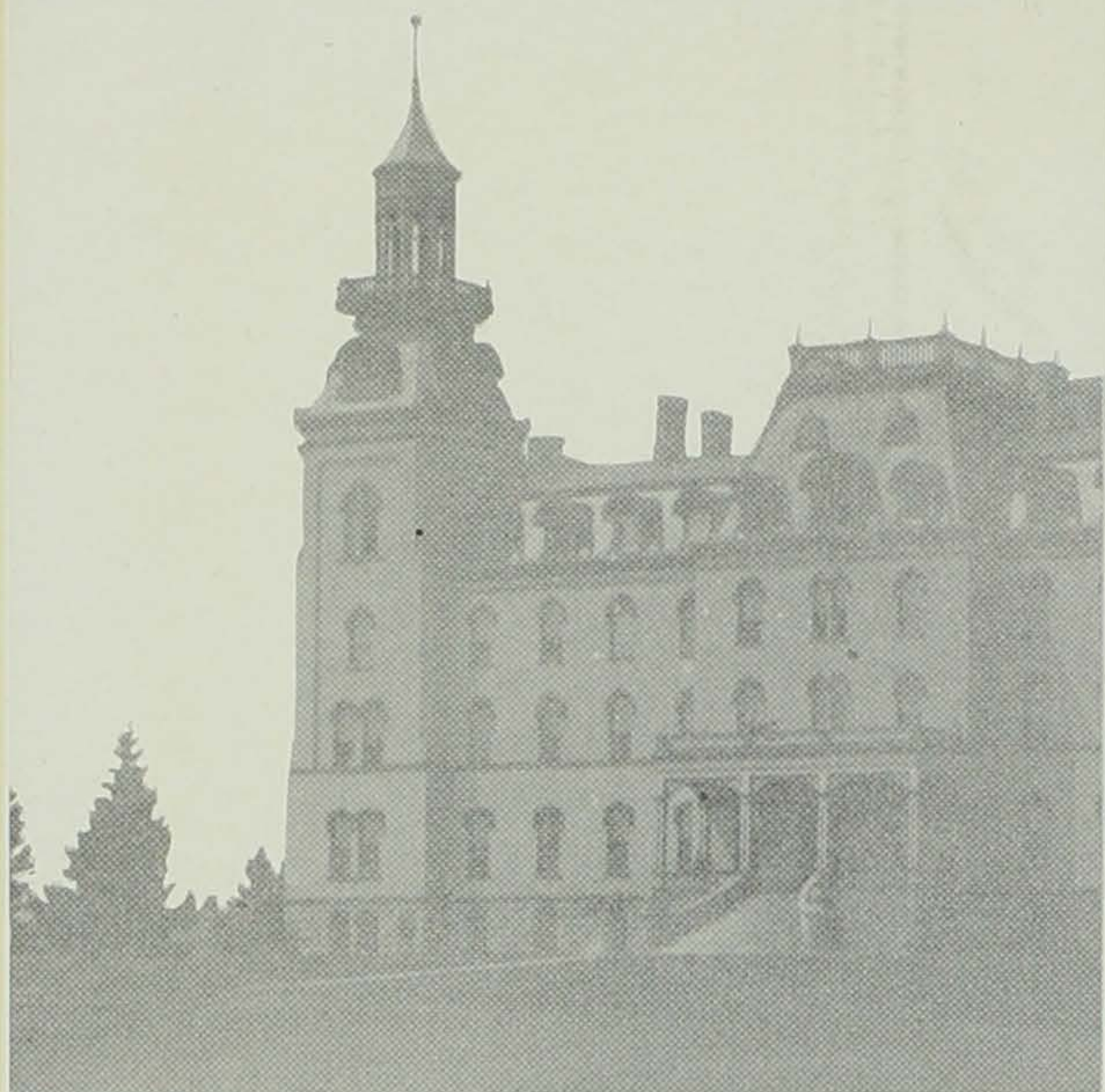
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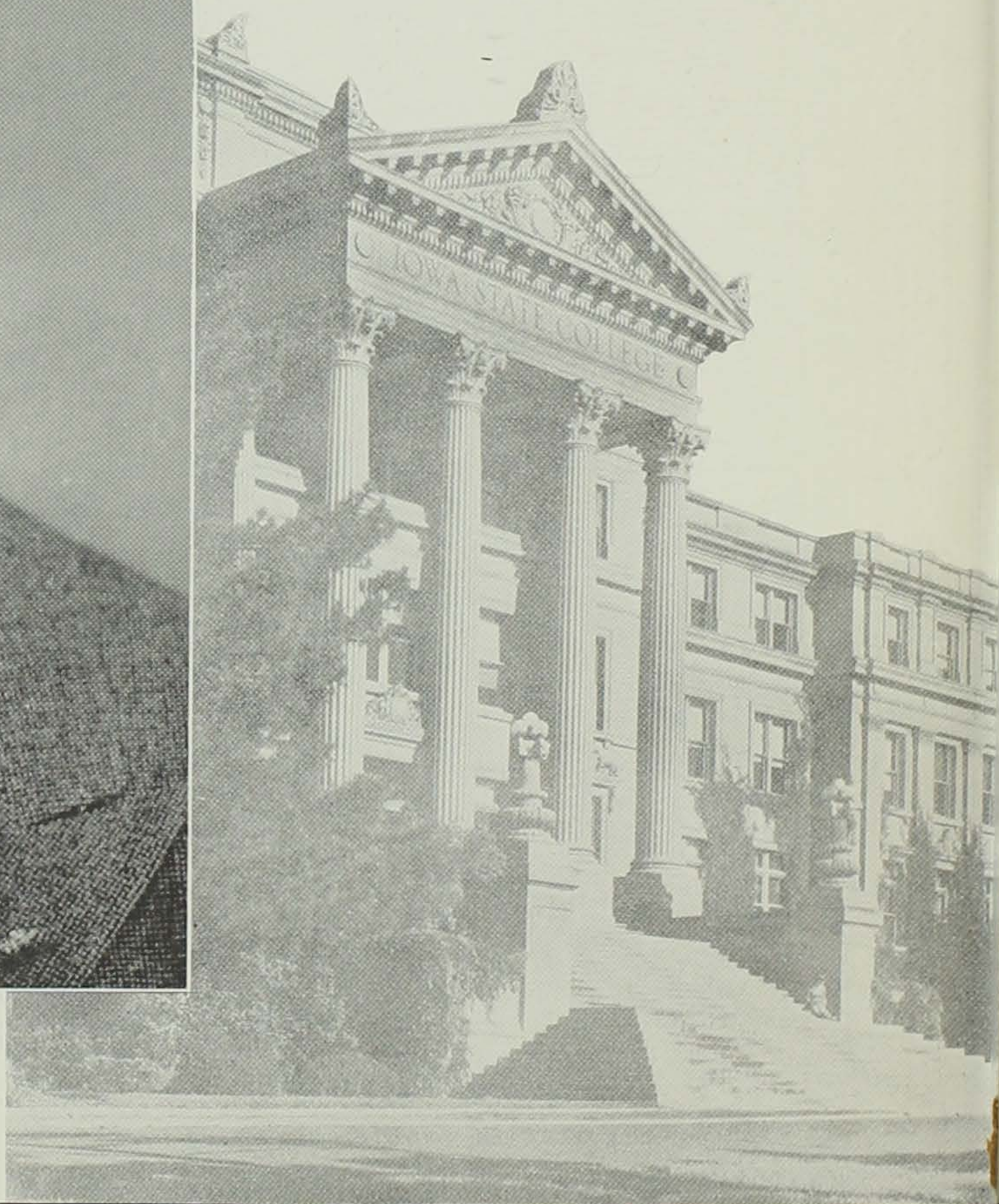




ADONIJAH S. WELCH  
*First President*



DR. CHARLES E. FRILEY  
*Today's President*





# F O R E W O R D

*By President Charles E. Friley*

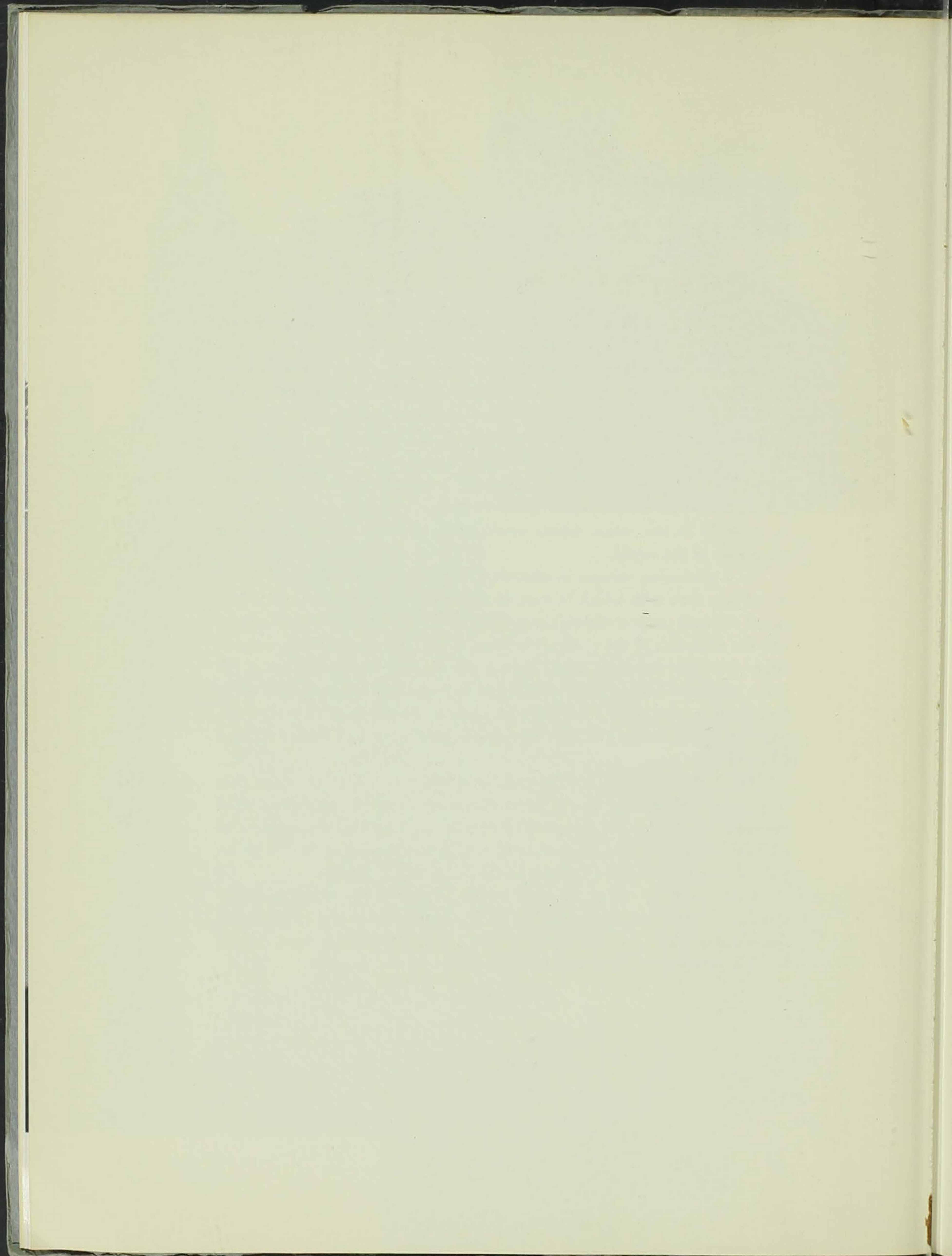
As history goes, 90 years is a relatively short time, but perhaps we may be pardoned for some modest pride in the achievements of those 90 years, particularly when it is recognized that the land-grant college was a pioneering adventure in education. Born in the threat and realities of civil strife, the Land Grant Act nevertheless was one of the most farsighted pieces of legislation ever passed by the national congress. It was based on an interesting and very significant philosophy—a philosophy which said in effect that the warfare of the future would be essentially commercial and industrial warfare, and that the nation which trains its young men and women in those areas would be the nation which would gain and retain supremacy among the people of the world.

As a pioneering venture in education it had its opponents, and of course it had very little with which to start. In those early days, there was little feeling of common purpose among the proponents of this new educational activity and the adherents of the classical tradition, and it apparently didn't occur to either that some day their tracks must meet. As one student has put it, "It was a long road before the physical began to rank with the metaphysical, before the man who knew what to do and how to do it was given recognition equal to that accorded the man who knew only what had been done and who did it."

Today the land-grant college and the liberal arts college recognize that they are complementary in the great system of American education. They are working together for the good of America and for the advancement of education in its broadest sense, because they recognize that there can be no jealousies or unwholesome rivalries in the realm of scholarship.

Quite naturally one of the most important tests of the work of any institution is the character and caliber of its alumni. It is highly gratifying that many distinguished graduates of The Iowa State College were present for this occasion and participated prominently in the program.







# The Opening Session

THE SOUTH BALL ROOM, MEMORIAL UNION  
MONDAY MORNING, MARCH 22, 1948



# AGRICULTURE ADVANCES HUMAN WELFARE

*By Dr. L. A. Maynard*

HEAD OF THE DEPARTMENT OF BIOCHEMISTRY, SCHOOL OF NUTRITION, CORNELL UNIVERSITY

Man depends on agriculture for his food and clothing, and for many other products for which farms and forests provide the raw materials. Agriculture has always done such a grand job in meeting man's essential needs that its accomplishments have been taken for granted. Thus, they have been far too little understood and appreciated. Over the years agriculture has advanced human welfare by stepping up its production to serve a rapidly increasing population. More important, it has provided this population with a food supply which has meant better health and a more productive and enjoyable life.

On the ninetieth anniversary of an institution which has played such an outstanding role in the development of agricultural science and practice for the improvement of human welfare, it seems especially appropriate to review some of the accomplishments. In so doing, it also seems fitting to consider the future role that agriculture can and must play in protecting and further advancing the well-being of man. Such are the objectives of this talk.

Agriculture begins with the soil. From studies starting with the parent rock, and covering the diverse chemical, physical and biological changes which characterize the soil as a dynamic system, the scientist has developed the principles which have been utilized to conserve its resources, step up its productivity and adapt its use to the changing needs of man.

The layman may be conscious of these contributions only in terms of the figures for increased yields or for the acres brought into production through irrigation. These achievements are the result of much more basic accomplishments. For example, fundamental studies which led to the development of the principle of ionic exchange in soils have made possible more accurate liming in terms of specific crops, better control of irrigation, and other improved practices.

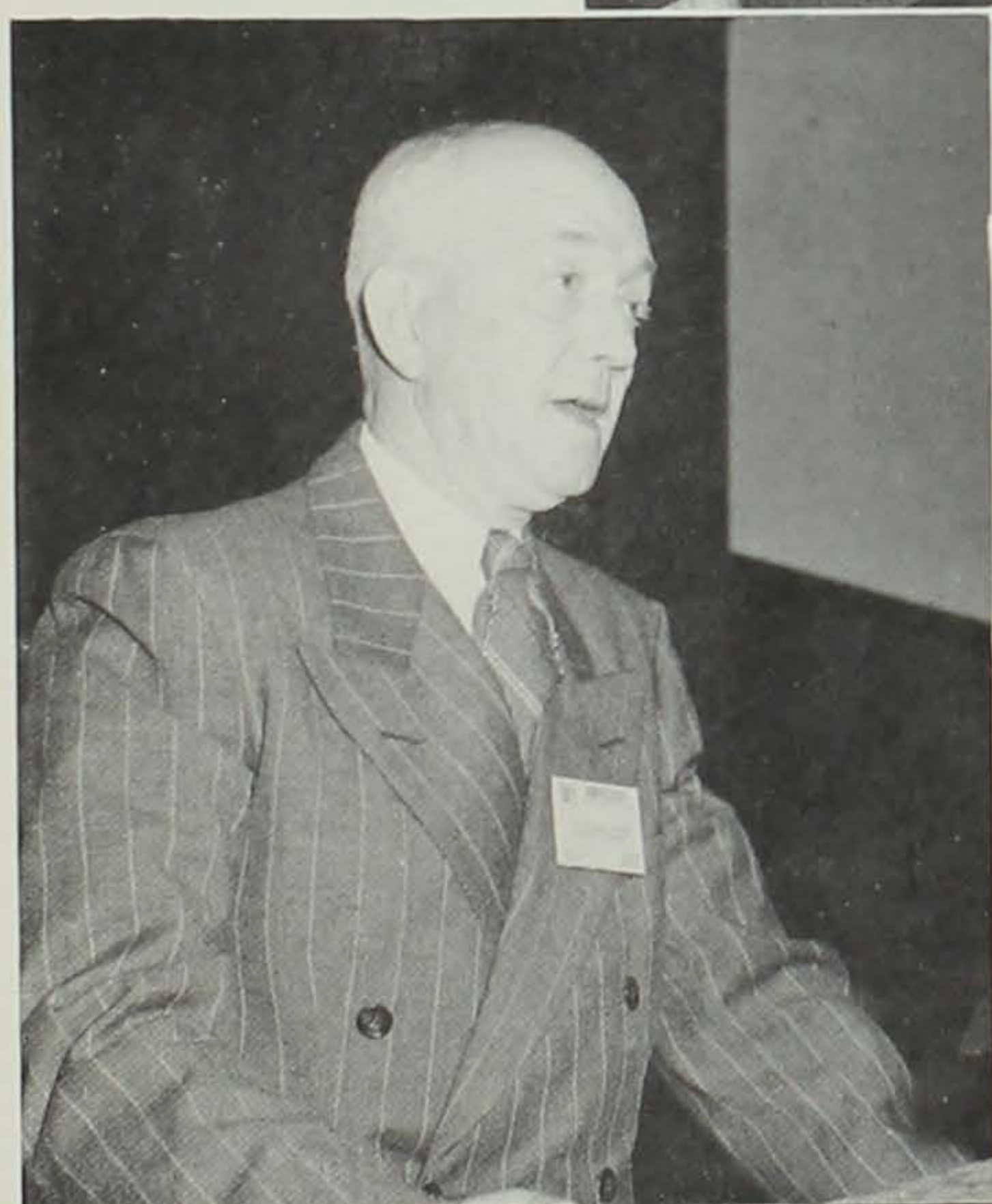
The soil investigator has always been a leader in using the latest techniques of science for the solution of his problems. Radioactive isotopes are now being employed to find ways of more effectively drawing on the vast stores of phosphate and potash in the subsoil for plant use, and of obtaining a greater recovery of nutrients added as fertilizer. This project, in which this college is cooperating, holds high promise for greater and more efficient production.

The developing knowledge of soils has been accompanied by equally important advances regarding crops for them. Here the science of genetics has enabled the plant breeder to develop disease-resistant, drouth-resistant and higher yielding crops.

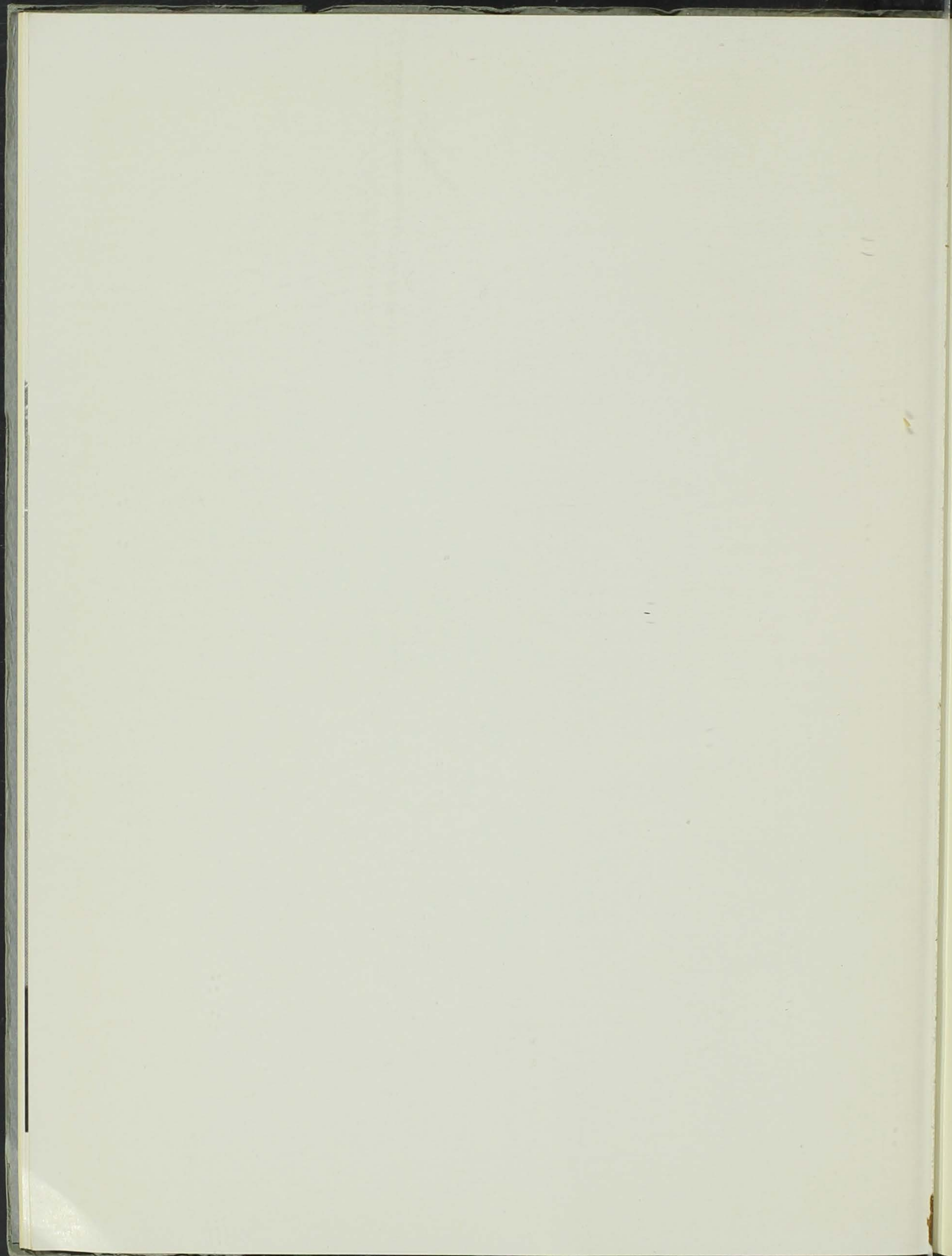
The story of the development of hybrid corn is an outstanding example of the accomplishments of agricultural science. It began about 1880 with crossbreeding studies at the Michigan Agricultural College. It continued with basic genetic research 30 years later at the Carnegie Institution and at the University of Illinois. Cooperative breeding programs in several experi-



Speakers at the Opening Session were DR. MARIE DYE (*right*); DR. WILLIAM H. FELDMAN (*below, left*); and DR. L. A. MAYNARD (*below, right*). In the center photo, the three guest speakers are greeted by DEAN H. H. KILDEE (*far left*); DEAN H. D. BERGMAN (*left center*); and DEAN P. MABEL NELSON (*far right*).









ment stations completed the story. Today, hybrid corn is adding hundreds of millions of bushels to our food resources, for it outyields open-pollinated varieties by approximately 25 percent.

Basic horticultural studies have contributed largely to the advancement of crop practices. It has been found that the growth, flowering and fruiting characteristics of many plants depend on variations in the length of day. The discovery of this principle has made it possible, through controlled greenhouse studies, to find the variety best adapted to day length and other conditions in a given locality. For example, onion varieties have been bred which will produce bulbs in a short-day region, others in a long-day region.

Studies by plant physiologists of hormones, and of growth regulators produced in the laboratory, have been responsible for such important practical developments as sprays for holding apples and pears on the trees until they are ready to pick, weed killers and others. Cooperative studies by the entomologist to find the most vulnerable point in the life cycle of injurious insects, and by the organic chemist to synthesize more effective killing agents, have made large contributions in maintaining and increasing crop yields.

The developments in soil and crop science and practice have been paralleled by equally important advances in the animal industry, which plays such a vital role in the diet and health of man, as well as furnishing him with many other products. Improvements in breeding, feeding and management, based upon discoveries in the underlying sciences, have greatly stepped up animal production and have lessened its cost. Here, as in the case of crops, cross-breeding studies have made significant contributions, as is strikingly illustrated by the swine experiments at this college.

Taking advantage of the knowledge gained in breeding experiments and in basic studies of the physiology of reproduction, artificial insemination has been developed and become a widespread practice for better and more economical production. For example, dairy farmers in New York saved nearly \$500,000 in feed costs and received over \$700,000 additional in milk sales in 1946 from the artificial insemination of 65,700 cows. Inevitably, the consumer benefits from developments which increase the food supply and lessen the cost of its production.

The animal nutritionist, through his pioneer studies of physiological needs and of the corresponding nutritive values in crops, early put the feeding of farm animals on a scientific basis. The animal industry has always been at the forefront in taking advantage of the discoveries of nutrition science, the better to serve man's needs for animal products. Of more direct service, the animal nutritionist has made many of the pioneer discoveries which have found application in human nutrition. It was the Wisconsin dairy cow experiment with single plants, carried out in the first decade of this century, which led McCollum to his purified-diet experiments resulting in the discovery of vitamin A.

Early controlled observations with grazing animals developed facts in the field of mineral nutrition applicable to man, as well as to livestock. The chicken has played a large role in vitamin discoveries, including the latest one, folic acid. It is doubtful whether vitamin



K, which is so important therapeutically in the prevention or control of certain hemorrhages in man, would be known today were it not for the chicken experiments responsible for its identification.

One only has to read the current literature in human nutrition to realize what a large role farm animal findings are playing in advancing the knowledge in this field. It is greatly to the credit of agriculture that its livestock experiments are now being conducted on such a fundamental basis and with such a broad outlook as to contribute so greatly to the knowledge of human nutrition as well. In fact, the farm animal experiments prior to the present century were forerunners of many of the developments in the human field. In his first report as director of the newly created Office of Experiment Stations, Atwater, who is regarded as the father of nutrition science in this country, stated: "In studying the foods of animals we have no right to neglect the foods of man." In this country, many land-grant colleges of agriculture were advancing the cause of human nutrition and health in the early days when most medical schools were interested merely in the cure of disease.

The advances which have been made in the fields of soils, crops and animal industry have proved particularly useful because they have been integrated to serve agriculture as a whole. Their applications have been guided by studies of the economics involved all along the line from the soil to market.

In developing the knowledge and techniques which have resulted in increased and more economical production, agriculture has become conscious of its responsibility to conserve its basic resources. Thus, soil, forest and range conservation measures are being practiced to ensure a better living tomorrow as well as today. Land which because of its character and slope is subject to erosion is being turned back to grass. Steps are being taken to maintain a grass cover on semi-arid lands, the soil of which otherwise blows away. It has become recognized that livestock provide the best medium for utilizing such land and also for maintaining its fertility. Similarly, forest lands are being conserved for timber use, watershed services, recreation and wildlife production.

The problems involved in establishing the best conservation practices are enormous. Much more research needs to be done to work out the required procedures. Public understanding of its vital interest, which will in turn result in the necessary support for the research needed and ensure the actual accomplishment of the measures called for, is essential. Agriculture cannot do the job alone. It is clear that the present changing pattern of land use in the interest of conservation needs to be greatly accelerated. All other agricultural advances can be of only temporary value if our basic land resources are not conserved.

Agriculture has not been solely concerned with the tons of food crops and livestock which it might produce. Conscious of the importance of nutritional quality, recent experiments are giving active consideration to the production factors which influence the specific nutrient content of basic food crops, and of livestock products as well. In many instances the plant breeder is now considering nutritive value as well as yield and market quality in developing new varieties and strains. Success has already been achieved in the case of cer-



tain vegetables and fruits in developing new varieties which are richer in vitamin C, for example. Progress in this general area is necessarily slow, but the results to date indicate clearly that important contributions to human welfare will result if there is adequate support for the necessary basic studies. Similarly, various environmental factors are being systematically explored. Light intensity is an example of a climatic factor which has been demonstrated to be of large importance in nutritional quality.

Soil factors are clearly of great significance, particularly in terms of the minerals of practical concern in human and animal nutrition. It has been amply shown that fertilization and other factors of soil management widen the choice of crops which can be grown on many soils. The opportunity is thus provided for the introduction of those of higher nutritive value accordingly. Several mineral deficiency troubles in animals have been traced directly to corresponding soil deficiencies which were reflected, in turn, in the forage produced thereon. It was through correlated soil, pasture grass and animal studies that cobalt deficiencies, previously responsible for hundreds and thousands of animal deaths, were identified, and corrective measures established. It was amazing to learn that as little as one-tenth of a milligram of cobalt daily, an amount which could be held on a head of a pin, could make the difference between life and death in sheep.

Correlated studies of the soil and other factors responsible for the wide variability in the content of various nutritionally important minerals in food crops are actively under way. The possible influence of these factors on the organic nutrients, such as protein and vitamins, is also receiving attention. Interrelationships between soil type, location and the nutrient content of specific food crops have been definitely established.

We have also learned, however, that the problem of attaining the desired objective is too complicated to be solved merely by fertilizer additions. A very large amount of detailed experimental work must be carried out before the dominant factors concerned can be established, and the extent of the practicability of controlling them to improve nutritive value can be assessed. It is of real significance, in terms of human welfare, that agriculture is giving active consideration to these problems and that, in the development of soil conservation programs, attention is being directed to the conservation of the health of people as well.

Agriculture's interest does not stop with production. It follows its products to the consumer's table through studies of processing, storage and marketing, to conserve nutritive value and palatability.

In recording the accomplishments of agricultural research, it must be recognized that the teaching and extension activities of our land-grant colleges have been primarily responsible for making these accomplishments actually serve human welfare. Students trained in these colleges translate the research results into practice on farms and in industries concerned with agriculture and its products. These findings are continually carried to farmers by the Extension Service. Thus, the land-grant college, aided by the U. S. Department of Agriculture, is the vital link in agriculture's service to human welfare.



In these times when we are so conscious of the world's need for food, the question frequently arises as to whether the food supply can keep pace with population increase, even in this country. Here one enters the realm of speculation. Certainly, however, agricultural science has developed the facts which will enable us to feed many more than our present population, if the need arises. The increased use of lime and fertilizer, better cultural practices, land reclamation through irrigation and drainage, better seeding mixtures and other means are at our disposal now. It has been demonstrated that eastern hill land now abandoned because of low productivity can be made to yield abundantly. The costs involved, however, make this production uneconomic at present. In the case of hunger the cost of food production becomes less important. It may be expected, however, that new discoveries in agricultural science will contribute to the economy of production as well as to output. Duplication in other fields of such outstanding developments as hybrid corn and artificial insemination is certainly possible.

By contrast, agriculture, as it looks ahead, has some concern lest its scientific achievements may have already overdeveloped the capacity to produce, in terms of normal market demand. Here lies a problem with which the public at large, as well as agriculture, must be concerned. If agriculture shoulders the job of developing the productive capacity required to provide all the food called for at the peak demand, then the problem thus created if the demand falls suddenly and markedly must receive public consideration. Technological developments in agriculture cannot be throttled down at will. In order to make sure that man has enough to eat, a factor of safety for bad weather and other limiting variables must be planned for. Surpluses are infinitely better than hunger, but surpluses create problems for the farmers. We now realize that agriculture, in continuing its wartime production, has provided the best bulwark for world peace. Certainly, people of the world need any surplus production we have, and we should find ways of getting it to them.

Irrespective of world demand, it should be our national policy to maintain our present food productive capacity and to orient it in the direction which will best serve our needs. First of all, such a policy is called for in the interests of national defense. In a world situation which compels us to spend billions for military preparedness we must not forget the vital role of food. We must make sure that our capacity to produce what may be needed is not impaired. If some government expenditures are required to keep us prepared on the food front, as well as with guns and bombs, it would be folly not to make them.

For the hoped-for years of peace, the maintenance of this capacity is equally important as a sound and constructive policy, in contrast to the destructive measures of the thirties. Such a program, properly oriented, will improve the nutrition, health and productive output of our population and will also contribute to the prosperity of our agriculture and to the stability of our entire economy. The orientation of our productive capacity particularly needed is the maintenance of our animal industry at a high level. This industry provides the foods which are both most nutritious and the best liked. A liberal supply, at a cost that is reasonable in terms of consumer incomes, thus makes dietary and health improvement



almost automatic. An expanded animal industry can help absorb crop surpluses, and thus contribute to the prosperity of agriculture generally. It will promote soil conservation and thus the maintenance of our productive capacity. It will provide the best form of food reserve as insurance against scarcities in peace or war.

In this talk, the achievements of agriculture have been reviewed, not merely to recount its services to mankind. An equally important objective has been to state the case for the continuing and increasing support of the agencies responsible for its accomplishments. There must be a broad, public understanding of the complicated problems agriculture faces in protecting and improving human welfare in the future. The basic research required to solve these problems must have adequate public support, irrespective of the uncertainty of the practical applications. Basic research can establish the principles which are then available for application when needed. It cannot hope to provide the answers overnight after a critical situation has actually arisen. The agricultural scientist must be encouraged to keep eternally searching for more of the truth. The resulting discoveries and their applications must become widely known and widely practiced. Here, strongly supported and effective teaching and extension agencies become essential.

The service to all will be greatest if there is a full understanding of the mutual interests of agriculture and the public at large. Consumers must depend on agriculture for food and clothing. Agriculture must depend on consumers for its market. Both have their legitimate interests and special problems. Groups and blocks, whether of labor or industry or farmers or consumers, must be willing to forswear pressures for short-time individual advantages which will work against the good of all in the long run. In this spirit will human welfare be best served.



# THE GROWTH AND DEVELOPMENT OF HOME ECONOMICS

*By Dr. Marie Dye*

DEAN OF THE SCHOOL OF HOME ECONOMICS, MICHIGAN STATE COLLEGE

## *Introduction*

From the beginnings of life at the human level almost until our own time, the family and woman's responsibility in it and for it were taken for granted. Dimly and then more clearly, man—or woman—began to see that here were focal points in society that could well be studied and perhaps controlled and improved. A new field of learning arose—home economics. Webster defines it as "the science and art dealing with homemaking and the relation of the home to the community, etc." Certainly the purpose of home economics is the strengthening of home and family life in present-day society.

During the last century it has developed a body of subject matter, educational plans and procedures at all levels and a small research program. The greatest progress in women's education during this time has been in schools of home economics in the colleges and universities. This is a demonstrable fact and yet little recognition is given to it. For example, home economics introduced a new field of learning based upon the interest of women and planned its curriculum toward the development of the individual.

The purpose of this paper is to present briefly the place at which home economics is now, and then to discuss some of the changes that will foster its future development, particularly in the land-grant colleges. Today, home economics stands at the cross roads; because it touches so many fields, strong leadership and critical thinking are essential for its sound growth.

## *Present Status of Home Economics*

Home economics at present has a broad educational program, offers challenging opportunities for employment, has made progress in research and has established a strong professional organization. The educational program starts in the elementary and secondary schools with courses in home and family life for girls and in a few cases for boys. Work in special areas is offered in the vocational schools. Now the expansion of these programs in the schools is limited for the most part by the lack of teachers of home economics.

Since the establishment of the first work in home economics at the college level at Iowa State College 75 years ago, great progress is evident. The number of institutions giving bachelors' degrees has grown from one to approximately 400. In many of these degrees are granted not only for teaching in high school but in special areas such as foods and nutrition, institution administration, dietetics, child development, family life, home management, clothing and textiles, related arts and household equipment. For over 35 years



the master's degree has been granted in many of these fields at a number of colleges and universities and for some 25 years the Ph.D. has been offered in a few of them.

Because home economics is a broad field touching many areas of learning, the curriculum for the past 20 years for most undergraduates has included basic requirements in the social, biological and physical sciences. One of the still unsolved problems in this connection is having these introductory courses presented so that they give an understanding of the subject and its relation to the needs of people rather than serve as first courses in a series arranged for students majoring in that subject. It is interesting to home economists in reviewing the objectives for general education and the core curriculum patterns outlined by Harvard, Yale, Princeton, the University of Chicago and a number of state universities to find a basic core so similar to the one required for some time in the home economics curricula. The major difference is in the emphasis in general education on the humanities and some of the social sciences and the development of special courses covering fields of learning rather than subjects.

In another type of education, that planned for adults, home economics has an extensive program. This has developed largely through the cooperative Extension Service of the United States Department of Agriculture and the land-grant colleges. Thousands of farm women and girls receive help through this work each year. In the public schools the homemaking teacher has classes for adults. Through radio programs and publications home economics reaches a still larger group.

The training that students receive in the schools of home economics prepares them for many kinds of positions. Teachers are needed in the elementary, secondary and nursery schools and in schools of home economics in colleges and universities. The Extension Service in home economics in all states employs many specialists and home agents. Dietitians for hospitals and managers for food service in schools, dormitories and restaurants are employed in large numbers. Sales promotion work with various industries and merchandising offer openings to many others. A few home economists enter research or journalism. That the home economist has been successful is indicated by the large number of requests that come for additional graduates.

Although a little research in home economics was done between 1900 and 1925, the amount has increased greatly since the passage of the Purnell Act. The most extensive programs have developed in the land-grant colleges where federal and state grants to the agricultural experiment stations have provided funds. The interest and support of the directors of the experiment stations have made this possible. Large programs have been developed in foods and nutrition, and a start has been made in textiles, home management, family economics, housing and equipment. Through vocational education funds, grants from other sources and work of graduate students some research is being conducted in all fields of home economics.

The largest program of research in home economics is that of the Bureau of Human Nutrition and Home Economics of the United States Department of Agriculture. It covers



many fields of home economics and is extensive. The Bureau has pioneered in developing new tools and methods of research. The problems which it is now studying indicate the importance of the work:

The collection and analysis of facts as to the quantities of different foods and other goods and services consumed by families in various regions and economic groups; the factors affecting consumption and an evaluation of their adequacy.

Studies on the nutritive contributions of different foods to the diet, the nutritional requirements of people and how these facts may be applied to families.

Studies on the comparative usefulness and cost of fabrics and garments that differ in material, construction, design and finish, to help the consumer in her selections of these items.

Studies of housing and home equipment needs of families for efficiency and comfort.

The research of the Bureau is of great value to home economists and to the 32 million homemakers of this country.

Another development in home economics has been through the establishment of professional organizations. The American Home Economics Association, founded in 1908, has a membership of 18,000 and affiliated associations in 47 states. A publication of high quality, the *Journal of Home Economics*, serves the profession well. The Consumer Education Service has contributed to the growth of the consumer movement. Since 1930, the Association has encouraged students from other countries to study at American universities through the granting of scholarships. It has pioneered in the organization of youth groups for high school and college students.

A second professional organization for a group of home economists is the American Dietetic Association. Founded in 1917, it now has a membership of 8,000. Its Journal is rated high by people in closely allied professions. The American Dietetic Association has been and is striving to strengthen the training that student dietitians receive in hospitals and to improve the working conditions of its members.

#### *Future Development of Home Economics*

How will home economics develop in the future? Where should the emphasis be placed? What are some of its greatest needs and what opportunities are there for its growth? These are the questions which are to receive primary consideration today. In discussing the development in home economics the suggestions will be centered on but not entirely limited to growth in the land-grant colleges.

What is the function of the school of home economics of a land-grant college in a state? How can it be more effective in promoting better family living among all groups? A school of agriculture is responsible for the educational and research program at the college including the training of high school teachers in agriculture, providing the Extension program for farmers and advising with industry on problems related to agriculture. Home economics does not have a unified program in most states. Frequently teaching, research



and extension are administered in different departments and have little correlation. A type of organization within the college that fosters a unified program in home economics will help promote its development.

To plan a well rounded program for all homes of the state, a school of home economics needs to have information about the families and their problems. It should make these facts available from time to time to all college and high school teachers and to extension workers. The type of information needed is similar to that prepared for the outlook conference held by the Cooperative Extension Service of the United States Department of Agriculture to help the Extension specialists in home management and farm management. It should cover the many aspects of family life such as housing, health, the divorce rate, juvenile delinquency and income trends. What group if not the schools of home economics in land-grant colleges should supply information on homes and families to be used in developing a state-wide program in home economics?

The educational program in home economics at the land-grant colleges may well continue to develop in the three ways it now functions: namely, for undergraduate students, both majors and non-majors, for graduate students and for adults. However, there are aspects of each phase that need to be reconsidered and changed if progress is to be made. A few of these will be presented.

Curricula for undergraduate majors in home economics should be critically reviewed. It is the practice in the larger schools of home economics to offer bachelors' degrees in several major fields such as dietetics, teaching in high school, clothing and textiles, and child development. For all majors there is a common group or core of required courses. These "core courses" include the requirements for general education and those courses in science and arts necessary to give the background for work in home economics. In addition, the "core" includes courses in the various fields of home economics which are basic to an understanding of home and family life. In view of the evident need today for more and better informed citizens, the general education requirements may well include additional work to give this important knowledge. While the training for the professional fields in home economics is important and high standards must be maintained, such training should not be at the expense of general education in non-home economics and home economics fields.

As indicated earlier in this paper, many universities now require a unifying core of studies to provide for all undergraduate students a broad general education. This includes work in the social and natural sciences and the humanities. The home is basic to the American way of life, yet very little if any recognition is given to it in these programs. Why is it not important for all students to recognize the unique place of the home and have some training in those fields of home economics which make significant contributions to better family living?

In addition to this contribution which home economics can make to the education of all students, the school should offer many elective courses for non-major students. Schools of equal size, judged by the number of major students, vary in the number of non-major



students electing courses at one time from 30 to 650. Many have been so busy teaching major students that they are failing to meet their obligation to other students. The junior or community college offers an opportunity to home economics to develop a challenging program for the two-year student.

Curriculum is not the only factor that is important in college education. In home economics as in other subjects, more effective teaching stimulates learning. Particularly, there is need for improved methods of teaching the skills and appreciations. Perhaps in addition too long a time is spent in laboratory courses in home economics and the sciences in relation to the learning that takes place.

It is becoming increasingly evident that home economics is not alone a woman's field. In a few schools some of the faculty are men. In several the number of men majoring in home economics is growing, and in many the number of men electing courses is increasing rapidly. Thus in the future, better plans for the men will be needed.

The graduate as well as the undergraduate program can be improved. One of the most important fields of development in home economics is that of the graduate work. There are no easily accessible data on the number of masters' and doctors' degrees granted each year, but the dearth of people to fill the available positions is proof that the number is too small. Many colleges and universities offer the master's degree in several fields and a few grant the Ph.D., largely in foods and nutrition. Only three or four give this degree in family economics, family life or textiles. Because of the small number of universities granting doctors' degrees in home economics, people have to take the degrees in a related field. This has been the practice for some 40 years. Now in many fields of home economics there has been developed a sufficient body of subject matter and a thorough research program to merit the awarding of home economics degrees in more universities.

The graduate work, especially at the doctorate level, must be of high quality. In the words of the report of the President's Commission on Higher Education, graduate work should give "broad scholarship and special competence. The basic work in the major field should include knowledge of the history of the field, understanding of the most important theories and principles, mastery of a substantial body of subject matter and competence in the working tools needed to extend knowledge." With these standards home economists agree. Training in the tools and techniques of research is of fundamental importance to further progress in all fields of home economics. The development of an inquiring attitude to enable the student to recognize as well as solve problems is essential.

The need for training in teaching for a college faculty is evident to every administrator. The graduate student who expects to do college teaching should study the techniques of curriculum building, of evaluation and counseling and have some skill in transmitting knowledge to others. The suggestion of the President's Commission that colleges and universities develop an internship training for both college teachers and research workers may be put into practice. These internships should aim at developing greater competence in teaching or research than is possible in the typical graduate assistantship. This kind of in-



ternship with half time or more devoted to teaching under guidance is possible in many of the larger schools of home economics where there is training for the Ph.D.

In addition to these formal educational programs, home economics has an extensive adult one through the Extension Service. The goal of reaching every farm home is still a long way from being met. The programs for the rural women and girls should be broader and planned to meet not only the immediate problems of the families but also some that affect the community.

Schools of agriculture are expected to be of service to all farms in the state. Similarly, schools of home economics can be expected to be of service to all homes of the state. A major advancement for home economics in land-grant colleges in most states will be through the expansion of this Extension Service to urban homes. New York state for years has had home agents in some cities, but few other states have made even a beginning in this way. In part this has been due to the lack of funds and the shortage of personnel. New programs and methods adapted to the various kinds of groups found in cities may of necessity introduce changes in the extension procedure.

In addition to the extension programs, schools of home economics have an opportunity for other services to women of the state. The number and kind of conferences and short courses held at the college can be expanded. During the summer most institutions have facilities for conferences of a week or short courses of several weeks for women. Some of these should be planned for college graduates in home economics and other fields who wish to continue their education for personal reasons.

The educational program, important as it is to the growth of home economics, does not rank first in importance. In the future development of home economics the two factors which will have most influence on its direction and quality are the scholarliness and quantity of the research and the type of faculty in the colleges and universities. Since home economics is a relatively new area of learning, the amount of research that has been done is small and limited to a few fields. The financial support of research through federal and state appropriations, now largely devoted to work in foods and nutrition, should be extended to other fields and the sum increased. The amount of money available to research on problems related to the home represents a very small part in the budget of many institutions. Until there is provision for extensive research in the less well developed fields, home economics cannot grow. These provisions should include suitable facilities as well as time for the faculty to do scholarly work.

While foods and nutrition are well developed fields and have the most support from allied sciences, there are many unanswered questions even in these fields. For instance, the seemingly simple but important topics of what are the dietary requirements for optimal human nutrition at all ages or what methods of preparing foods should be used to maintain nutritive value and good taste cannot be completely answered. Many problems related to the preparation and service of food to large groups of people also need to be solved.

In textiles the consumer is dependent on what is on the market and except through



trial has little to guide his choice. Studies should be made to determine the variations in service of the various fabrics and, still more important, to help in the development of new ones that will better suit the needs of present-day living. Closer cooperation between departments of textiles and clothing and industry should be mutually advantageous.

Clothing consumes a significant part of the family budget and is significant in giving social status. Little is known about clothing consumption patterns, or whether clothing can contribute to or hinder the personal and social adjustments of the individual.

The house has an important place in the well-being of the family. Home economists should know the housing needs of families of different size and composition—these needs to be evaluated in terms of family relationships, convenience and cost. The furnishings and equipment for homes should be studied in terms of appearance, comfort, convenience and cost.

If agreement can to some extent be reached on what are good home management practices, there is no accurate knowledge of the effect of any kind of managerial practices on family members or their relationships. Together with social scientists, home economists need to study the factors that affect the stability of families, make the home a good place for children and bring deep satisfaction to adults.

These examples illustrate problems for study in the various fields of home economics. In many cases the tools and techniques for research must be developed. Many of the problems are large, and progress will be slow even with liberal financial support.

It cannot be too strongly emphasized that in the end the development of home economics in the years ahead will depend upon the people who staff the schools in the colleges and universities. The report of the President's Commission on Higher Education states that "the qualities the individual faculty member should possess include sound scholarship, professional competence, a clear concept of the role of higher education in society, broad humanistic understanding, lively curiosity, a sincere interest in research, insight into motivation, and a sympathetic, intelligent understanding of young people." This statement is a challenge to every home economics administrator. Certainly the faculty should be as well qualified as the faculty in other schools. The Commission recommends a minimum of three years of graduate training for all college and university faculty. Schools of home economics must as rapidly as possible obtain staffs that meet this standard.

The shortage of staff even inadequately trained is acute. Present faculty must be encouraged to continue their education through the usual means of leaves of absence, summer schools and in-service training. A program of recruitment for college home economics faculty to attract the most promising people should be started at once through institutions, professional associations, high schools and youth organizations. Additional staff may be recruited from other fields by interesting able people through the granting of scholarships and fellowships for graduate study.

To attract more persons to the field, the advantages of college teaching and research in home economics as professions especially for women need to be more generally recognized.



There are very few positions that offer equal or better opportunities for independent work, for intellectual challenge in the development of fields of learnings or for professional advancement. There are more administrative and leadership positions open to women in home economics than in any other subject-matter area.

To assure the increase in the training of the present staff and to attract additional able staff, working conditions must be made attractive through adequate salaries, provisions for personal and professional security, opportunities for effective work, reasonable teaching loads, good facilities for teaching and research and an opportunity to participate in decision making in the school. No limitation on employment because of marital status should be permitted.

As indicated earlier, the training of home economics faculty in the graduate schools should be thorough and so stimulating that continuous professional growth will be assured. A plan to train home economics administrators would be helpful in improving the quality of administration and in supplying the many vacancies that occur each year.

Another major problem facing home economics is the number of students receiving bachelors' and advanced degrees. The demand for home economics graduates has been increasing for some years and the rate was further accelerated during the war. While data on the total number of positions that are open are not available, all information indicates a great shortage of personnel. The American Dietetics Association had listed 680 openings at one time. Every state needs more extension workers and high school teachers. Many colleges have teaching and research positions that have not been filled. With the increased enrollment in students needed to fill positions, and the opening of community colleges, the demand for college faculty will increase. Business concerns are using more and more home economists.

Counselors, high school students and their parents must be informed about these opportunities in home economics so that enrollment may be increased. Many more undergraduate as well as graduate students should enter all the fields of home economics if the positions are to be filled. To attract the more able students scholarships and fellowships may be necessary. The recruitment is and will continue to be a serious problem for home economics because it is largely a woman's field and marriage continuously depletes the ranks of the profession.

Courage in facing unsolved problems as they arise and accepting new and different solutions of old problems will make for progress in this important and unique field of education—formerly and still primarily a woman's field but with growing implications of importance for all family members including men and children.



# VETERINARY MEDICINE: GUARDIAN OF HUMAN AND ANIMAL HEALTH

*By Dr. William H. Feldman*

THE MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH, ROCHESTER, MINNESOTA

It is a great honor to participate in the program arranged for this historic occasion. The contributions that Iowa State College has made to the betterment of agricultural America have amply justified the faith of its founders. The enduring greatness of this college is based on the unstinted devotion of those men and women who for 90 years have constituted the faculties.

As a member of the faculty of a sister institution, it is my pleasant duty to convey to you warmest greetings and congratulations from Dr. Victor Johnson, Director of the Mayo Foundation of the Graduate School of the University of Minnesota.

Today much of the world's population, outside of the Western Hemisphere, is hungry. To insure adequate nutrition for our own people and provide lifesaving and morale-building food for those less fortunate, we must keep our livestock healthy and reduce preventable losses to a minimum. This is a formidable task. Our livestock industry is of prodigious size. It provides food for millions of people and is the means of livelihood for millions of farmers and others associated with the care, handling and selling of animals. Yet the well-being—in fact the very existence—of these indispensable resources is at all times dependent on the ability of man to combat successfully the constant menace of disease. Animal husbandry without the benefits of modern veterinary services would be as hazardous as undertaking a major military campaign without the services of the Army Medical Corps. The consequences would be equally catastrophic.

## *The Development of Veterinary Medicine*

Medicine may be defined as the science and art pertaining to the prevention, cure or alleviation of disease. Veterinary medicine is that branch of medical science that deals particularly with the diseases of animals. However, veterinarians and physicians are fundamentally concerned with identical problems: the diagnosis of disease, its treatment or alleviation, and its prevention and control.

In the pursuit of his professional activities, the veterinarian functions in four distinct though somewhat overlapping fields: (1) administering to sick and injured animals, (2) protecting the livestock industry against losses from infections and parasitic diseases, (3) investigating problems of basic importance to the medical sciences and (4) protecting the public against diseases of animals that are communicable to man.

With each passing year it becomes more apparent that all branches of the medical sciences are definitely related and that each is an important and vital part of the whole. If mankind is to obtain the greatest benefits from modern scientific accomplishments, the in-



correlation of human and veterinary medicine must be more widely recognized and intensified.

Veterinary medicine, as it applies to the treatment of sick and injured animals, had its beginnings in antiquity. The study of the anatomy of animals was founded by Aristotle more than three centuries before the beginning of the Christian era. However, little of our present knowledge of veterinary medicine was contributed by those who practiced the art before the modern era. The treatment of sick animals was for the most part shrouded in superstitions and for centuries it was purely empirical.

Of some significance in the evolution of the study of diseases of animals were the Crusades (eleventh through thirteenth centuries). Since the Crusaders used horses to a great extent, the health of their animals was of primary importance. Another factor accounting for the emphasis placed on the study of the horse in health and disease during the Middle Ages was the popularity of horsemanship among the nobility. Furthermore, as Stange pointed out, the military power of various ruling kings was dependent largely on "horse-power" and campaigns could be won or lost depending on the condition of the horses.

It was not until the beginning of the present century that serious attention was given to the study of the other domesticated animals. In fact the horse maintained a dominant position in the course of study in veterinary schools until the past two decades, when the economic importance of cattle, sheep and swine made the intensive study of their diseases imperative.

The modern era in veterinary medicine may be dated from 1762, when a school was established at Lyon, France. This venture had the blessing of Louis XV, who conferred on the institution the title "Royal Veterinary College." A year later another school for the teaching of veterinary medicine was founded at Alfort, France. Both of these schools are still in existence.

The success of the French schools demonstrated the importance of systematic, formal instruction and study of diseases of animals. In consequence several other schools of veterinary medicine were established in Europe during the last half of the eighteenth century.

The European schools of veterinary medicine were controlled and supported by the state. In contrast, the first veterinary schools in the United States were privately organized and privately owned. The first of a long list of such schools was organized in New York in 1857. Eventually, however, schools of veterinary medicine were established in several of our state educational institutions. These state-supported schools were better able to meet the increasing need of a broader educational training of veterinarians than were the privately owned schools. In consequence, the last of the private schools closed its doors some 25 years ago. This left the field of veterinary education the sole responsibility of state-supported institutions.

It is pleasant to mention that the first school of veterinary medicine to be organized and maintained as part of a state educational system is the one at Iowa State College, established in 1879.



Indicative of the leadership exerted by Iowa State College in veterinary education are several important events which have increased the professional stature of veterinary medicine for the past three generations. In 1887 the curriculum was extended from one to three years. In 1903 it was extended to four years. In 1911 matriculants were required to be graduates of an accredited high school. In 1931 Iowa State College became the first American school of veterinary medicine to require a minimum of one year of collegiate work for admission. These were important milestones in the development of modern veterinary education.

The history of veterinary medicine at Iowa State College has been admirably recounted by the late Dean Stange. In this very human document he provided for posterity an impressive account of the tenacity of purpose of the distinguished personalities who were occasionally defeated but never conquered in their struggle to provide scientific information and training for the solution of problems vital to the future development of a successful agriculture. Foremost in the development of the splendid school of veterinary medicine of Iowa State College was Dr. Stange himself, who served as Dean for 27 years. His fine intellect, his idealism and his foresight properly qualify him as a giant among veterinary educators.

Professional schools for the training of veterinarians were started by educational institutions in several other states as follows: Ohio and Pennsylvania, 1884; New York, 1894; Washington, 1896; Kansas, 1905; Alabama and Colorado, 1907; Michigan, 1909; Texas, 1916; and Georgia, 1918. More recently, to meet the increasing demand for more veterinarians, schools have been authorized by the University of Illinois, the University of California, the University of Minnesota, Tuskegee Normal and Industrial Institute, the University of Missouri and the Oklahoma Agricultural and Mechanical College.

With the exit of the private schools from the field of veterinary training many significant changes in the curriculum have been and are being introduced, and the course of study has been lengthened. In addition most schools now require that students accepted for professional training have previously completed two years of preveterinary training of college grade.

The careful selection of all students who enter the veterinary colleges and the high academic standards now being insisted on insure a type of professional training for veterinarians comparable to that of our better medical colleges. In fact, the curriculum of the modern veterinary school includes essentially the same basic subjects as that of the modern medical school.

The present graduates of our veterinary colleges are keen-minded young men, possessed of the best of technical training and aware of their opportunities and responsibilities. These men are experts in the science of animal health. Their talents and availability provide a comforting assurance that in America, serious animal plagues, which might otherwise reduce important items of our food supply to an alarming degree, are not likely to occur.

An important factor in raising the standards of veterinary education in the United States



has been the American Veterinary Medical Association. This organization, which has a membership of approximately 9,000 graduates of recognized veterinary schools, represents all of North America. By a system of periodic inspection, it has elevated the quality of teaching provided for students in the respective veterinary schools. There are at present 11 veterinary colleges accredited by the American Veterinary Medical Association: 10 in the United States and one in Canada. In other parts of the world there are approximately 100 veterinary schools.

While most of the graduates of veterinary schools become private practitioners, a considerable number are employed by the various states and by the United States government. A relatively small number pursue a career of teaching or research or both.

To recapitulate: The development of veterinary medicine, like that of the other professions, has been a slow and at times a painful process. From a beginning handicapped by ignorance and superstition, a science of animal health finally emerged which has attracted men of high character and intelligence. As a consequence, the profession as now constituted requires no apologies. Its accomplishments in safeguarding the health of farm animals and of human beings are notable examples of man's ability to use facts, not alone for selfish ends but also beneficently for the welfare of society.

#### *Contributions of Veterinary Medicine to American Agriculture*

Economics is the pulse of our agricultural industry. Of the many factors that determine profits or losses from year to year, one of the most important is disease, both plant and animal. Fortunately, by the application of knowledge most diseases can be brought under satisfactory control and some, if sufficient effort is expended, can be eradicated. If disease is not controlled, its results may well be devastating.

In 1942 the United States Department of Agriculture estimated the total value of the livestock—including poultry—of our country as slightly more than 7 billion dollars. At present prices this figure may well be doubled. A full understanding of what this stupendous industry means to our national welfare connotes the frightening responsibilities that continuously confront the veterinary profession. Should any one of a half dozen highly contagious diseases of cattle, swine or poultry be permitted to establish itself in this country and to spread unopposed, the consequences would be calamitous. It is the responsibility of veterinary medicine as the guardian of animal health to preclude such a catastrophe. This cannot be done by the veterinarians unassisted. The intelligent cooperation of the livestock industry is imperative. Happily, the notable achievements made in the control of major animal disease problems in the United States have been accomplished by such cooperative efforts.

Although livestock in the United States and Canada is probably the healthiest in the world, we must not become complacent and assume that preventable livestock losses have been reduced to a minimum. In a report issued in 1942 by the United States Department of Agriculture the annual losses from the more important diseases of livestock and poultry



were estimated at more than 500 million dollars. As a matter of fact, owing to our failure to maintain a national agency for the tabulation of all livestock mortality, precise information concerning deaths of livestock is not available. The actual value of losses of livestock is without doubt greatly in excess of the figure quoted. Furthermore, losses due to nutritional and parasitic diseases, which inflict tremendous economic damage without necessarily causing death, are impossible to compute. It has been estimated that animal losses from parasitism alone amount annually to nearly 300 million dollars. (Incidentally, the veterinary school at Iowa State College has been foremost in emphasizing the importance of control of animal parasitism to the animal health.) Other losses that are frequently overlooked are those resulting solely from injuries incidental to shipping. These losses, which are largely preventable, have been estimated at \$11,500,000 annually.

Further evidences of livestock losses which are seldom considered in estimating the overall drain on our agricultural economy are the figures pertaining to dead farm animals processed by renderers. Recent information indicates that there are approximately 500 rendering plants in the United States and that the sale value of their products is approximately 400 million dollars yearly. This income is derived from the sale of 64 million pounds of hides, 500,000 tons of fat and nearly 1 million tons of meat scrap. How many animals that might have contributed to our food supply are represented by these figures is problematical.

In any consideration of the economic burden to the owners of livestock and to the consumers of livestock products, the money spent on worthless drugs and nostrums should not be ignored. The United States Department of Agriculture has estimated that 10 million dollars are spent annually by livestock and poultry owners for ineffective proprietary remedies. Not only is this large amount of money wasted but, what is more reprehensible, the condition that is treated is in many instances incorrectly diagnosed. The owner of sick livestock would have more money in his pocket and fewer regrets if he would leave the treatment of disease to his veterinarian.

It is obvious that our animal disease problems have not been completely conquered; yet, during the past 40 or more years gains of tremendous significance have been made. Let us consider a few of these.

1. *The control of bovine tuberculosis.* From the point of view of economic loss, hazard to human health and the ubiquitous character of the disease, tuberculosis is without question the most important disease of cattle. This world-wide disease is a major problem, especially in many areas of western Europe. In the United States tuberculosis of cattle has become relatively rare, as a result of the successful plan of eradication set up cooperatively between the respective states and the federal government in 1917. At that time 5 percent of bovine animals were tuberculous. Twenty-five years later, as a consequence of the slaughter of all cattle that had reacted to tuberculin, the incidence of infection had been reduced to 0.5 percent. In 1947 the incidence of tuberculosis of cattle in the United States was 0.2 percent. To obtain this remarkable achievement, it was necessary to test with tuberculin during a 28-year period more than 279 million cattle, of which nearly 4 million reacted to the



test and were slaughtered. Approximately 250 million dollars have been spent in carrying out this program but, considering the results achieved, the cost has not been excessive. In the long history of man's conflict with his microbial enemies there is no more brilliant chapter than that recounting the conquest of bovine tuberculosis in the United States by the veterinary profession.

2. *Hog cholera.* Hog cholera is a disease of animals with which the farmers of Iowa are too familiar. This practically world-wide disease is without question one of the most devastating of all animal ailments. It has caused enormous losses in the United States for more than a century. The money value of losses in a single year has been as high as 65 million dollars.

The first successful attack on hog cholera was the direct consequence of a series of brilliant investigations conducted near Ames by Drs. Marion Dorset, C. N. McBryde and W. B. Niles, of the Bureau of Animal Industry, during the years 1904 to 1906. These investigators proved unequivocally that hog cholera is caused by a virus, not by the so-called hog-cholera bacillus, and that hogs which recover from an attack of the disease are thereafter immune. On the basis of these observations Dorset and his associates soon developed a method of immunization of swine against hog cholera. The experience of more than 40 years since this epochal discovery was announced has confirmed the correctness of the original observations.

The importance of this contribution to American agriculture cannot be overestimated. It probably did more to stabilize the swine industry than any single discovery before or since. It is pleasant to relate that the method of immunizing swine against hog cholera was patented in the name of Dorset with the stipulation that the method could be used by any person in the United States without the payment of royalties.

3. *Cattle tick fever.* The campaign to eradicate Texas fever or, more correctly, cattle tick fever from the cattle of the United States is probably the most stupendous and protracted attack ever made on a major parasitic disease. The success of the campaign to eliminate the tick, *Boophilus annulatus*, which serves as the intermediate host for the protozoon responsible for this disease, is truly one of the notable accomplishments of medical science.

For more than a century before the cause of the disease was definitely known, cattle tick fever had been the most serious obstacle to the cattle industry of our southern and southwestern states. Early in the present century the yearly losses due to this disease were estimated at 40 million dollars. Until the cause of the disease was definitely established and the role played by the tick in its transmission was discovered, effective means of combating this disease were unknown.

The tangible benefits of the campaign to conquer cattle tick fever, which began in 1906, include (1) nearly 50 percent greater productivity of dairy cattle in previously tick-infested territories; (2) an increase in the size of dairy herds and improvement of the herds by the introduction of purebred and good grade stock; (3) an increase by several million of the total cattle population in the South; (4) organization of cow-testing associations, the erec-



tion of cheese factories and creameries, and the development of a diversified agriculture; (5) a marked increase in the value of farms that have been freed from the cattle fever tick.

Eradication of the parasite responsible for the transmission of cattle tick fever has returned to the people of the South untold millions of dollars and made possible a prosperous cattle industry in a large area of our country in which this was not possible previously. The brilliant research that proved the tick responsible for the transmission of cattle fever and the successful fight against the cattle tick which followed stand as one of the finest achievements of veterinary medicine.

4. *Other diseases.* Time will not permit more than brief mention of other significant contributions to our agricultural economy. Foremost of the other animal diseases that threaten the economic welfare of the American farmer are brucellosis of cattle and swine and pul-lorum disease of chickens. For both of these conditions veterinary medicine has provided methods of control, if not of eradication. Other important animal diseases that, as a consequence of research and study by veterinarians, are no longer unopposed include bovine mastitis, equine encephalomyelitis, anthrax, glanders, blackleg, fowl leukosis, distemper of dogs, rabies and an impressive list of parasitic diseases and nutritional disturbances.

When the contributions of veterinary medicine to American agriculture are examined objectively, two important conclusions emerge. The first of these is that, through knowledge gained by research and by the practical application of scientific facts, veterinarians, in cooperation with livestock owners, have contributed immeasurably to American agriculture. Without veterinary control of a host of animal diseases, pestilence, insecurity, poverty, economic disaster and insufficient food supplies would be of common occurrence.

The second conclusion which is painfully evident is that, in spite of the gains made, veterinary medicine has by no means conquered the many disease problems that still menace our livestock. However, if the profession can continue to provide a sound basic scientific training to young men of character, imagination and foresight and if society will supply adequate financial support to implement research and more research, many diseases that still exact an enormous toll from the livestock industry will be eliminated or rendered impotent. The future is challenging and the outlook is bright.

#### *Contributions of Veterinary Medicine to Human Health*

Many diseases of animals are transmissible to human beings. Consequently, their control—their elimination when possible—is of great importance to human health.

The number of animal diseases communicable to man is uncertain. The list, however, contains many that will produce grave and disabling illness or even death. Among these are bovine tuberculosis, brucellosis, rabies, anthrax, tularemia, glanders, psittacosis, swine erysipelas, plague, equine encephalomyelitis and more than 80 different diseases caused by animal parasites occurring in a wide variety of species of animals.

Most of the diseases of animals to which man is susceptible occur in our domesticated species. The manner by which human beings become infected varies. Infection may occur



by direct exposure to the infective agent; by the ingestion of raw or inadequately cooked flesh of diseased animals, or of raw or imperfectly pasteurized milk; or by being bitten by certain blood-sucking flies, fleas, lice and ticks which serve as vectors.

The threat to human beings of those diseases of animals communicable to man has diminished in direct ratio to the ability of veterinary medicine to suppress the respective diseases in their natural hosts. For example, in the United States tuberculosis of children as a result of their drinking raw milk from tuberculous cattle practically never occurs. In Great Britain, where tuberculosis among cattle is rampant, 2,000 children die annually from tuberculosis derived from the milk of tuberculous cows.

The suppression of anthrax and glanders in their natural host has also reduced the hazard of these diseases to man. The same may be said for rabies, although this problem is far from solved. We have sufficient knowledge to eliminate rabies from our domestic animals completely within a relatively short period, but so far we have not applied this knowledge effectively. Less sentimentality and more realism in dealing with this problem are urgently needed.

Besides preventing animal diseases hazardous to human health and recognizing these diseases in sick and in dead animals, veterinary medicine has erected several other effective barriers against animal diseases transmissible to man. These include (1) vigilant state and federal veterinary regulatory services, (2) supervision of milk supplies and (3) a nationwide system of meat inspection for all meat-packing concerns engaged in interstate commerce. This system is responsible for separating unwholesome meat from that suitable for human consumption.

Another contribution of veterinary medicine to human welfare was the demonstration for the first time that an infectious agent can be transmitted from animal to animal by an insect serving as an intermediate host. This discovery, by Drs. F. L. Kilborne, Theobald Smith and Cooper Curtice, of the Federal Bureau of Animal Industry, may properly be considered one of the epochal achievements in medical research. Their solution of the mystery of cattle tick fever ultimately led to the discovery that many other important diseases are also transmitted by intermediate hosts. Other diseases transmitted by insect vectors include malaria, yellow fever, typhus fever, African sleeping sickness, Rocky Mountain spotted fever, nagana and bubonic plague.

Although the responsibility for the recognition and suppression of animal disease dangerous to human health belongs primarily to veterinary medicine, the task can be successfully accomplished only by the closest cooperation with the medical profession. Each profession has much to give the other for the betterment and protection of human welfare.

### *The Challenge of the Future*

The development of veterinary medicine has been in response to a definite demand for provision of a much needed and important service. The training necessary for graduation from our veterinary schools has become increasingly technical, increasingly arduous, increas-



ingly prolonged and increasingly expensive. The graduates possess an educational equipment comparable to that possessed by those trained for the other branches of the medical sciences.

Stock owners and poultrymen are becoming better informed with every passing year. They are entitled to, and will demand, the best that modern veterinary medicine can provide. Incompetence and complacency on the part of veterinary medicine will not and should not be tolerated. Unless the profession keeps not only abreast but a little ahead of the times, confidence will be lost and other means will be sought to meet the disease problems of our livestock industry.

The task of providing and maintaining a veterinary service commensurate with its present and future responsibilities rests largely with the faculties of our veterinary schools. It is here that the future is confronted with a serious uncertainty. The availability of qualified men in sufficient numbers to staff our existing schools properly is a source of deep administrative concern. Men capable of the best in teaching and research are the products of long and expensive specialized training. Unfortunately, entirely too few graduates of promise for a career of teaching or research have been willing to accept a meager salary and devote a lifetime to the dissemination of knowledge and to exploration of the unknown. There must be a realization by the state that the teaching and research staffs of professional schools are subject to a highly competitive market. To obtain and retain competent teachers and investigators it has become increasingly necessary to meet this competition, not by adequate salaries alone but by providing for every member of the staff conditions that will permit of the most satisfying career.

Facilities and time should be available to so-called full-time teachers for at least a modest research program. The really great teachers of the medical sciences speak from their workbenches and, as a consequence, their teaching has that quality of truth that is the essence of all knowledge. Science is ever-changing and what was considered to be true yesterday may not necessarily be true today or tomorrow.

Finally, veterinary medicine and American agriculture in partnership must continue to wage an uncompromising attack on the world's two most basic problems—hunger and disease. The record of past accomplishments is unsurpassed. However, to meet the unpredictable demands of the future may well tax our capacities to a degree beyond our present abilities to foresee. Without doubt agriculture could function more efficiently if relieved of the burden of animal diseases. To reduce this burden to the vanishing point must be the principal future objective of veterinary medicine. With staunch and intelligent leadership and a continuing acceptance of social responsibility the veterinary profession can meet this challenge with distinction. This would be an achievement exemplifying the highest function of science: to provide and apply significant truths for the service of man.



#### LITERATURE CONSULTED

1. Hagan, W. A., Cox, H. R., Feldman, W. H., Huddleson, I. F., Johnson, H. N., Kelser, R. A., Klauder, J. V., Meyer, K. F., Stein, C. D. and Wright, W. H. The relation of diseases in the lower animals to human welfare. *Ann. New York Acad. Sci.*, 48:351-574. 1947.
2. Houck, N. G. The Bureau of Animal Industry of the U. S. Department of Agriculture. Its establishment, achievement and current activities. Published by the author, Washington, D. C. 1924.
3. Hull, T. G. Diseases transmitted from animals to man. Ed. 3. Charles C Thomas, Springfield, Ill., 571 pp. 1947.
4. Stange, C. H. Veterinary science. In the *National Encyclopedia*, 10:298-300. P. F. Collier & Son Company, New York. 1934.
5. Stange, C. H. History of veterinary medicine at Iowa State College. (June) 1929.
6. Yearbook of Agriculture, U. S. Department of Agriculture. Keeping livestock healthy. Government Printing Office, Washington, D. C., 1271 pp. 1942.







# The Ninetieth Anniversary Luncheon

GREAT HALL, MEMORIAL UNION

MONDAY NOON, MARCH 22, 1948



# GREETINGS FROM DRAKE UNIVERSITY

*By President Henry G. Harmon*

It is a genuine pleasure to bring greeting to the faculty and friends of The Iowa State College on behalf of the privately controlled colleges and universities of this state. I know that the staffs of the institutions for which I speak share with all citizens of Iowa in a real pride in our state college.

The 90 years that this school has served Iowa and the United States include a significant development in modern agriculture, engineering and other aspects of American culture. During its existence, agriculture—first industry of the Midwest—has moved from a state of relatively unscientific practice to the present high standard of scientific operation. It has seen engineering develop from a period of European domination to witness the large contribution that this school is making now to the development of modern engineering in the United States. We are proud—each one—of the story of this college and grateful for the contribution it has made.

The high rank that Iowa has among the agricultural states of the world is not wholly the result of the productivity of its soil. It is to a great degree the result of the fertility of mind that has been created and nurtured on this campus. The contribution that was here made to science, limelighted particularly during the last war, reflects the originality and genuineness of the research activities of this faculty. The educational life of our state, especially its institutions of higher learning both publicly and privately supported, has been blessed richly by the fine cooperation and genuine leadership that it has received from the administration and faculty of Iowa State College. The leadership, the research, the development of agriculture and engineering have not been confined to the laboratory alone, nor were they for the honor and glory of science *per se*, but, as you all know, they have been expressed always in terms of human values for which purposes such institutions were created.

For these reasons, we of Iowa and particularly the faculties of the privately endowed schools feel that the 90 years of history that we recognize today have been extremely significant in the life of this state, for the Midwest, for our nation and the world.

These greetings are at once an expression of congratulation and appreciation to the faculty of this college, to the Board of Education that governs it, and to its distinguished president, Dr. Friley.





Four Iowa college presidents extended greetings to President Friley at the Anniversary Luncheon. Above (left to right) are PRESIDENT MALCOLM PRICE of the Iowa State Teachers College; PRESIDENT RUSSELL D. COLE of Cornell College; DR. FRILEY; PRESIDENT VIRGIL M. HANCHER of the State University of Iowa; and PRESIDENT HENRY G. HARMON of Drake University. Below is the speakers' table at the Anniversary Luncheon.









# GREETINGS FROM CORNELL COLLEGE

*By President Russell D. Cole*

The individual who defies the psalmist and lives for four score and ten years is always the recipient of congratulations though he may have done little more than survive. But when a college passes the milestone of four score and ten years and is the recipient of congratulations, you may well rest assured they are well deserved. For, unless some significant service has been rendered the years would have ceased accumulating. Colleges are powerful institutions. They leave lasting imprints upon the future. They touch the minds and bodies and spirits of the ablest young men and women of the country more than any other organizations. They bear the terrific responsibility of penetrating the jungles of ignorance, fear, superstition and prejudice, cutting away the growth and dispelling the darkness so that intelligence and wisdom and freedom may characterize men's activities. The quality of a college is directly related to the quality of its men. Buildings, moneys and programs are of little avail unless all of it is inoculated with at least a few men who are real geniuses. In the last analysis it is the human personalities which are about a college campus which set the tone of a college. No single college in this country has a corner on education. There are no exclusive patterns on educational procedures. Colleges move forward side by side each with its special purposes, obligations and opportunities. Education is a co-operative enterprise and yet one with many diversities, and all are centered upon the common paths of the preparation of youths for the future.

Ninety splendid years stretch back from this hour. The five young men who sat shivering in a Des Moines boarding house on a cold night in 1858 were possessed with an idea. An idea that science and practice could be wedded and that the people of this state should have an institution of higher learning which would serve both agriculture and industry along these lines and where significant truth might be put to the service of men. It was a valid idea, an idea with legs, an idea with consequences, and an idea which was destined to be creative. The spirit and practice of those who through the years have espoused the destiny of this college accord well with the noble words of John Ruskin, "When we build, let us think that we build forever." The years, the achievement and the service to state and nation are all fused in a record which is of magnificent proportions.

In *The Servant in the House* are eloquent words regarding the church which apply as well to a college. "When you enter it you hear a sound. A sound as of some mighty poem chanted. Listen long enough and you will learn that it is made up of the beating of human hearts. Up into heights and spaces are inscribed the numberless musings of all the dreamers of the world. It is building, building and built upon. Sometimes the work goes forward in deep darkness, sometimes in laughter and heroic shouting like the cry of thunder. Sometimes in the silence of the night-time one may hear the tiny hammering of the com-



rades at work up in the dome. The comrades that have climbed ahead and now charge us to carry on their work."

So on this ninetieth anniversary, I bring the greetings and the congratulations of the privately administered colleges of Iowa along with the confidence and the hope that the past is but prologue for the tiny hammerings of the future that swell into a crescendo for Iowa State College.



# GREETINGS FROM THE STUDENT BODY

*By Don DeLaHunt*

PRESIDENT OF THE STUDENT BODY

Many years ago a small handful of students gathered here to begin a battle for an education. They got up early in the morning; they worked late at night, and what social activity they had was what they made for themselves. Four years later an even smaller group marched sedately up the aisle and out into the cold world.

Today, 10,000 students swarm over this campus. They have outgrown the building that has been done; they are now encroaching on the campus and are in wooden barracks and wooden houses. This fall when they wanted some recreation they paid \$3,500 for a dance band to play for two nights, about eight hours' entertainment. And when the midwinter graduating class walked up the aisle Saturday morning, as they went by, a small boy's voice plaintively said, "Where's Daddy?"

And yet underneath it all there really isn't much difference between those students 90 years ago and the students of today. The students 90 years ago, I am sure, asked two questions which we of the student body today ask often and urgently. The first was, "Is it worthwhile?" and the second was, "Am I going to make it?" You people who are sitting out here and are symbolic of the growth of Iowa State are an answer to those questions for the student body of today. That is the reason that the student body is happy to extend a greeting to you and to the college, because your answers to those questions are the answers and the inspiration for the students of today to answer those questions, "Yes."

You have made it, and therefore we can make it. And you look around you at the people sitting beside you, and at the things that you have done, and that is an inspiration for the students of today to say "Yes, it is worthwhile."

And it is for those reasons that the student body of today is very happy to extend a welcome to you folks who are representing people who have come out of Iowa State College and are representing the growth of Iowa State College. The students are happy to welcome you back to the campus and urge you to enjoy your stay here to the utmost.



# GREETINGS FROM IOWA STATE TEACHERS COLLEGE

*By President Malcolm Price*

Fundamentally, the only reason for the maintenance of an institution of higher education is the return the college makes directly to society or indirectly through the young people who come under the influence of the college. It is a pleasure to represent the Iowa State Teachers College here today and bring greetings to you.

The Iowa State College has well justified its existence as a college. Founded in a pioneer state, through the services of the college the state has flourished until today our agricultural economy is second to none. Direct service emanating from the college in the form of research and extension service has nurtured and advanced our economy. Keen and capable young people have gone forth from this campus to assume important positions of leadership.

The Iowa State Teachers College congratulates the Iowa State College upon its 90 years of service in the state of Iowa. May the future be even more noble than the past.



# GREETINGS FROM STATE UNIVERSITY OF IOWA

*By President Virgil M. Hancher*

It is a great pleasure for me today to represent the faculties and the administrative officials of the State University of Iowa in bringing greetings and best wishes to Iowa State College for continued success in the cause of education and learning.

The contributions of this college have had a direct relation to the welfare of the state as have those of all well regulated colleges and institutions of higher learning. It is well for those who believe that education is something which should reside in an ivory tower to remember that the earliest universities grew out of the professional needs of the time. I am told, and my own experience tends to confirm the fact, that it is difficult to get complete agreement among academic minds. But I think that they are as near unanimous agreement as can be reached on any subject in their belief that the first university of the western world was the University of Salerno, which was exclusively devoted to medicine. Next in point of time, the universities of Bologna and Padua were devoted to the study of law and particularly to canon law, a great professional occupation of the time because of the dominance of the church. Then came the University of Paris with its preoccupation with theology and its handmaiden philosophy, from which there emigrated scholars—and here the academic minds are not in agreement—to Oxford, and from Oxford to Cambridge, and from Cambridge to Harvard. You know the pedigree from then on.

It is well for us to keep in mind, however, that these great institutions of learning had their inception in the professional and practical needs of their day and generation, and that when learning becomes divorced from the needs of the people it is likely to go astray. Reference has already been made to this great institution and to its scholars—substantial, resting on firm foundation.

If I may digress and inject a somewhat lighter note than has been injected for a few minutes, I should like to tell a story because it provides by direct antithesis an emphasis on the point I should like to make. The story concerns a magician who was employed to go on a trans-Atlantic liner to entertain the passengers. The second night out he started performing his tricks and to his great horror he discovered that there was a parrot in the room which from time to time squawked "Fake." Nevertheless, he continued his tricks. He did them on the second night and the third night and the fourth; but from time to time with this most unpleasing interruption, "Fake." Then on the next day the ship got into trouble and it was necessary for the passengers and the crew to abandon ship. And the magician found himself at last in a lifeboat safely launched and on the high seas; but here to his great disgust was the parrot. They glowered at each other for the first day without saying anything, and for a second and for a third day. Finally, near the end of the third



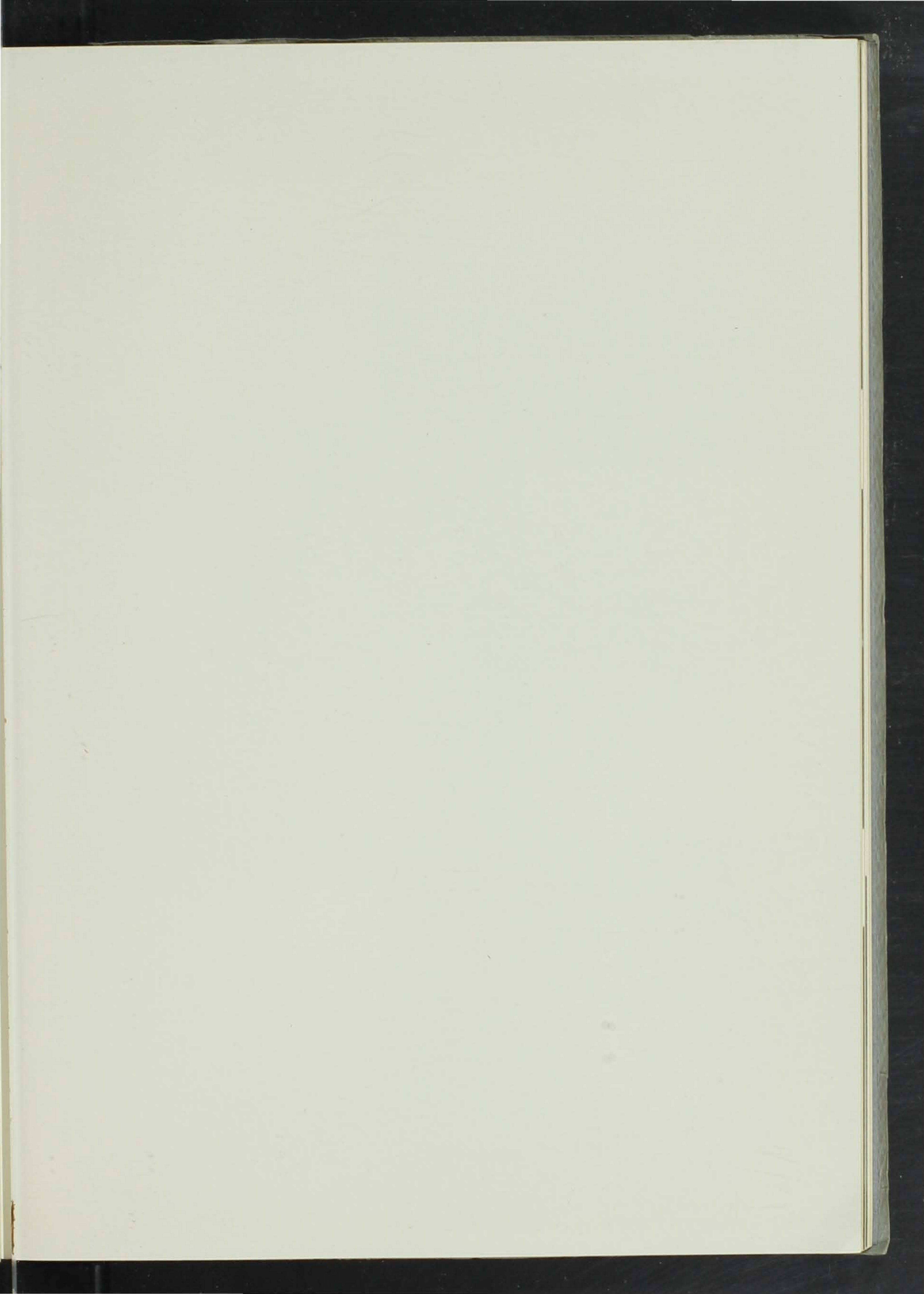
day, the parrot could stand it no longer. With his feathers ruffled and in a rasping voice he said, "All right, you win. What did you do with the ship?"

Now we know what has been done to the ship. The ship is sailing on—sailing on a true course and there is nothing faked about it. We know that it possesses great scholars. We know that it possesses research facilities. We know that it has made a great contribution and it will continue to make a great contribution to our state, to our nation and even to the hungry world beyond our border. Much of its success has been due to great administration. Much of its success has been due to wise government by a State Board of Education, appointed by the governor and confirmed by the senate of the state. No more than five of them may be members of one political party. For the seven years with which I have had dealings with that board, never once has there been a decision reached which shows any taint of political consideration. This is a tremendous record of which the great state of Iowa can be proud. But above all, I think my good friend, President Friley, would agree that the distinction of this college as the distinction of every college and university rests upon the great scholars, the great scientists, the men who have expanded the frontiers of knowledge and will continue to do so. And these institutions must survive if our civilization is to continue. A few days ago a young man said to me, "Are there opportunities ahead? Can all of these young men of my generation find opportunities when they graduate?" And I said to him, "My dear friend, if our civilization is not to stop there must be opportunity for you."

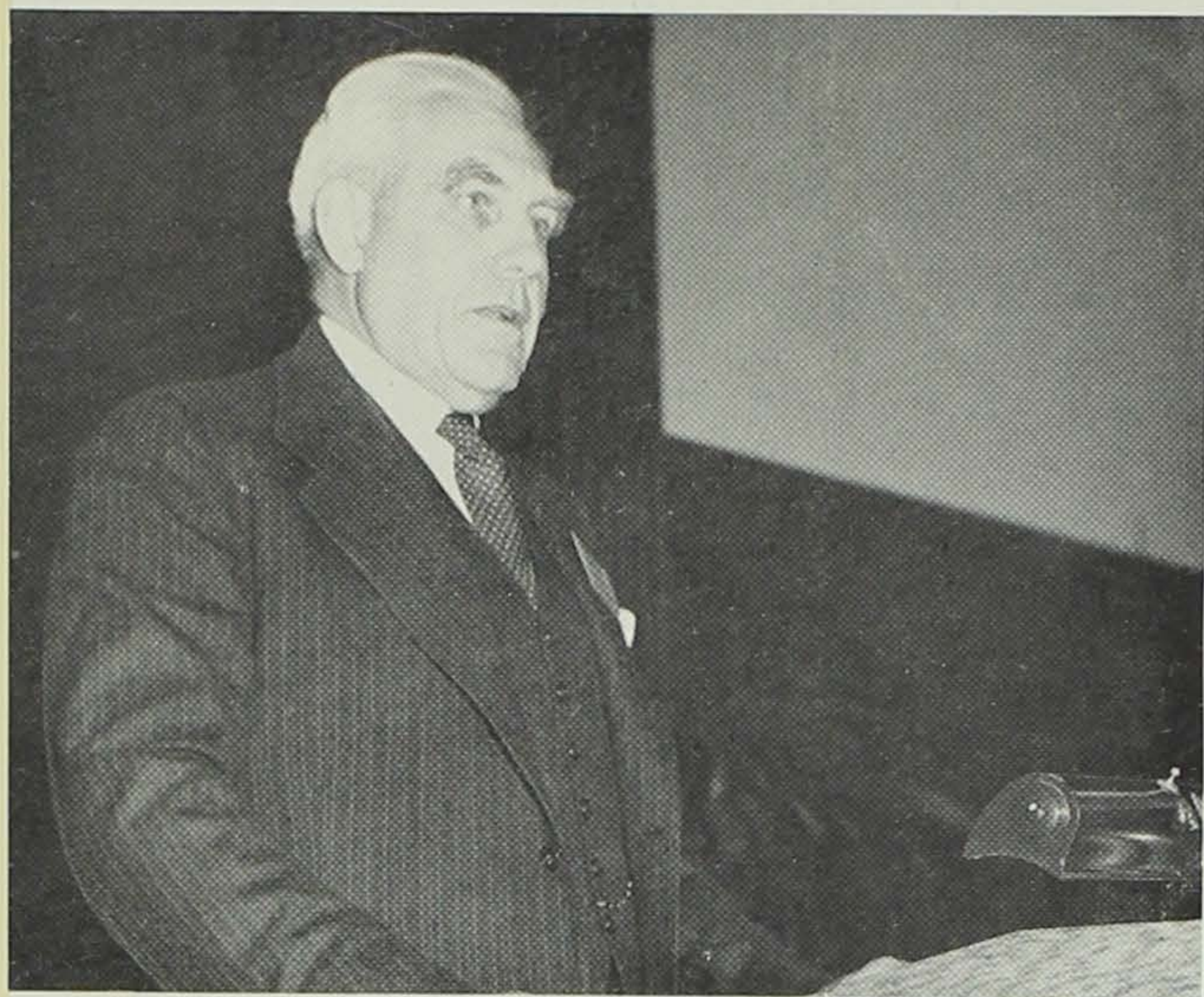
Our civilization is becoming more complex. We require greater administrative capacities that we have ever had before. Never has there been such a shortage of men needed to fill the ranks, the very top ranks of every profession, every occupation. And as our civilization becomes more complex and the interactions of capital and labor, of church and secularism and all these things become more acute, we must have better trained men, wiser men, men who are able to understand the various social services which we shall be called upon to perform. Unless these institutions continue, unless they train young men and young women fit for the responsibilities of the time, our civilization must stop. It must cease to make any advancement, and therefore, I hope and trust that you, friends of Iowa State College, will give it your loyal support, uphold its hands in the day of trouble, support it in the time of plenty and prosperity, and see to it that it always has the opportunity to do its great work.

It is said that over the grave of Sir Christopher Wren there is the epitaph, "*Si monumentum requirit circumspice.*" If you wish a monument, or better still if you wish a reminder, look around you. If you wish a reminder of the greatness of this institution, look around you!



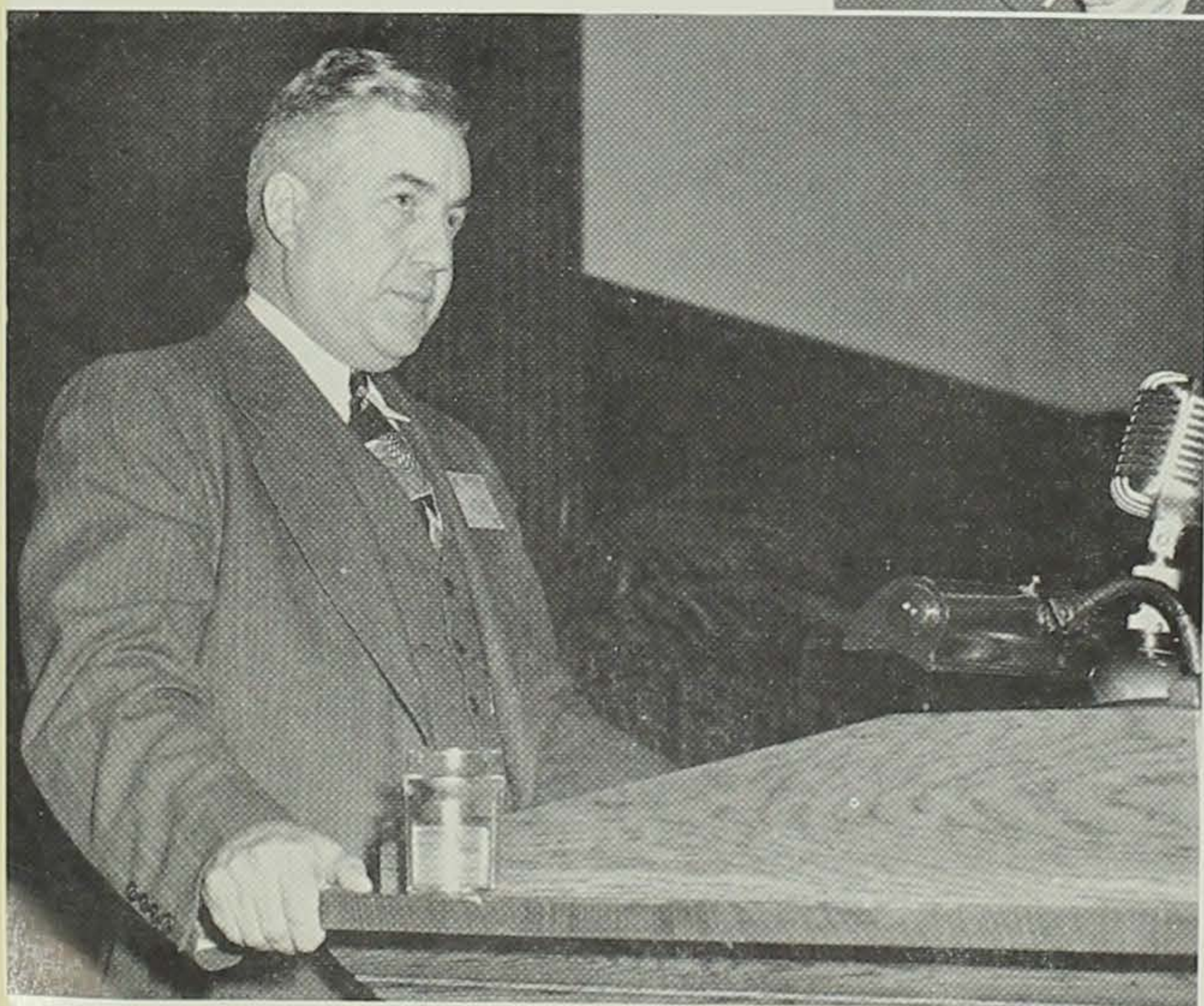
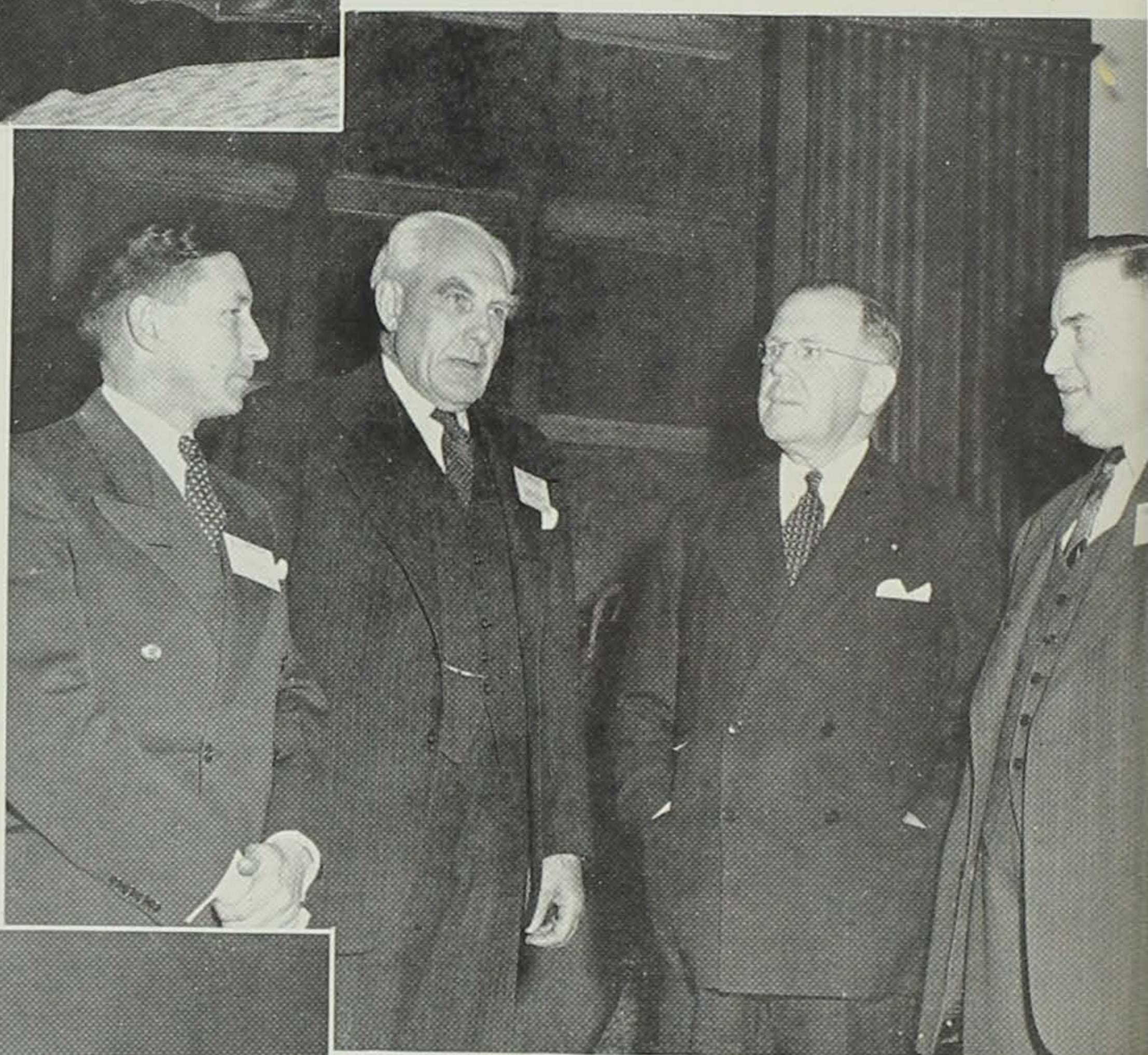






EARL O. SHREVE, Vice-President, General Electric Company, and President, United States Chamber of Commerce, speaks on "Engineering Looks to the Future."

At the Afternoon Session (*left to right*): DEAN H. V. GASKILL, E. O. SHREVE, PRESIDENT FRILEY and ROBERT D. COGHILL.



ROBERT D. COGHILL, Director of Research, Abbott Laboratories, speaks on "Future Aspects of Science."



# The Afternoon Session

THE SOUTH BALL ROOM, MEMORIAL UNION  
MONDAY AFTERNOON, MARCH 22, 1948



# ENGINEERING LOOKS TO THE FUTURE

By Earl O. Shreve, '04

VICE-PRESIDENT, GENERAL ELECTRIC COMPANY; PRESIDENT, UNITED STATES CHAMBER OF COMMERCE

Modern science and engineering have dimmed the fabled luster of Aladdin's wondrous lamp. For, within the lifetime of many living Americans, myriad ways have been found to turn the unknown into the known . . . the impossible into the possible.

Yet, there is at least one thing we still can't do—and don't want to do. We have no genie whose magical touch can turn back the clock. Back a hundred years. Or back even a mere 25—to narrow the broad horizons of engineering progress you have asked me to discuss—or even to narrow the problems such progress inevitably presents to the human race.

A hundred years ago, a look into the future seemed a pretty simple thing. For back there, some of the ablest thinkers of the time were proclaiming that *all that was going to be—was!* The future of science seemed even to the scientist to be limited by definite boundaries.

Yet, a poet, far removed from practical things, in 1842 let his mind reach far into a future of wonders—and Tennyson wrote:

For I dipt into the future, far as human eye could see,  
Saw the vision of the world, and all the wonder that would be;  
Saw the heavens fill with commerce, argosies of magic sails,  
Pilots of the purple twilight, dropping down with costly bales;  
Heard the heavens fill with shouting, and there rain'd a ghastly dew  
From the nations' airy navies grappling in the central blue.

We today are seeing the things the poet dreamed, and all of us have come to realize that science has no boundaries. If limits do exist, they are so distant even the keenest and ablest men of research dare not predict their limit. We know only that what we do not know *today*, we may well know *tomorrow*. Even the sky, as we know it and see it, we now know to be no longer "the limit." Flight into the unknown has lost its connotation of fantasy as a phrase to be bandied about by poets and comic strip makers. Supersonic planes and rockets and sound waves are piercing all barriers of time and distance as we knew them—or thought we knew them—in the past. Radio has made acquaintance with the moon!

Modern men of science are creating in their laboratories the means for technological progress undreamed of even 25 years ago. Yet, that progress can hold out no long-term promises of well-being, except as it is guaranteed by a corresponding advance in social and spiritual progress.

To an engineer, the formula for social progress does not seem to be so much more difficult, nor so much different, than the formula for scientific progress. I have heard many men in our profession discuss this problem and argue as to how it can best be met. And nine times out of ten, they have arrived at the same conclusion—a conclusion which in view



of their training is, I might say, inevitable. They believe that social progress can be attained only if the same kind of fundamental thinking—the same singleness of purpose—is directed to that problem as is directed to problems of research. And, thus, a heavy responsibility rests upon scientists and engineers. It is their obligation to look beyond the confines of the laboratory and to view the broad picture of our economic and social processes, so that they may contribute their full share to human progress and human welfare. They must help write the formulas which leadership must use in planning methods to attain higher standards of improved living.

Scientific advance is based on clear and independent thinking. Neither personal bias nor wishful hopes have any place in the laboratory. Problems must be approached with an open mind. They must be subject to no influences except established facts. Scientists are trained to question the reason behind all they see and hear which might seem to hold new knowledge or defy the old.

Naturally, in these swift-moving times there are many who are asking “What *does* the future hold in practical engineering achievement?”

Since I am neither a prophet nor an alchemist, I can only reach for answers in the light of the past, in the reality of the present and in the promise of the future—and then only insofar as outlines appear in mathematic equation and on the drafting boards.

The impact of America's wars upon our scientific progress dates back to our beginnings. During the American Revolution, Washington tried in vain to coordinate research and development for military ends.

Lincoln, during the Civil War, was somewhat more successful. During that war the National Academy of Science was established to give the government technical scientific advice.

On the eve of World War I, at the request of Woodrow Wilson, the Academy created the National Research Council to assist the government in coordinating the scientific resources of the country. It has become a permanent institution.

World War I was a rude awakening for many an industrialist. Great determination and energy provided at least a partial impetus to make up for time lost. Peace, however, slowed up the machinery of research. Progress was made, to be sure. But that progress was an amiable, ambling progress paced by an illusion that there was not too much need to get anything done in any particular length of time.

Then, again, a second world war and suddenly there was much need to get many things done in a very short length of time. Indeed, there had never been greater need to get *more* done in *less* time. Once again, determination and energy provided the impetus for accomplishment. And at last the absurdity of being faced, again and again, with such a critical situation, dawned on enough Americans so that I think it can now be safely said the people themselves will see to it that peace will not again be a laggard to progress.

In both war and peace our whole economy has been in continuous change because of research and development. Improved methods of transportation have served to concentrate



population. Steady improvement in the production of light, heat and power have made mass output a practical and an inevitable answer for better living. Research has increased employment. It has increased the output of industry and of agriculture. It has decreased the load on workers, by lowering working hours and lessening toil. It has erased time in communication. Within a century, it has increased by a quarter of a century the expected life span of Americans. It has levelled mountains and raised skyscrapers. It has turned deserts into gardens, and coal into cloth.

On the other hand—by its very affinity for change, science often has sorely disrupted the American economy. The introduction of new materials, new devices, new machines, has shaken us out of easy routines. And finally, under stress, research has brought into being weapons of war which could, in a very short time, destroy civilization as we know it.

Therein lies the real danger. The progress of science places a tremendous responsibility, not only on the scientist and on the engineer, but on every man and woman who stands to benefit by progress in research.

Only a few days ago, the line of thinking that is in many a scientist's mind was brought home sharply to me, as I stood talking to one of the great men of nuclear research, almost within the shadow of a giant new betatron.

Each time that I would mention atomic research in relation to military usefulness, this man would stress, with almost a kind of urgent appeal in his voice, the great contribution that the same research might make to health. Perhaps my reaction was exaggerated. Yet I carried away with me the feeling that this man, and his co-workers, wished that they might exclude themselves from the dark side of their progress.

On the other hand, I sensed, in talking with this man and with others in the acres of laboratories I visited, the continuing exhilaration that came to them in working with the unknown—in unlocking the secrets of nature at that moment when all the component parts of the key suddenly meshed with the lock.

For many years, I have dealt more with the output resulting from research and development than I have with science searching. And so, in a sense, I can be as amazed and as curious as a true layman, when an opportunity comes to me to delve into new basic projects. I shall, in fact, probably never shake a certain boylike fascination that takes hold of me when I encounter the simple beginnings of an experiment . . . the solving of a mathematical equation . . . the bringing together of elements in a test tube . . . the waiting for the inevitable—and sometimes unexpected—result.

Nor does the very simplicity of the beginnings of some of our great scientific discoveries ever fail to interest me. It still seems hard to believe that great new industries have been and will be based on some accidental outcome of a simple experiment. It is still hard to believe, for instance, that the great radio industry sprang from an experiment having to do only with the transmission and reception of electric sparks off two brass rods across empty space. And it is even more amazing to remember that the great automotive development was made possible by the simple addition of a little sulfur and a bit of heat to natural rub-



ber—a material which man had known but had had small use for over a long stretch of time.

Indeed, there are so many things happening so fast, that even to the most hardened engineer, miracles still seem like miracles. Less than 10 years ago, about the only known use for uranium was as a coloring agent for glass and china. Today, every man who can read knows that uranium brought a mighty nation to its knees.

Yesterday, no one knew any use for polonium. Today, in hardly weighable amounts, it is at work in a dozen ways, dissipating potentially dangerous static electricity.

Yesterday, no one knew a use for germanium. Today, we know that it may soon replace vacuum tubes in radios, and lift the two-way wrist radio mite off the wrist of Dick Tracy and snap it on the wrists of America's millions. Today, we know that by its ability to change alternating current to direct current, germanium may well make a major contribution to radar, television and F.M. broadcasting.

Yesterday, if the weatherman told us a drouth would continue, or a hurricane hit, we had to be resigned to his prediction. Today, if that prediction bodes no good, we are on the threshold of being our own weatherman. With a bit of dry ice, we now know how to squeeze a cloud or brush away a fog.

And even though the progress of rocket development today is in the same infant stage as was aviation at the close of World War I, we already know more about the earth's upper atmosphere than had been learned in all times past. And tomorrow, say the men who work with rockets, we may have missiles that can fly continuously around the earth at terrific speeds. We may indeed, they tell us, even have interplanetary rockets such as not even Buck Rogers ever dreamed up in his most fantastic episodes.

To look back over the last 25 years, one almost comes to wonder if he is dreaming. For those years have held almost unbelievable progress in research and development—particularly since the stress of national defense need sparked research and development to an all-time high. The list of the results is as a lexicon of new words in our language. Their magic and their sound might have come straight out of Carroll's Wonderland of Jabberwockies and talking cats. Radio. Television. Radar. Sonar. Diesels. Electronics. Gas turbines. Jet propulsion. Bouncing plastic. Isotopes. Mesons. Gyro-gliders. Flying wings.

The list is never ending. Streamlining. Airconditioning. Glass insulation. Plastics for speed and economy in production—for color—and for a thousand other purposes. Mechanized farming. Mechanized housework. Mechanized factories. All have grown towards maturity in the same quarter of a century.

And in this same time, aviation has grown from a child into a giant. Radio and radar have helped secure the growth. Jet propulsion, made possible by the development of the gas turbine, has speeded up the process.

And the whole modern field of electronics has been developed in this short period. It has expanded to an extent exceeded by few other industries. It has a part in the manufacture of all but a few products. It has put brains into boxes—as gunnery computers, as sta-



tistical wizards, as industrial detectives seeking out material flaws. It has made possible electronic cooking, newspaper facsimile, submarine sonar, sound motion pictures, atomic fission.

The same quarter century has brought equal strides in medical fields. Blood plasma. Penicillin. DDT. Sulfa. Mass chest X-ray through the teamwork of film and fluoroscope.

And today, we are beginning to put sound itself to work. We know now that high-frequency, high-power sound can literally tear some compounds apart, and mix others better than ever before. We know now that sound can determine thickness, seek out flaws, and measure the molecular structure of many materials. We know that it can even force water out of cloth.

Yes, the past and the present are full of miracles—beneficent miracles—greater than any genie ever pulled out of a lamp. But the future holds promise that each of these miracles will be multiplied many times over by the miracles of tomorrow.

Perhaps, though, I should amend that statement. Perhaps I should make that prediction subject to the grim reality of the problem of peace. There'll be few miracles—unless life hereafter proves a miracle—if this country and Russia don't soon find a way to live in peace—together or apart. And that in itself is the miracle for which I hope most—but which I would be more than foolish to predict at this moment.

But what of 25 years from now? What is life likely to hold for our young people, if they have escaped another war?

I've discussed those possibilities with some of our most eminent scientists and engineers. If I hadn't, I wouldn't, in fact, have the courage to stand before this meeting and speak the words I am about to address to you. Even now, I fear you may think me rash. But I assure you that my comments are based on predictions made by men in far better position to foresee the future than I. They were offered to me in all seriousness. And, I might add, as predictions not of 25-year fulfillment, but of 10.

I am told that 100-passenger helicopter commuting buses would be in service between such cities as Des Moines and Omaha. And that they would be powered by small jet engines attached to each blade tip of a single rotor.

And further, it seems that by 1958, plane accidents in commercial flying are expected to be rare indeed. Radar will be an all-seeing eye for the pilot, and also, I might add, for the railroad engineer.

I am told that our meals in plane and train, and even at home, may frequently be pre-cooked and then kept frozen for many months, before they are put momentarily on an electronic stove and then served fresh and piping hot, at the table.

And men who should know what they're talking about tell me that interiors of schools, of public gathering places, of factories, and even of homes, may well be germ-free in a few short years—either through germicidal light installations or otherwise.

Preventive medicine will guarantee healthier crops, as well as healthier people. Chem-



istry will defeat weeds and nourish plants. Livestock will be fed from automatic devices, and the food will be sterilized and prepared by machinery.

Toward war's end, we heard much about this bright new world into which we were suddenly to be thrown. And now I hear people ask "*Where is it?*" Perhaps they were promised too much, too quickly. Industry was forced to use old molds, old patterns, to close the gaps in production of consumer goods as quickly as possible. But the bright new world has not faded. It *is* beginning to come off the drafting boards and onto the assembly lines. The next few years, provided we have peace, will furnish increasing fulfillment of the bright promise that was held forth.

Indeed, I could go on and on, discussing the many new things the future not only promises but surely holds. The list is long. It would stretch as far as a piece of a new elastic silicon that is today an orphan of the plastic family, but which tomorrow may well be the pride of some new industry, whose founder has discovered a way to stretch the putty's qualities into new jobs, new profits.

Now—I am sure that *at least a few* of you have noted a very great hole in my discussion of the recent past, of the present and of the future. Perhaps it was an instinctive, but involuntary, method on my part of tantalizing you all to stay with me throughout these past minutes. I refer, of course, to the past, present and future of atomic energy.

Most of you know as much as I do about this fabulous research. You probably know of the 100 million volt betatrons now in operation as induction electron accelerators. And of the 70 million volt synchrotron, which increases the energy of electrons by a synchronous radio-frequency field rather than by magnetic induction as in the betatron. And doubtless you know, too, of the later linear accelerator, an atom-smashing device made possible by wartime work with radar.

Nor can I tell you anything new about the military potentials of atomic energy. You have undoubtedly read the recent announcement of the current use of pure plutonium in relatively small piles without a moderator to slow down the fast neutrons. And, even more recently, you have probably heard of the creation of man-made mesons—those hitherto mystifying particles knocked out of atomic nuclei by the application of tremendous force. What this last achievement may mean is not yet clear. But you can be sure that science will not rest until it is clear!

One thing we do know. It is only a matter of time before industrial power can be obtained from nuclear energy. *How* and *when* and *where* remains to be answered, it is true. Engineering and economic factors are still to be solved. But atomic scientists today predict that in the not too distant future, the first application of atomic energy to commercial use will be a reality. And they look to navigation as the door which will first be opened. They believe that stationary power plants and ship propulsion will be its first practical use, and they believe also that railroads and planes will be among its last users, because of the need for reasonable stability and for necessary space to provide heavy protection between the atomic plant and the passengers.



Of the many conceivable systems for producing power from the fission of uranium and plutonium, only one seems at this time favorable for an early practical application. That system is one in which a liquid is heated in a "pile" or nuclear reactor and then conducted to a heat exchanger where it generates steam for use in a standard steam turbine-generator set. Such a procedure could not at present be undertaken in any set-up less large or stable than a big ship or a land installation. And I might add, that if atomic energy is finally tested in a ship, it is expected that the ship *could travel 40 times around the world* without refueling.

However, there are a multitude of engineering problems still to be solved to achieve effective heat transfer even under less experimental conditions. The process is going to take a long time.

But the utilization of the betatron principle of X-ray is a more immediate practical reality. Since it permits generation of X-rays far above the present 2 million volt level, it opens up an entirely new field, not only for industrial radiography, but also for medical therapy. Betatrons can be made extremely compact. A 10 million volt unit, for example, could be built in the space required by an office desk.

The future contribution of isotopes to medical therapy may well make medical history overshadowing even the glorious chapters of Pasteur, Curie and Reed. Cancer, leukemia, anemia, Hodgkin's disease, gangrene—all are being attacked, at least experimentally, with the radio-isotopes. All may lose their fearful grip on mankind, if the tests now being conducted prove these isotopes to be even in part as effective as many men of research believe them to be.

Yes—if we can keep our utilization of atomic energy confined to peace, it will doubtless prove to be one of God's great blessings.

Yet, in a sense, the splitting of an atom or the piercing of the sonic barrier is, in the final analysis, no more important to human well-being than are many other engineering contributions—to improved homes, to better factories, to finer cities. The dramatics of the cyclotron and the instrument-filled war-head may outshine the everyday gleam of the refrigerator, the roller-hearth furnace or the concrete highway. Yet, their practical contribution is none the less great.

The universe of the scientist and the engineer is truly an expanding one. And with the scientist and the engineer, industry has formed a team to meet the challenge of the future. This team is strengthened by the farsighted efforts of American colleges and universities—in whose laboratories are being trained tomorrow's men of science.

As engineers look ahead, they feel that there is much to be done. They see it as a tremendous job, a tremendous opportunity *and* a tremendous responsibility. Theirs is the task of finding new tools for humanity to use. Theirs is the task of finding practical ways to produce those tools in large volume.

More than ever before, the people demand that research and development be pursued in ever-increasing haste—in behalf of progress and prosperity. And they look to industry, not government, as the sponsor of scientific study. And industry, as it has in the past, will



respond to that need—because industry recognizes the value of research and development.

The spirit of science cannot be mobilized. But it can grow. It can grow in the schools. It can grow in industry. But it must grow in freedom, if it is to keep alive the spirit of adventure and progress which has made America strong and prosperous in the past.

Scientists and engineers know that the wellsprings of progress and of prosperity have hardly been tapped. They know that we stand on the threshold of a new era—an era which will make the past of a hundred years ago—or even of 25 years ago—or of *today*—seem as far away tomorrow as the moonrockets of tomorrow seem today.

The future *is* ours—if we can match its *scientific* progress with *social* progress. To do that, we must truly apply the formula of research to the formula of living. We must face our everyday problems with the same direct reasoning and honest attack by which men of science approach scientific problems. Open and alert minds offer the key to our future. Let us use this key now *and* in the future. If we do, there is a good chance that *Americans all* may march with their modern Aladdins of science and engineering along a broad course of social and scientific progress and prosperity.



# FUTURE ASPECTS OF SCIENCE

*By Robert D. Coghill*

DIRECTOR OF RESEARCH, ABBOTT LABORATORIES

## *Introduction*

In speaking to you today about the future of science, I will not have the presumption to attempt to predict the course it is going to take over the next 10 or 20 years. That would seem to be folly, for who in speaking on this topic in 1938, would have had the foresight to predict that 10 years hence we would be expending as much time and effort in the two fields atomic energy and antibiotics as is the case today? I venture to say there would have been no one. I fear that the truth of the matter is that scientists do not, to a very large extent, determine their own destiny in this respect. Rather, it is forced upon them by the resurgence of much greater forces in the world about them, forces which are largely beyond their control. Had it not been for the intervention of World War II, for instance, we would neither be troubled today by the fear of atomic bombs, nor soothed with the thought of the availability of penicillin. Both of these accomplishments were born of the exigencies of war. Although both of them would probably have eventuated in the course of time, it was the tremendous financial backing which comes only in wartime, and the urge of necessity, which made them a reality today.

Therefore, it seems to me that rather than to attempt predictions—which I would probably blush to read 10 years hence—it is better that I try to point out to you, as I see them, the nature and importance of some of the forces which are operating today in shaping the future direction of science.

## *The Influence of the Source of Financial Support*

The first and probably most important of these forces is the source of financial support. This force has become of increasingly greater importance during the past 10 or 20 years—for a variety of reasons. During its infancy and early life, science was, to quite an extent, the avocation of members of the leisure classes. Not troubled by having to earn a living, they were the ones who had the time to think and the resources for modest experimentation. Great discoveries were made by the use of very modest equipment. In fact, our whole background of fundamental scientific knowledge is almost entirely the result of individual effort. It can be likened to the exploration of a new land—great intellectual riches awaited the man who was first there. In this connection, one of my old teachers frequently bemoaned the fact that he had not been born 50 years earlier, when so many wonderful plums were there for the picking. As time goes on, however, the more easily reached plums have, for the most part, been gathered in, and important progress comes only at the cost of greater effort.

Science today is not what it was 50 or 75 years ago. To be sure, there are still fields for individual effort, but one man—or even a few men—cannot build and operate a cyclo-



tron. It takes physicists, engineers and mathematicians. The development of a new anti-malarial requires the combined efforts of the synthetic organic chemist, the pharmacologist and the parasitologist. To provide a new antibiotic, one must coordinate the efforts, among others, of the microbiologist, the biochemist, the pharmacologist and the clinician. The point I wish to make is that most of our big research projects today are big in more than a scientific sense—they are big from an administrative and financial point of view. Charles Good-year vulcanized the first rubber on his kitchen stove in New Haven, and from that discovery have sprung several great industries, but compare the scale of this operation with the magnitude of synthetic rubber research during the last war!

This change from individual effort to organized research has brought up the problem of financial support. Research facilities have to be made available, equipment (much of it fantastically expensive) has to be provided, and salaries have to be paid. Science is no longer an avocation. It has become a profession which provides a means of living for an increasingly large minority of our population, and which directly or indirectly affects the life of everyone.

Obviously, the financial support for the professional scientist determines, to a large extent, the direction of his efforts. A pharmaceutical house, for instance, does not employ men to develop better synthetic rubbers, nor does an electrical equipment company seek to discover new antibiotics. The source and magnitude of financial support here, as elsewhere, dictates the field of research, and the amount of support is, of course, roughly determinant of the results to be expected. It is therefore pertinent to look into the origin of this financial support, and the radical changes which are taking place in this respect. There are today three chief sources of funds available, namely: endowments, industry and government.

*Endowments*—The first of these sources includes all primary university funds as well as those of various foundations. These private funds formerly supplied the chief financial support of scientific research. Under their operation the scientist was almost entirely free to travel in any direction he chose—to follow any leads, irrespective of their practical importance, which might eventuate in discoveries of fundamental import. There are well-known instances, of course, where a man's scientific conclusions have had to be subjugated to the fancied economic and political welfare of his community, but by and large, science under this type of backing has progressed more or less untrammelled. Under this scheme of things, fundamental research has been encouraged and science has enjoyed an orderly development over a broad front. This particular source of support, however, is rapidly disappearing. Practice of the so-called "soak the rich" theory of taxation has almost completely dried up the reservoir of large gifts. A man who had a million-dollar income 20 years ago could afford to give a hundred thousand dollars to a university or foundation and have plenty left over with which to buy shoes, food and yachts. Today, however, federal income taxes take about \$850,000 of the million, and by the time a potential donor pays state income taxes on the whole, he has virtually nothing left—certainly nothing to give away. On top of this, the inflation in the cost of labor and materials, which we are still



experiencing, has cut the effectiveness of previous endowments to the point where they can now pay for only about half of the work which was previously possible. As a support of scientific work, therefore, we can look upon private grants as a factor of rapidly decreasing importance. With them goes the chief hope of a free and natural growth of science. The so-called "academic" research of the past, which has yielded so much of fundamental importance, will have to give way to a large extent to "directed" research—"directed" by virtue of the origin of its financial backing.

*Industry*—With respect to the industrial support of science, little need be said. Industrial research has grown enormously over the past 25 years, and industry is now one of the main supports of science and the scientist. Science in industry, however, is for the most part not free and untrammelled. Most of the problems are of a practical nature and translatable into dollars within a reasonable period of time. It has to be this way. Otherwise, the company supporting the research would proceed to go bankrupt within a foreseeable future. Nevertheless, some large organizations—and they must necessarily be large—have been able to foster a certain proportion of free fundamental research. This policy is to be commended, and will undoubtedly spread as forward-looking executives are educated to its necessity and desirability, and to their obligations to the community in this respect. Such "luxury" in industrial research, however, will always have to come from organizations having a strong financial structure and large research departments.

Another aspect of the industrial support of science is the fellowships and grants stemming from this source. Whereas many of these grants are necessarily directed into specific channels and problems, a gratifyingly large proportion of them—among them our Abbott Postwar Fellowships—represent gifts to our universities which can be used for the support of science at the discretion of the institution, and have no strings attached. As such, they are helping to fill the gap left by the drying up of funds from private sources.

*Government*—Support of science by the government can be divided into two categories. In the first place, we have the work being carried out in the many government laboratories themselves. Secondly, there is available what amounts to a system of grants. The latter may best be exemplified by the allocation of United States Department of Agriculture funds to the state Experiment Stations and by the research grants and fellowships available from the National Advisory Health Council. The Army and Navy also have money available for this purpose.

First let us consider research in the government's own laboratories. I can speak from the heart on this subject, for I was a research worker in the Department of Agriculture for over six years, which included the period of the war. This is the first chance since I left two years ago (and may possibly be my last) to speak publicly on the subject of governmental administration of research. Before going on, however, allow me to state that I have the greatest respect for the scientific ability of the majority of the administrators and research men with whom I came in contact, and my former colleagues are still among my very best friends. Irrespective of their ability and devotion to work, however, the fact re-



mains that they are carrying on under many very great handicaps. I bring this situation to your attention because it is first-class evidence for the thesis which I am trying to develop, namely, that the direction which research (science) is to take will be controlled by the holders of the purse strings—in the case of governmental research, Congress.

The members of the appropriations committees and subcommittees in Congress are the *real* directors of governmental research. This stems from the fact that each bureau chief must appear yearly before the appropriate subcommittee to obtain his next year's funds. The work of the past year and new projects for the future have to be "justified." Projects displeasing to certain congressmen may (and have been) eliminated. I am thinking of one particular case in which a well-conceived and executed project on lead and arsenic toxicity, one having important public health implications, had to be terminated and the animals sacrificed on June 30—prior to completion of the work—because one congressman, a fruit grower, was afraid that the results might pinch his profits. The next year's appropriation for the whole bureau was accordingly made contingent upon the complete elimination of this project. What is a bureau chief to do? He has other work of value to carry on and an organization to hold together. Another aspect of congressional direction of research is that pressure groups within Congress are able to force research on projects having no scientific promise or justification. A bureau chief's *most essential duty* is to make as favorable an impression as possible on the committee, in order that his next year's appropriation may be forthcoming. The result is well exemplified in the statement, known to me, which was recently made by an administrator to one next lower in rank. While turning down a newly proposed project, he said, "No, John. I know it's a good project. But it is much better to have a poor project that a congressman can understand than a good one that he can't understand." As a constructive suggestion, the solution to that problem, and one which merits the earnest attention of Congress, is to make appropriations for research on a 5- or 10-year basis—rather than for one year only—in order that an administrator may feel free to work on worthy long-term projects without fear of being cut off before significant results are available. Fundamental work which may later lead to important practical applications is exceedingly difficult to explain and justify to a non-technical person, particularly when that person may be thinking primarily in terms of tax reduction or of certain constituents' pet projects or aversions.

There are also other weaknesses in governmental research. Chief of these is the unfortunately low salary scale. A congressman's salary represents the maximum which a government scientist may hope to attain. Furthermore, the government employee is not, in general, allowed to enhance his income by consulting on the side, as do many university professors. When one works down through the many echelons of administrators, the actual research man in the laboratory, the scientist who produces the results, receives a salary which compares very poorly with what he could receive in industry. The result is that the better men, although fortunately not all of them, are constantly being lured away for



an average of about twice what they were paid by the government. This leaves the poorer men to carry on.

Secondly, travel allowances established by Congress are disgracefully low. During my three years of extensive traveling on the penicillin project during the war—with only six dollars a day allowed to pay for my hotel, meals, taxis, tips, etc.—I had to spend hundreds of dollars out of my own pocket, a pocket replenished by only a \$6,000 salary before income taxes. I was repaid by the satisfaction which came from the importance of the results which were achieved—but the continual financial drain did not add to the allure of my position. You can be assured that congressmen travel on a much more liberal basis!

Finally, government scientists are so restricted by departmental regulations concerning attendance at meetings, that many good men have been unable to go to scientific meetings for years. Congressmen have never seemed to be able to understand the difference between a national scientific meeting and an American Legion Convention. In industry, we know that it pays good dollars to maintain a liberal policy in this respect, and to see that every senior research worker gets to *at least one* important scientific meeting a year. This policy would be of equal value to the government.

The examples given above are just further evidence of how administrative research policies—which to such a large extent determine the direction of science—are the results of the source of financial support. The quality of the men available for government positions is directly related to the attractiveness of the employment—and it is the quality of these men which determines the success of the research. Again, to make a constructive suggestion, every effort should be made to remove the above cited shortcomings in our federal research system.

With respect to the grants-in-aid emanating from governmental coffers, we are faced again with the fact that the research is directed into definite channels which are dictated by the origin of the funds. The United States Department of Agriculture, through its Office of Experiment Stations, grants funds to the state Experiment Stations, such as the one here at Ames, but most of these grants are for specific projects. A certain proportion of the funds available, however, are given directly to the Experiment Station without having any strings attached except, of course, that they are to be expended towards agricultural ends. The extent to which these funds can be used for the support of fundamental research is dependent upon the imagination and farsightedness of the administrator at the state level.

Another very large source of federal funds which are earmarked for research has been made available to the National Advisory Health Council. This committee of the National Institute of Health, upon recommendation of the study sections which have been appointed to advise in all the various fields of medicine and public health, grants financial support to individual projects in amounts ranging from several hundred to as much as a hundred thousand dollars per grant. This money goes almost entirely to the universities, and there are virtually no strings attached. It is today our best assurance of the continuance of fundamental research in the field of medical science. Problems are conceived by the university



scientists, who write up projects and present them to the appropriate study sections with their requests for aid. The members of the study sections, all scientists, must sift these applications and try to pick the most promising—for there are not sufficient funds to take care of all. Of the many forms of federal support of research, this system seems to be working the best and offering the most promise. Medical scientists are relatively free to follow their own ideas. The future direction of medical science is thus limited only by the amount of funds available, and guided by the judgment of the scientists—leaders in their respective fields—who go to make up the study sections.

### *The Influence of World Politics*

The other great influence on the future direction of science is that of world politics. This factor, however, is very closely related to the one which I have just discussed—and, in a sense, inseparable from it.

Much as we hate to admit it, I believe that it has gradually dawned upon most of us that the war we have just fought—supposedly for the elimination of the aggressor nations—was not completely successful in that respect. There yet remains one nation which by its every action and word is obviously committed to a policy of world domination. Its methods of action, its complete disregard of the value of the life and liberty of the individual, and its insidious fomenting of strife in the national life of other nations, stamps it as no whit better than the Nazi Germany of Hitler. One after another of its weaker neighbors has been swallowed up. Czechoslovakia was, only recently, the latest victim. Finland is obviously the next on the list. As advocated by Hitler in *Mein Kampf*, the screw is being tightened a quarter of a turn at a time—never enough to arouse overt action on the part of a future victim, never enough to provoke a concerted attack on the part of others—but its progress is inexorable.

What can one do about such a state of affairs? An individual afflicted with paranoia and a persecution complex is a difficult enough problem to handle. When a powerful nation becomes so diseased, it is an almost impossible situation. As I see it, the only thing which can be done is to prepare ourselves for the worst—and prepare ourselves in no unconvincing manner. I doubt whether history can produce a single example wherein unpreparedness has saved a nation from an aggressor. The plight of an almost completely unprepared England in 1939 is still fresh in our minds. Here, as always, unpreparedness was merely an invitation to aggression. In spite of this, we still have our political ostriches who believe that we can evade danger by ignoring it—or by calling it by some other name.

The chief difficulty in becoming prepared is the completeness which is necessary for effectiveness. The most compelling example of this with which I am familiar relates to the place of gas warfare during the recent world conflict. Germany had it ready for use, as did Japan, but neither employed it against our troops. Italy used it against the Ethiopians, who were powerless to retaliate, but not against us. The reason for the failure to employ this weapon of warfare on the part of our enemies was just one—they knew that we



had the munitions *at hand* to give it back to them on a tenfold scale. This is a beautiful example in which complete preparedness staved off attack by a specific weapon.

I firmly believe that this extent of preparedness is our greatest insurance for peace and freedom from aggression in the years to come. We must have the most and the best airplanes. Our lead in the field of atomic weapons must be maintained at all costs. We must have the best available of the machines of war, as well as the factories to produce them and the necessary raw materials. Never again must we be caught without the "rubbers" and the "tins" and the "quinines" that are necessary for an economy which is self-sufficient within the area of effectiveness of our navy and air force. Biological warfare, abhorrent and fearful as the thought may be, must be developed to its fullest extent, in order that our potential of action in this respect may save us from attack by this weapon—reasoning from the recent history of poison gas which I have just related. Preparedness on such a scale in so many fields is a truly stupendous undertaking. It is undoubtedly the most important task facing science and scientists today if we propose to survive as a nation and as a society of free men.

An important aspect of a preparedness program of this type and scope is a purely educational one. We will need men and more men—and they can be masculine or feminine. We will need technicians, research assistants, senior scientists and scientific administrators to man our research laboratories, factories and proving grounds. These men will need sound fundamental training, and this educational effort will have to encompass all of the fields of science. They will have to be, more than ever before, cooperative and easy to work with—for most projects of the future, as I have pointed out above, will be large and depend for success on effective teamwork. This factor of size also means that our future scientists should be trained adequately in the art of writing an understandable report, an accomplishment which many of the young scientists of today do not possess. All of this training is the function of our great educational institutions such as the Iowa State College. The effective scientific education of your students and the fundamental research activities of your faculties will be the cornerstones upon which will rest the future of science in the United States. Educators and scientists may not be able to determine the future direction of science, but they most certainly can determine its quality.

To return to my thesis—the future direction of science—I have tried to indicate how world affairs exert a most powerful influence on that direction. Over the near future, the preparedness motif must be dominant. From this effort will result much of value to a peaceful world. Research directed toward an atomic bomb has already promised us atomic energy and the availability of radioactive materials for medical research and possible clinical use. Commercial aviation will be benefited by the quest for better bombers. Research on biological warfare will undoubtedly yield effective methods of treatment for hitherto unconquered diseases. The effort will, in short, not be a total loss. Nevertheless, one cannot help but bemoan the tremendous waste of otherwise useful talent which is thus occasioned by a power-hungry dictatorship.



There is one more point. Until now I seem to have made the tacit assumption that the future direction of science will be determined in the United States. I do not mean to imply this. The fact remains, however, that the same factors which are operating in this country, those factors which I have discussed today, are operating the world over. Science in England and Russia is under the same restraints as I have just described as operating in our own country.

### *Summary*

In conclusion, I would like to summarize for you the general tenor of my thoughts relative to the future direction of research. I have elaborated on some of them in detail, and may have obscured their implications. Let us take these last few minutes to try to see the forest rather than the trees.

It is my thought that the time is now well past when *scientists* determine the path for the future of science. From a stage of individual effort occasioned by the comparative infancy of science—a stage in which scientific workers were supported by private funds—science has expanded in its breadth and application to the point where most projects are now necessarily large. This period of a growth which required ever increasing financial support has been concurrent with the development of economic conditions which have to a large extent dried up private sources of financial aid (killed the goose that laid the golden egg), and rendered existing endowments only partially effective. This has thrown the financial support of science increasingly into the arms of industry and government. The effect of this trend has been to influence the direction of research into those specific channels for which funds have been made available—generally quite practical in nature. This has in turn served to dry up our efforts in pure fundamental science—the touchstone for important developments of the future.

The time is now upon us when, to an ever increasing extent, the financial support of science will come from the government. Inasmuch as this involves the appropriation of funds by congressional action, it is our legislators and politicians who will, to the greatest extent, determine not only the direction science will take but also its momentum, for specific amounts of money are always appropriated for specific purposes.

Finally, the political situation in the world as a whole will be a most important determining factor in the minds of legislators. Science encompasses many fields of action. The direction of science is in reality the summation of all of the vectors which go to make up the whole. In times of international political stress, a legislator will think in terms of national defense. When we are lulled into a sense of security, national defense will undoubtedly be sidetracked in favor of other fields. To be sure, politicians will on occasion ask our scientists for advice, but they do not always take such advice, as witnessed by the intrigue in connection with the National Science Foundation legislation. We still do not have the foundation, largely because of the lack of agreement as to whether the scientists or the politicians shall be in the driver's seat.

When everything is taken into consideration, it is my belief that the interdependent fac-



tors of research financing, world politics and legislative authority will be the greatest influences in determining the future direction of science. We scientists may fight the currents which appear unfavorable to us, but in the long run we will find ourselves ending up where the tides of economic and political forces carry us.



# The Anniversary Dinner

G R E A T H A L L , M E M O R I A L U N I O N

M O N D A Y E V E N I N G , M A R C H 22 , 1948



# GREETINGS FROM ALUMNI AGRICULTURE

*By E. N. Wentworth, '08*

DIRECTOR, LIVESTOCK BUREAU, ARMOUR AND COMPANY; PRESIDENT, IOWA STATE COLLEGE  
ALUMNI ASSOCIATION

Dr. Friley, Governor Blue, distinguished guests, friends of Iowa State, members of the faculty, and alumni. It is an unusual experience for me to appear tonight on behalf of the Division of Agriculture. I might say parenthetically that it is a wonderful opportunity. My name begins with "W" and I have always been at the far end of the alphabetical list, but by being classified under "agriculture" I have now reached the top. To me it is an outstanding occasion.

During my many years as an alumnus I have been identified with the general activities of the college. It has become my custom to boast of Iowa State men and women rather than those who represent any special division. But Dean Kildee has assured me that tonight is my "night to howl" as an old student of agriculture, and I should never overlook an opportunity of that sort.

Ninety years ago, when Iowa State College was authorized, the leading agricultural authority in Iowa, if one can judge from the journals of that time, was a Congregational minister. His name was J. B. Grinnell, and Grinnell College is named for him. How things have changed since that day. Grinnell is no longer our agricultural authority, and the men coming from these halls have assumed higher and higher degrees of agricultural prestige. I do not want to detail a list of distinguished alumni, for they are too numerous for any occasion. But I do think there are some who illustrate definite fields of activity, and I shall mention some of their leading men to demonstrate the extent to which the Division of Agriculture has come to affect the agricultural picture—not only of Iowa, but of the United States and of the world.

First I should like to mention college presidents. G. I. Christie, '03, now retired, was president of the Ontario Agricultural College for many years. Before that he was director of Extension at Purdue, and before that was a professor of agronomy and farm management here at Iowa State. Alfred Atkinson, '04, also retired, was formerly president of the Montana State College, and later of the University of Arizona. Then here, in our own midst tonight, we discover a fine example—Fred Leinbach, who is president of the South Dakota State College.

And then there are deans. I have already referred to Dean Kildee, '08, and of course the older of us remember with deepest affection our deceased leader, Dean C. F. Curtiss. Many of us, too, have had deep friendship with James W. Wilson, one of our original Cyclones and son of our first Dean of Agriculture at Iowa State, the revered "Tama Jim" Wilson. James W. Wilson was Dean at South Dakota State College and Director of the Experi-

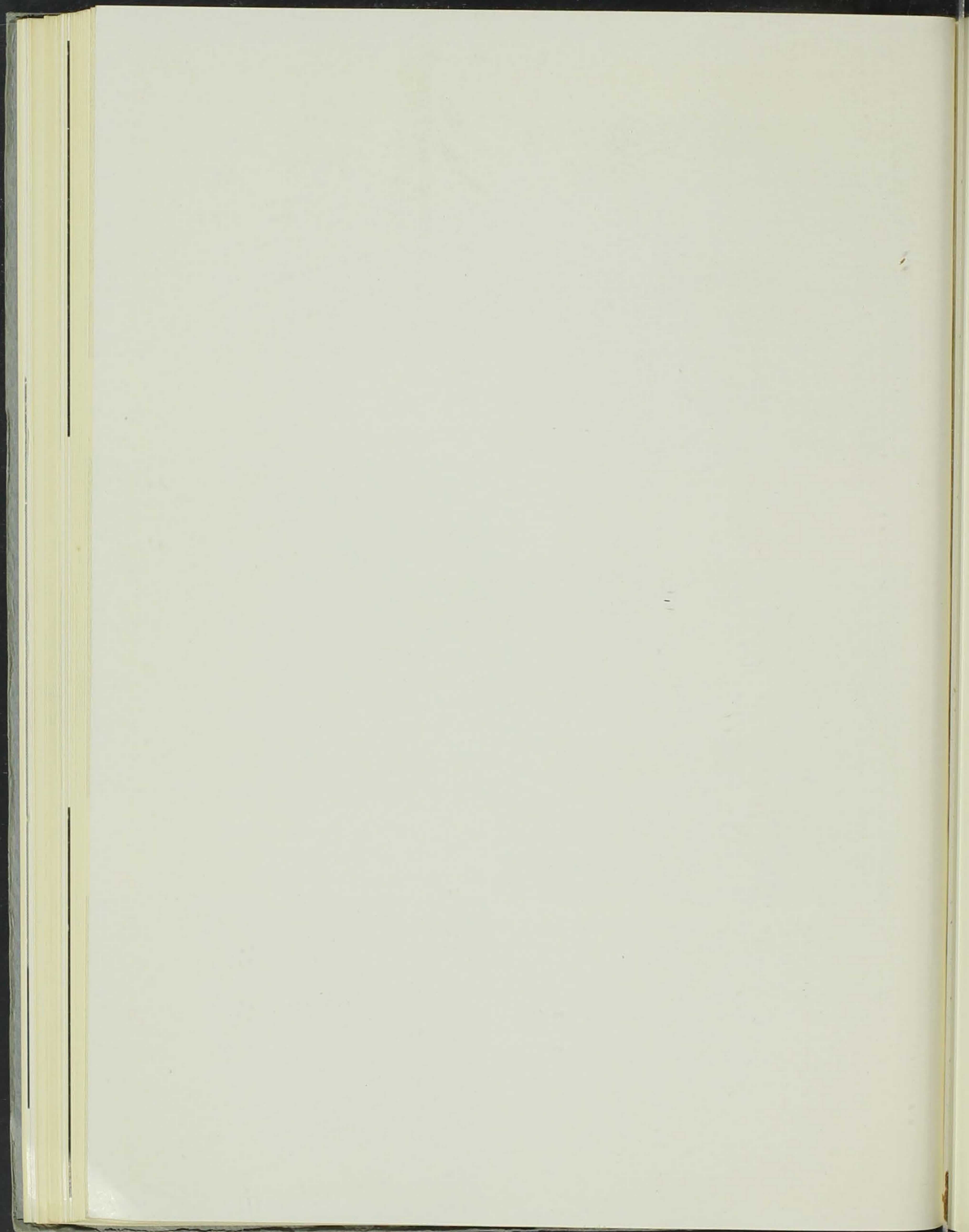




Distinguished alumni extended greetings at the Anniversary Dinner: ELOISE DAVISON, '24 (upper left); FRED T. WHITING, '13 (lower left); E. N. WENTWORTH, '08 (upper right); DR. W. A. PENNINGTON, '33 (right center); and DR. LESLIE M. HURT, '04 (lower right).









ment Station for many years. Then, J. H. Hilton, '23, is Dean of the North Carolina State College; D. R. Theophilus, '20, is Dean of the University of Idaho; and C. A. Larsen, '02, now retired, was a long-term Dean of Agriculture at South Dakota State.

If I come now to department heads, I would name so many that you would be here quite a while. Nevertheless, I should like to mention a few of the outstanding ones. Dr. E. L. Potter, '08, of Oregon, head of the Division of Agricultural Economics, has been one of our best writers on the western range livestock industry. N. E. Hansen, '87, was head of horticulture for many years at South Dakota. He was one of the leading importers of plants and new crops for the entire nation, and has done some wonderful things for the high plains country. Of course, we should mention Professor Shearer here at Iowa State in animal husbandry, Fred Hultz, head of animal husbandry at the University of Wyoming, and W. H. Peters, '08, head of animal husbandry at the University of Minnesota. M. P. Jarnagin, '05, professor of animal husbandry in Georgia, has done one of the most interesting tasks that I know of, so far as physical accomplishment is concerned. Under his leadership, and almost under his personal tutelage, Georgia farmers have increased the state production of livestock to a point where, three years ago, it passed the value of the cotton crop for the first time in history. He is one of the most indefatigable workers with the people in his own state of any person I have ever met.

Professors of dairying and agronomy are connected with many of the leading agricultural colleges in the country. Director of Extension at the University of Minnesota is P. E. Miller of the Class of 1911, and director of the Experiment Station at South Dakota is Dean I. B. Johnson. At Ohio State University, Fordyce Ely is head of dairy husbandry, and at the University of Michigan, Shirley W. Allen, '09, is head of the forestry department.

The leading breeds of livestock have all been affected at some time or other by graduates of Iowa State College. I would like to mention as one of the particularly foundational men R. J. Kinzer, who developed the American Hereford Breeders Association from an organization rather impoverished financially to an organization that is now one of the big real estate owners in Kansas City. In addition, he registered over 2 million head of cattle. Charles Gray, 1904, was secretary for many years of the Aberdeen-Angus Association, and today another "Iowa Stater," J. M. Tudor, is president of that Association. Floyd Johnston, '24, is secretary of the American Jersey Cattle Club. Fred Marshall, 1900, was for over 25 years secretary of the National Wool Growers' Association. Wayland Hopley has been president of the Iowa Beef Cattle Producers Association for a long time also.

Then we may go into other organizations, apart from livestock registry societies. Allan B. Kline, '38, is president of the American Farm Bureau Federation. Howard Hill, '30, is president of the Iowa Farm Bureau Federation; and its vice president is Richard Stevens, ex '25. Then in other fields, Wayne Dinsmore has for nearly three decades been head of the Horse and Mule Association of the United States, the man who has really kept horses and mules before the public. Guy Noble, '14, is one of the founders and present manager of the National Committee on Boys and Girls Club Work. R. C. Pollock, '13, is managing direc-



tor of the National Livestock and Meat Board. John T. Caine, III, '05, is the manager of the National Western Livestock Show, a show which has done more to improve the western cattle industry than any other single influence I have discovered. Ed Estel, '10, is head of the Dairy Cattle Congress; Carroll Plager is one of the chief officers of the National Barrow Show; R. C. Hibben is head of the International Association of Ice Cream Manufacturers in Washington. But I must cut off this list arbitrarily.

In journalism Carroll Streeter is editor of the *Farm Journal* of Philadelphia. Kirk Fox is editor of *Successful Farming* in Des Moines; Merle Seder is with the Curtis Publications; J. P. Eves is head of the Meredith Publications office in Chicago; "Jim" Watson, '13, is editor of the *New England Homestead*; and Jim Henderson is editor of the *Hog Breeder*, published in Missouri.

Then in radio, some of the most distinguished men come from Iowa State College—Frank E. Mullen, executive vice president of NBC, and N. F. "Scoop" Russell, '20, with NBC in Washington. C. L. Burlingham, '13, is a radio free-lancer in Chicago who appears over almost every farm station in the United States at some time or other. Harry Butcher, who wrote the biography of General Eisenhower, operates a large radio station in Santa Barbara at present, and we must not forget our own Herb Plambeck of WHO, Des Moines. I have scarcely entered this field, and I can assure you that the rest of the sampling is equally good.

Since 1900 Iowa State College has been very prominent in the government. George Rommel, '99, now deceased, was really the founder of the Division of Animal Husbandry in the Bureau of Animal Industry; M. L. Wilson, class of 1907, is director of Extension for the Department of Agriculture; Lyle F. Watts, '13, is chief of the Forest Service; A. S. Hitchcock, '82, now deceased, was one of the greatest students of grasses this country ever had, and was a great improver of grass crops on plains and forests; Fred Rossiter, '23, is the acting head of the Office of Foreign Relations; and Elwood Mead of the Reclamation Service was one of our great former students.

In business, W. H. Brenton is the president of the Iowa Bankers Association and president of the Des Moines National Bank; Glenn Rogers is head of the real estate department of the Metropolitan Life Insurance Company; Porter Jarvis is vice president of Swift and Company; W. A. Wentworth, my brother, is in charge of industrial relations for the Borden Company in New York; and Bruce Russell, '20, is vice president of the Farmers' National Company of Omaha, and president of the American Society of Farm Managers.

In the beginning I intended to say that I was not going to mention our graduates and former students who have succeeded in farming, because merely mentioning our Master Farmers would be an endless job. Some of the finest producers in the state of Iowa, and in surrounding states, have come from this school, and have practiced that old precept of "science with practice." But one man, William Howard Smith of Prattville, Alabama, is to my notion the finest example of a scientific plantation manager that I know of in the entire United States. He was one of the first, if not the first, to break away from the old system of tenant farming with the negroes. He put them under business management in labor groups,



and raised their standards of living so greatly that no one can tell how important this innovation proved. William Howard Smith is a pioneer whose voice is not yet properly heard in his own state, but he is one of our great outstanding graduates.

There is just one other phase that I want to mention, and that is the place of Iowa State men all over the world. People who visit South America tell me there is not a single country where they go but that the leading men in agriculture proudly state that they are graduates of Iowa State. But in the eastern hemisphere there are two particular men I want to mention—J. A. Scott Watson, who was here in 1910 for his master's degree, and who is professor of agriculture at Oxford University in England, after serving as agricultural attache to the British Embassy in Washington; and E. L. Bosman, who is the principal of agriculture in one of the leading agricultural colleges in the Union of South Africa.

I had previously stated that this is our night to make acknowledgments with pride for our Department of Agriculture. I think you can all feel that pride with which those of us who have come out of the Division of Agriculture regard the men who have taken a leading part in shaping public opinion, and in molding the thinking and heading the procession in all ways in agricultural production, science and leadership all over the world.



# GREETINGS FROM ALUMNI ENGINEERING

*By Fred T. Whiting, '13*

VICE-PRESIDENT, WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY

I think you will all admit that times have changed. You who attended the sessions this afternoon heard plenty of evidence of that, but I dare say that this is the first time that they have ever had the temerity to put an Ag and an Engineer on the same program.

I am very happy to be here tonight for this very memorable occasion and to take part in celebrating the ninetieth anniversary of the founding of Iowa State College. I am especially proud of the privilege of representing the engineering graduates. At the same time, in carrying out that assignment, I feel most humble; humble because I am sure there are many who would better qualify. As we grow older we are more and more inclined to look back and with mixed feelings view what has gone before. In my own life there have been two periods which have really stood out. First, my four years at Iowa State, which by the way will always be just Ames to me, and second, my 35 years with Westinghouse. I have thoroughly enjoyed both and I have always been proud of each. I am sure that every engineering alumnus can, and undoubtedly does, share the same pride in his alma mater. I have yet to find the first one who failed to throw out his chest just a little when speaking of his school. I question whether you folks here who are living with it day in and day out really appreciate the lift that we alumni get from the mere knowledge that it is our school.

Men, yes both men and women, engineering graduates of this great school have been welcomed not only throughout the engineering world but in other fields as well. Not always have we chosen and stuck to strictly engineering callings, but you can rest assured that that engineering background and that engineering training have helped many to progress in other fields. Upon graduation a great many have chosen to go with large companies or corporations, others with smaller companies, and still others have either started in with or have developed businesses of their own. Tonight I had planned to mention something about some of the many engineering alumni who have earned real recognition in their particular calling. I even went so far as to start such a list. I abandoned the idea because there were so many in the Engineering Division that I would not attempt even to read any such list.

Not many of the faculty still remain who were here when I graduated in 1913. Dean Marston is one; he is sitting down here in front, and I am sure that he is one who was loved and respected by everyone who knew him. I feel certain that every engineering alumnus would want me to pass on his personal greeting to Dean Marston this evening.

It may interest you to know that the first engineering class consisting of six graduated in 1872. By comparison, last year there were 465. More than 7,700 have received engineering degrees since the school started. Of that number, approximately 6,500 are living today. From this group it is my privilege and a real pleasure to bring greetings.



# GREETINGS FROM ALUMNI HOME ECONOMICS

*By Eloise Davison, '24*

DIRECTOR, NEW YORK HERALD-TRIBUNE INSTITUTE

For anyone who has watched Home Economics in action for the past 25 years as I have, it is a frightening, a daring, but nevertheless a challenging thing to bring a five-minute message to the distinguished assembly here tonight, and to try in some way to convey the greetings of the 6,486 graduates of this Home Economics Department. I confess that whenever I am faced with figures about the Iowa State College, I am very surprised. When the seventy-fifth anniversary number of the *Iowa Homemaker* came to my attention it was full of facts and figures that even I, who have had a chance to be a part of things here at the Iowa State College, found surprising. I was very surprised to learn that at the present time there are 1,600 home economics students here in this college. So, even though a huge job has already been done, I feel quite sure that there is a bigger job ahead.

I am not sure that the first 90 years have been the hardest. Home economics is the only type of education that is truly and admittedly home-centered. One of Iowa State College's greatest prides, it would seem to me, should be that from the very outset, women at this institution have had the same educational opportunities as men. To me, this shows the vision of those who have been in command at the Iowa State College from the very first. After all, it is a very right thing, because home is where democracy begins. Indeed, a home is a miniature democracy that is beset by all the ills that plague the world. Dictators, too, are made at home. Sometimes they are very young dictators and sometimes they are older, but dictators nonetheless and very set in their ways. Yet, homes, too, are the places where we live together in peace, and I would say at this moment that nothing to which you can give support is more important than the place where we learn to live together in peace. As imperfect as homes can be, home is still the place where fundamental cultures and customs, traditions and affections are bred and nurtured. And so it must be until we find something better. But so far as I am able to discern there is not even a blot on the horizon that looks as if it could in any way replace the home as a training spot.

I find myself in contact with home economics students from the Iowa State College almost continuously. I must admit that I thrill with pride whenever I run into them, and I do run into them in the strangest places. Every place I go, it seems that somebody comes up and says to me, "Aren't you Miss Davison, and wasn't I in your class?" or "Didn't somebody tell me that you taught at Iowa State College?" And the younger they are, the better I like it because—and I am not saying this to be amusing, either—it looks to me as if the Iowa State College were training leaders in home economics. Not very long ago I went into a little restaurant in New York very close to where I live, and there were four attractive girls sitting at a table. One of them came over to me and said, "You know, we come



from Iowa State College." I think it's wonderful to have a tag so that people sort you out and come and tell you that they carry the same tag.

Like Colonel Wentworth, I would love to make a list of the famous home economists that I run into, but I'm not going to do it because I think you know them as well as I do. And I am hoping that we shall continue to recruit the very top-flight girls all over this state of Iowa and from every other place from which they come; that we will get the brightest and the best girls that there are in this whole country. And I am not talking about them from a career point of view. I am talking about them because I think they are the girls who will make the very best homes, and will give this country the stability it so needs. They are, I think, our safeguard so far as democracy is concerned.

Now, whether the first 90 years are the hardest or not, as long as we are shivering on the sharp edge of another world war—I hope it does not come, but we cannot dismiss it from our minds—I think what happens right at home, in your home and in mine, and in all the homes that are to come, is just one of the most important things in the world. And in this challenging, stimulating, baffling, changing world ahead of us, I hope you will continue to support home economics the way you have in the past so that some feeling of security can grow out of this institution that has been such an inspiration to so many through the years that have gone. Thank you.



# GREETINGS FROM ALUMNI SCIENCE

*By Dr. William A. Pennington, '33*

CHIEF CHEMIST AND METALLURGIST, CARRIER CORPORATION

It is indeed good to get back to the beautiful campus of Iowa State College. In the 14 years that I have been away many changes have been made, and the faculty is to be congratulated on the commendable way in which the emergencies have been met. The city of Ames proper has undergone so many changes that it is difficult for one returning after so long a time to orient himself so as to recall what was on this corner or what was on that corner.

The changing times can be illustrated by recounting a happening which took place here on the campus back about 1932. Most of you will remember that those days were different, entirely different from what we have today. Hamburgers were hamburgers, but the price was not the same. The story which I am about to relate had to do with the price of things. The Alpha Chi Sigma, professional chemical fraternity, was having a banquet here in the Union, and the toastmaster was experiencing considerable pain due to a sacroiliac condition which had caused his back to be temporarily badly stooped. Finally it occurred to him that some reference should be made to the situation if the group was to be put at ease. With no further hesitation he said, "Doubtless you wonder why my back has been hurt? To be frank with you it was nothing but bad judgment on my part. Nothing but bad judgment. I very foolishly tried to lift a dime's worth of oats." The sequel, of course, would be to display a dime's worth of oats tonight. I had thought of bringing a bag containing such an amount, but must confess, if I did, it has either been misplaced or I cannot find which pocket I put it in.

In representing the Division of Science there is a great tendency to tell you that it is the best division of the best school in the land. For fear that the first contention might provoke an argument, we shall not say it, but we reserve the right to think what we please. We are in one accord, however, where the school as a whole is concerned. Still some care must be exercised so that our praise does not take on the appearance of mere propaganda.

I have thought pretty hard about what should be said to you. So hard, in fact, that it seems that thought messages were being sent out to the alumni throughout the whole world. It was encouraging when messages seemed to be returned. This made it possible to conduct a type of Gallup poll to learn what the good people whom I represent would have me say to you tonight. Like every scientist who experiences something for the first time, I thought that this thought transmission discovery was entirely new. It has since been learned that the phenomenon is being studied today in several institutions under the name of parapsychology. The scientists whom I represent seemed to say to me, "If you can convince those people at the banquet that a rebel like you could come up from the hills of Tennessee and



go out four years later with a deep respect and love for the college, certainly they will believe us to be the most ardent of supporters." Part of their message then was "Speak for yourself, John."

It was not long before it began to dawn upon me, after my first arrival here as a student, that I really came to become a "yankee." To be sure, I would not ever believe that Grant took Richmond, but I would finally have to confess that he got mighty close. The professors had a lot to do with the transformation, so did the students.

May I recall one incident. At my boarding house I relied heavily upon a young man from Des Moines to tell me what some of the new dishes were. One day I noticed a dish that no one seemed to be eating so I turned to my friend and said, "What is this stuff?" In a muffled voice he replied, "I do not know, but I think it is something like slaw." I helped myself quite generously and conveyed a fully loaded fork to my mouth. Never has there been a worse sensation. My hair seemed to lift from the very top of my head and about the time that it was leaving, two streaks of energy not unlike that of Hiroshima shot out of the nasal passages. My friend had very subtly conquered a rebel with simple horseradish.

"Before you stop talking," the alumni of the Division of Science have said, "tell the people there about Mike. This story will represent us, too." Well, Mike is a young man who works for me as a technician, who is highly talented in taking properly refrigerant samples from refrigeration units. He is about 21 years old, has spent some two years in the Navy and has never been to college. Some few days ago I was showing a visitor the equipment used in the sampling, and at the first break in the conversation I, with considerable exuberance, informed the visitor that I was coming to Ames, and just as we were about to leave the laboratory the visitor turned to Mike and asked, "Are you from Ames, too?" With no reluctance whatsoever Mike replied in a most convincing tone that he was. Imagine my embarrassment! As soon as the visitor had left I spoke to Mike rather sternly, "What do you mean telling this man that you are from Iowa State College when you have never been to college a day in your life?" Mike had a most comforting, cooling effect in his reply, "I was afraid to say that I was not from Iowa State College because you might not like it."

When I was in school here, the chemists used to tease the chemical engineers and they in turn had their day with us. I have known a lot of chemical engineers—different kinds of chemical engineers. But a few days ago I saw a reference to what may be a new type. On page 816 of the March 15 issue of *Chemical and Engineering News* you may find an advertisement seeking to employ a literate chemical engineer. Not knowing what kind this was, I had to resort to the dictionary. The first definition found for the word "literate" was one who can read and write. It is only fair, however, to tell you that a re-examination of the advertisement revealed that they could also use a literate chemist.

Throughout the world there are hundreds and hundreds of scientists who have gone out from the walls of this institution. Their hearts are with us tonight. The faculty has their best wishes and they are with Dr. Friley as our leader for an even greater Iowa State College. It is from these men and women that I so proudly bring greetings tonight.



# GREETINGS FROM ALUMNI VETERINARY MEDICINE

*By Dr. Leslie M. Hurt, '04*

PRESIDENT-ELECT, AMERICAN VETERINARY MEDICAL ASSOCIATION

Nearly a hundred years ago a group of pioneer settlers, including goodly numbers of Civil War veterans, invaded the region of the Northwest Territory in search of land suitable for agricultural purposes. Nowhere were the prospects better than within the boundaries of the future state of Iowa. These farseeing settlers soon realized that there were many things about farming that they did not know, so they organized to bring about the establishment of an agricultural college. Their efforts met with success, and legislative authorization for the establishment of such a school was secured. Realizing the importance of livestock in the farm program, it was quite natural that some provision should be made for maintaining the health of their domestic animals. An act of the legislature, signed in 1858 by Governor Lowe, provided for the establishment of a State Agricultural College and Farm, to include "veterinary studies among other courses to be taught." Thus, from the very first literature from the college there is found frequent reference to subjects in veterinary science.

Due to limited financial resources of the time, it was not until 1879 that instruction in veterinary science became a reality. President Welch was insistent that students of agriculture take electives offered in veterinary science. Some objected to this, saying they came to college to secure instruction in agriculture, science and literature, even including mathematics. Dean Stanton, professor of mathematics, at that time holding the position of what is now the junior dean, had great interest then, as always, in veterinary subjects and informed these objectors that they should "take veterinary science and like it." This they did, and later boasted of it. Dr. O. H. Cessna, another early faculty member, always expressed great pleasure that he had had opportunity to take work under the first veterinary instructor of the college, the able Dr. H. J. Detmers, recently arrived from Germany.

The second veterinarian on the staff was Dr. Milliken Stalker, a graduate of the College of Agriculture in the class of 1873, who had studied veterinary science at Cornell and Ontario.

The early presidents of the college, from Dr. Welsh to Dr. Beardshear, were really magicians, pulling names out of the hat and in some way, with little or no money, securing assistants for Dr. Stalker. Dr. David Fairchild and Dr. Wilbert Harriman, the first college physicians, together with Mr. George Judisch, the pharmacist, are some of the early instructors in veterinary science most familiar to the old-timers here. These men made actual sacrifice in order to further the progress of veterinary science at this institution. Real progress, though slow, was made, as evidenced by increasing the curriculum from two years of six months each to two years of nine months each; then to three years; later to four. Subse-



quently one year of preprofessional work was made a requirement, in spite of which more applicants than could be accepted still sought admission.

Reorganization and strengthening of the division occurred during President Beardshear's regime. Such men as Doctors L. A. Klein, J. H. McNeil, J. J. Repp, C. W. Gay, and other prominent veterinarians of the time, were added to the staff. Professors Bennett, Pammel and Summers offered work in chemistry, botany, zoology and the allied sciences, and graduates of these men are among the educators of a later generation. Among these are Bemis, Stange, Dykstra, Bergman and Murray.

At one time half of the accredited veterinary colleges of the United States had graduates of Iowa State College as deans. We have had six graduates of Iowa State as presidents of the American Veterinary Medical Association, and one is now president-elect. About one-tenth of the membership of that organization are Iowa State alumni. We old-timers are very proud of this record.

Of course, coming from California, I am not inclined to brag, but at the risk of being criticized I am going to say a few boastful things about this division of the college which I am supposed to represent tonight. There have been 1,438 graduates of this division since the first lectures were given. Approximately 1,200 of these are alive, yes, very much alive. If there is any question about this in your mind, just ask their competitors or the people with whom they work. These 1,200 are scattered variously about the country, largely in Iowa and the border states of Minnesota and Illinois. From there in all directions across the United States and in foreign countries you will find them engaged in some phase of veterinary work.

The college motto "Science With Practice" is particularly applicable to the Division of Veterinary Medicine, for 65 percent of its graduates are in that field, caring for the day-to-day needs of livestock producers in maintaining the health of their herds and flocks. Personally, I am very proud of this record for, after all, that was the original purpose of founding the school, and I have urged other schools of the United States to direct their attention to turning out more practitioners.

Probably six percent of our graduates are engaged in teaching, with another four percent in research work in other institutions. It is these men, perhaps more than any other group, who establish the reputation of their alma mater beyond its immediate limits. Some of the most important research work in animal diseases in America is being carried on by Iowa State men. Their connections with agricultural colleges, research institutions and biologic laboratories are well known and well recognized.

In peacetime about two percent of our graduates are in the regular army. During the late war this number was augmented to about 12 percent. The record of that Veterinary Corps will probably stand for all time, and my most sincere compliments to the head of that organization, General Kelser, who is with us tonight, and to his entire personnel. They had charge of all foods of animal origin, including ante-mortem and post-mortem inspection of all slaughtered animals; the storage, transportation and distribution of all processed



foods; with the result that cases of human illness due to any spoilage whatever were practically nil.

In addressing this group tonight, I believe I recognize the great majority as interested in agriculture and livestock; if not directly, at least indirectly. In fact, I find that in speaking to any group on the subject of livestock, they all seem to like it, and like to make it appear they know something about it. It is therefore gratifying to tell you that 12 percent of our veterinary alumni are coworkers in that excellent organization, the United States Department of Agriculture, the greatest livestock disease control agency in the world. This organization, as you know, has charge of the meat inspection service whose little purple stamp on processed meats gives you the guarantee of the health of the animal from which it came, and its wholesomeness until it is placed in cold storage for distribution to you.

I bring you greetings from these 1,200 alumni. I am one of them, and am personally acquainted with many of them. I also bring you greetings and congratulations on this important event from the Executive Board of the American Veterinary Medical Association, whose 12,000 members we represent.

To President Friley, Governor Blue, members of the Board of Education and of the State Legislature, I extend sincere thanks for the help you have been able to give to the program of the school in budgetary matters, and for encouragement from year to year for the enlargement and progress of the division.



# GREETINGS FROM THE IOWA STATE BOARD OF EDUCATION

*By Henry C. Shull*

PRESIDENT, IOWA STATE BOARD OF EDUCATION

The Iowa State Board of Education had its first meeting in May, 1909. That is 39 years ago. Those who attended that first meeting are all gone except Mr. W. R. Boyd who sits down here in front of me. He is the first and only chairman of the finance committee of the board, and truly he is the grand old man of higher education in Iowa. When I see him in a few minutes following this, I think he will say, "That was fine, Henry, except I am not old."

I really don't know what to say to you tonight by way of a greeting. We are so much a part of Iowa State College that this is almost our birthday too. You see, we never considered ourselves policemen of higher education in Iowa. We always have considered ourselves as a part of the way that the great state of Iowa intended to operate its institutions of higher learning—in other words that it was a great cooperative enterprise in which great scholars would exchange ideas with a representative group of laymen appointed at large throughout the state by the governor, and confirmed by the senate.

Historically, I am told, the board came into being because the state wanted to eliminate a very fierce rivalry that had commenced between the several institutions in the state and among the separate boards of trustees; also to prevent duplication of facilities, of courses, of staff and personnel.

I think, as I look back, that probably the greatest function this board has had, has been that of taking the ideas, the dreams, the plans of the professional educator and interpreting those plans to the legislature, persuading the legislature of the state concerning the merit of the plans and translating those plans into the money that is necessary to carry on these institutions.

So tonight, to congratulate you is really out of order because in doing that we really congratulate ourselves. We have had a very pleasant 40 years of governing you, and if we have been successful, and I think the record will speak for itself, it is because of that motto that he who governs least governs best. We have had great confidence in the faculties here, and all we have tried to do is to seize their ideas and get into the gear of their dreams, that we may translate them into layman's language to the great legislatures of this state who provide the funds to carry them out.

My friends, tonight you have the opportunity of blowing out 90 candles, figuratively speaking, one for each year. You also are entitled to make 90 wishes. Our board admonishes you in making these 90 wishes to pledge yourselves to make a greater and more useful Iowa State in the next 90 years.



# GREETINGS FROM THE STATE OF IOWA

*By Governor Robert D. Blue*

President Friley, distinguished guests, alumni and friends of Iowa State College, this is a happy occasion. It is indeed a privilege to be able to bring greetings to this audience from the 2½ million people who make up this grand state of Iowa, and who one and all have a feeling of affection and very high regard for this splendid institution.

As we grow older as individuals or as institutions, it seems to be the habit to look backward and think of the accomplishments and the pleasures of the past. Tonight this institution is 90 years old, but it is also 90 years young. And so tonight, rather than to look backward over the accomplishments of the institution, it would seem perhaps that for a moment we might look forward. It is said that old men dream dreams and young men see visions, and as surely as we are gathered here tonight 90 years young, we should be able to see the vision of what this institution can do for this grand state in the future.

It is said that there be four things that make a nation great and strong—a fertile soil, a sound industry, a thrifty and God-fearing people and an adequate system of transportation. And if that be true, then truly this institution is one of the most important cogs in the machinery of our Iowa state government. Because flowing out of this institution must come the leadership, the agricultural leadership which will preserve the fertility and the productivity of the soil of this great agricultural state. Out of the halls of science and from the engineering halls must come the mothers and the leaders of the next generation who will build the homes where will be reared thrifty God-fearing citizenry. And surely the engineers have played a great part in the building of the splendid system of transportation which we enjoy here in the state of Iowa. In fact this institution was primarily the Highway Commission of the state of Iowa in the beginning of that institution.

So tonight in this great hall and before this splendid group of citizens of the state and friends of the institution, we pause to pay tribute to the institution and to the men of the institution, faculty, graduates and students, who have made it a splendid institution. We pause to tell them that we have confidence in them, that we look to them for leadership in the days that lie ahead, that we have confidence that this institution will give us the leadership, along with the other educational institutions of this great state, which will make it possible for us to play our part in this troubled world in which we live.

So tonight, 2½ million citizens wish to the faculty, to the alumni and to the students of this great school, good luck, best wishes and assurance of a continued support for the things that this institution has been able to lead in and will continue to lead in in the future.



# A LOOK AT THE PAST AND A PLAN FOR THE FUTURE

*By Bourke B. Hickenlooper, '21*

Your invitation to address this convocation representing the ninetieth anniversary of the establishment of Iowa State College is one which I deeply appreciate. My appreciation is twofold, first because of the pre-eminence of Iowa State College in its particular educational fields, and secondly, because of the sentiment that attaches to this college as my alma mater. In the kaleidoscopic past of personal affairs and startling national and world developments, I sometimes feel that it must have been 90 years ago when I worried about examinations here and generally disagreed with the judgment of my instructors as to my grades. At other times, however, it seems but a short time since 1914 when I first came here.

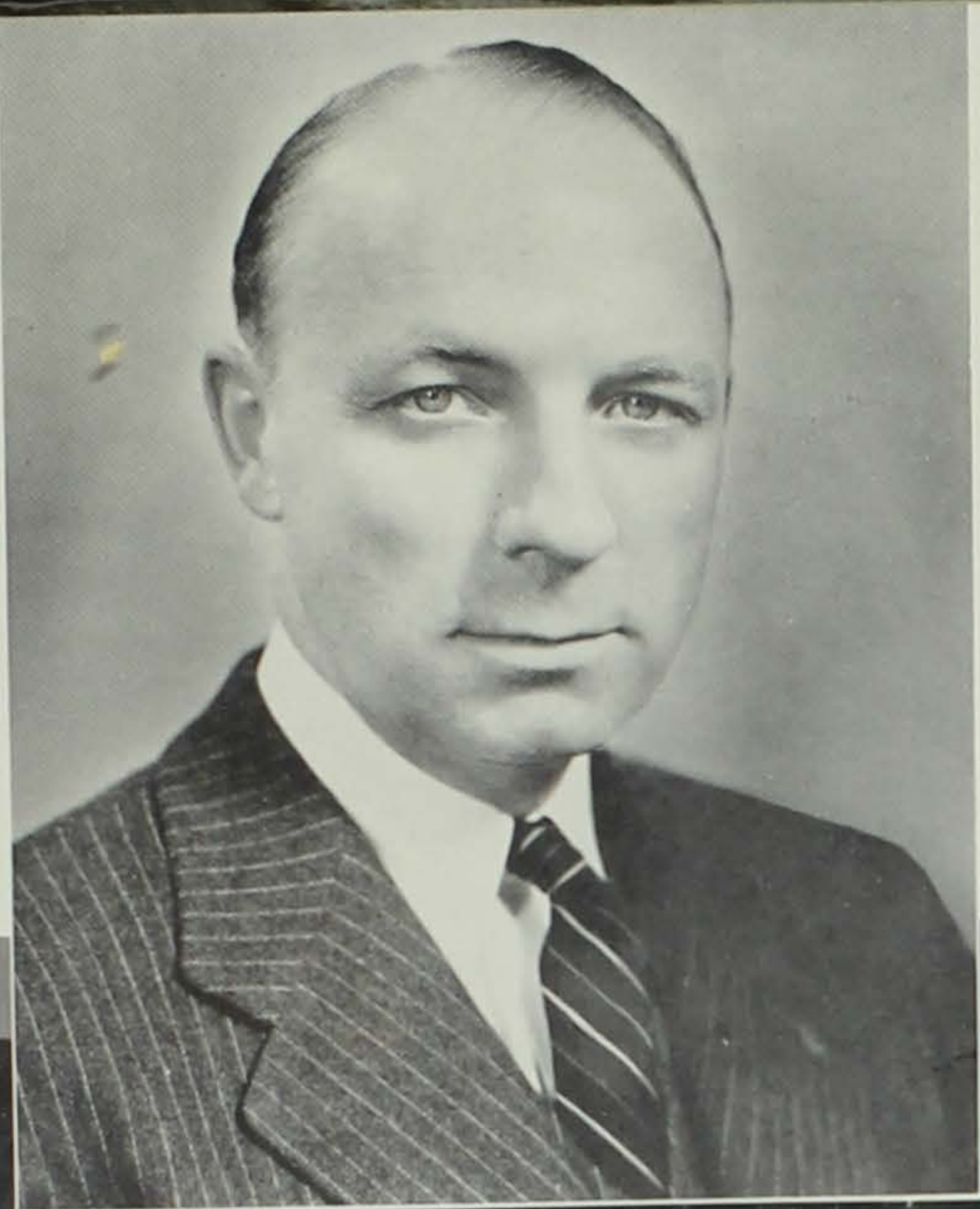
Iowa was justly proud of Iowa State College then as it is increasingly so now, and the nation then recognized its outstanding contribution to agriculture and engineering; for many years engineers and agricultural experts from Ames have been called to remote parts of the world to build better and to produce more for progressing civilization. Since those days, prior to World War I, this great institution has maintained its position of leadership in a vigorously developing field and has added year by year to the economic advancement of mankind.

This college is a product of the people of Iowa, and therefore it is not strange that its success is so marked. The fiber of Iowa thinking, since the first homemakers came here a little over 100 years ago, has been education, and the people have supported education with intelligence and willingness. While support of education is essential, it must of course also have intelligent direction, and in the progress of this college, those whose immediate responsibilities have been administrative and educational have kept clearly in mind its objectives and the ideals of service to the people of the state. In so doing, they have not only merited the support of the people of Iowa but have justified that support constantly as a result of sound progress and leadership.

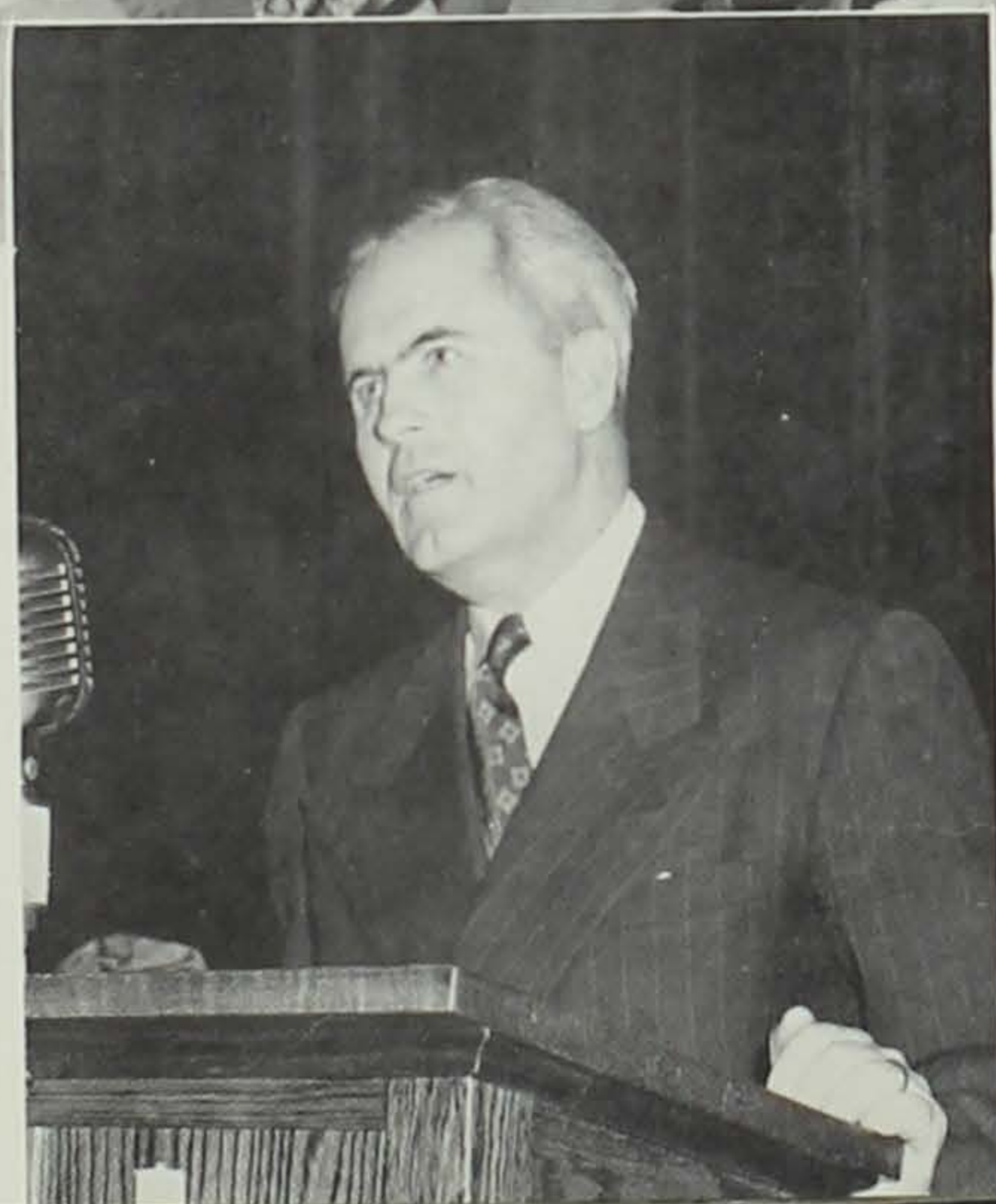
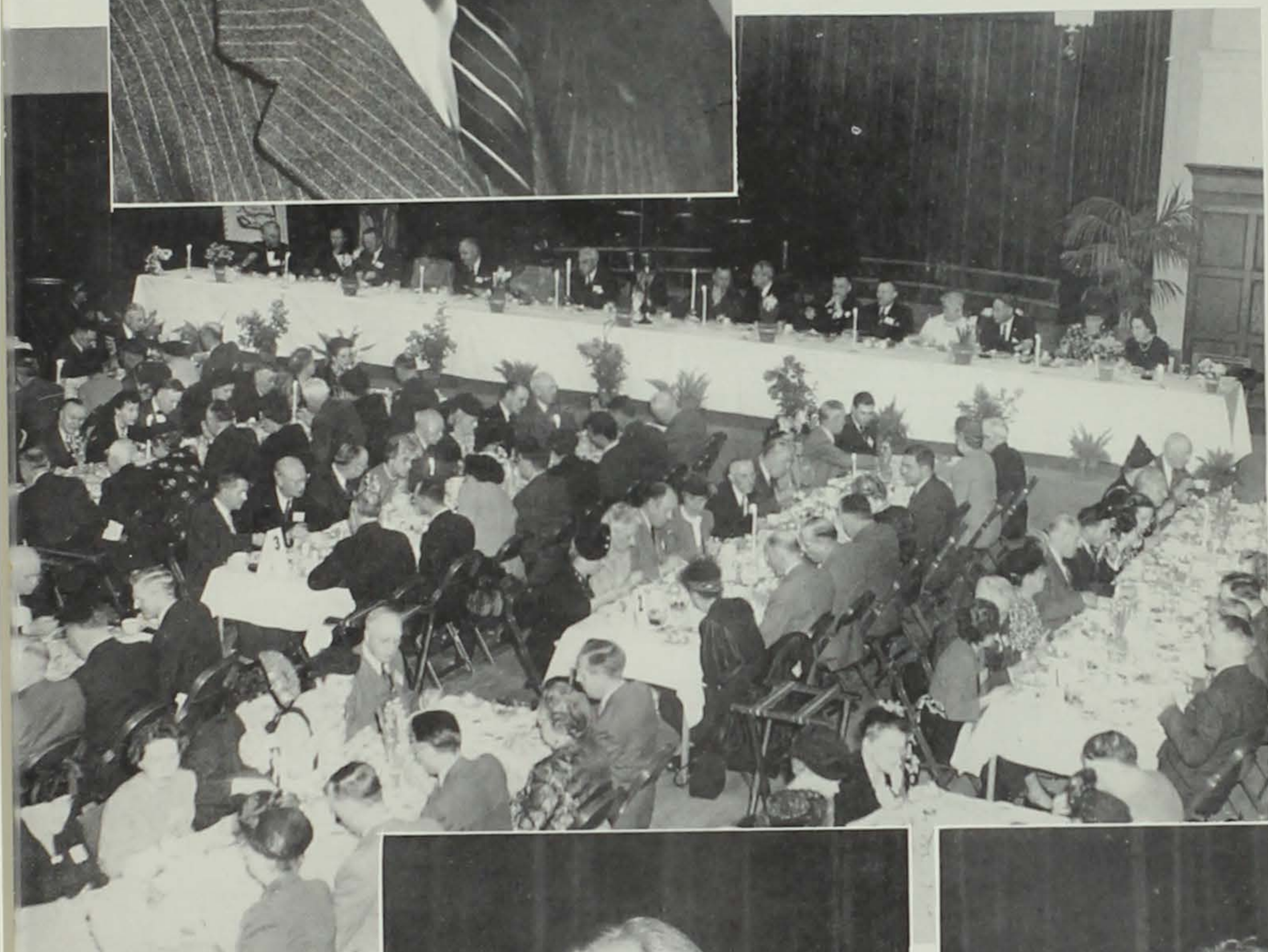
The entire history of the growth and development of Iowa State College is replete with accomplishments. Countless specific first and many outstanding achievements can be pointed to. I shall not, of course, attempt to detail them. However, because of my great interest in the subject and, I hope, a little knowledge about it, I want to call your attention and pay tribute to one outstanding contribution made to our nation here at Ames. The highly successful work and research done on the Iowa State College campus by Dr. Frank H. Spedding and his associates in the field of metallurgy and with uranium and other essential metals has been hailed everywhere as one of the major contributions to the success of the atomic bomb. It is an accomplishment of which we can all be justly proud, and Dr. Spedding and his associates merit in full measure the recognition and credit which they have received.

Ninety years, by many standards, is not a long time. It falls short of the life span of

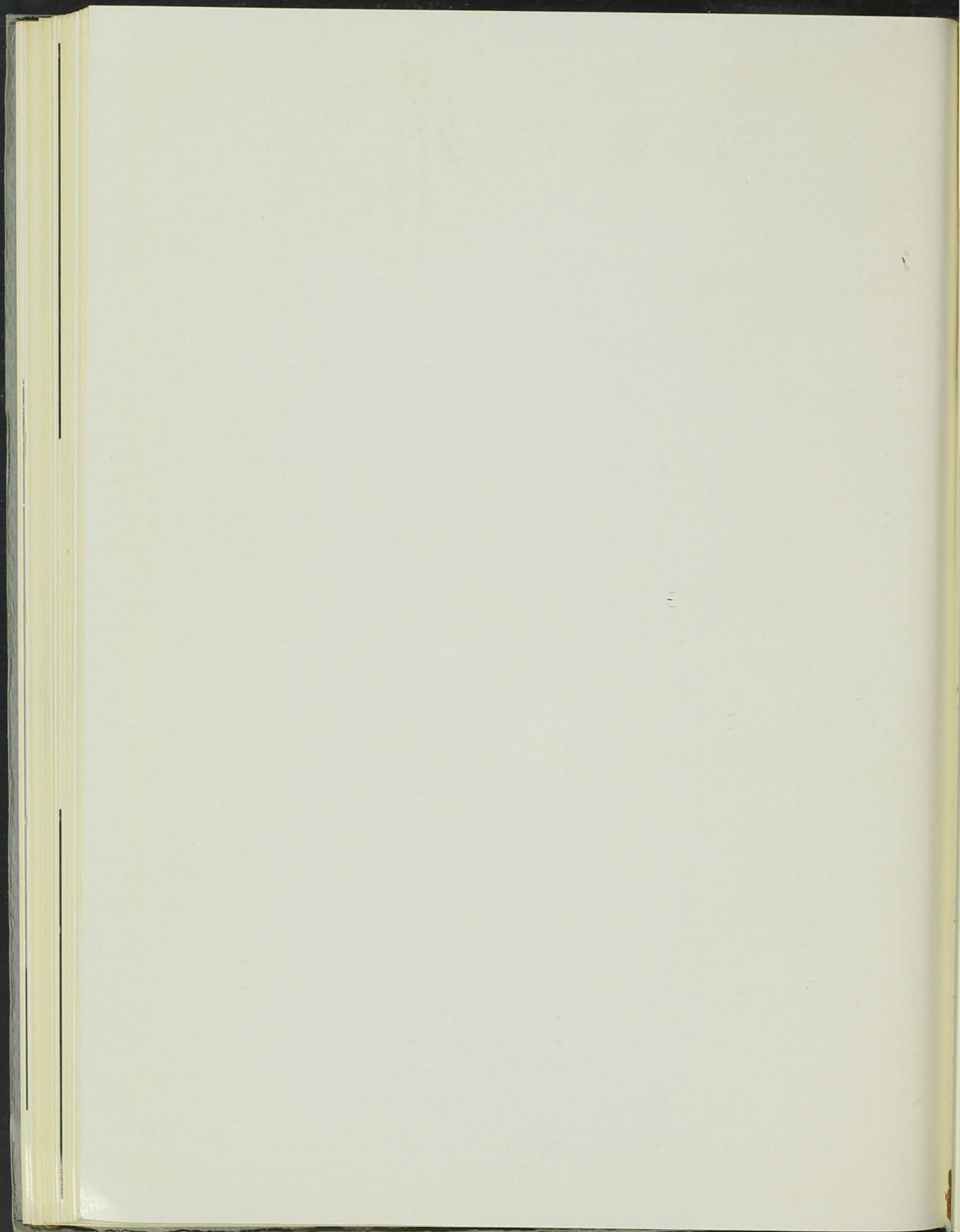




The climax of the Anniversary Dinner was the speech by Iowa's SENATOR BOURKE B. HICKENLOOPER (*left*), which was read by PRESIDENT FRILEY. GOVERNOR ROBERT D. BLUE (*lower left*) and HENRY C. SHULL (*lower right*), President of the Iowa State Board of Education, also delivered short addresses. In the center are guests at the dinner, with the speakers' table in the background.









many people now living, and yet it is only 12 years short of the time of the birth of our state. Twenty years before this college was founded, Iowa was uninhabited by and virtually unknown to civilization. Only a handful of venturesome white men had seen the beauty of its rolling hills and prairies or even faintly suspected the vast wealth of its soil. Even in 1858 the shock of the Spirit Lake Massacre of the year before continued to cause men to look to their priming when they ventured over the hill and to continue nervous preparation for defense of their homes and families.

Nevertheless, by that time, and new as the state then was, its people realized the potentials of its soil and climate and established this institution to learn more of their benefits and to teach their use.

In 1858 the railroads were coming. Their steel fingers were crossing the Mississippi and reaching toward the far West; the day when goods could be readily shipped to distant markets was not far off and the trails were filled with home seekers coming into this land of promise. Truly, Iowa was a place pulsing with hope and opportunity and freedom and the promise of comfort. It has fully justified those hopes of yesterday.

Looking back over these 90 years, however, leaves one breathless. No other such span in history has remotely approached in magnitude the mechanical and material advancement of this one. While in 1858 the steam engine had been brought to practical use, electricity was still a mysterious spark and its utility largely a dream. During these 90 years transportation has developed to a degree beyond what would have been the lunatic fringe of thinking in those days. Anyone then who might have predicted that man one day could cross the continent in six hours would have been spoken of with muted voice and with deep sympathy for his wife and family. No one would have dared to believe that man could direct uninhabited vehicles from remote distances or that he could look into an illuminated screen called radar and recognize objects and measure their progress many miles away through fog and night. In those days no one dreamed that by turning a button on a little box in the living room one could hear music and speech around the world.

No one then dreamed that machines would become more proficient than the human hand or that mechanical brains would be able to calculate in minutes problems that would require years of work by hundreds of trained people working with pencil and slide rule. In 1858 the borders of Iowa were farther away in time from Ames than London or Paris are now, and the United States itself was sectionalized by barriers of time and travel.

Yes, truly the period during which Iowa State College has lived has seen the world change from a vast expanse of inaccessible distances to a small and accessible community by comparison.

This shrinking of time and distance has many results. So far as the United States is concerned, our country has developed from a sectionalized nation in habits, attitudes and customs to a well-knit and integrated people whose interests and attitudes are now more universally common from one seaboard to the other than were those of Iowa and Missouri 90 years ago. The question of sectionalism and sectional sovereignty and rights was settled in



the 60's by the Civil War. Most of the causes of sectionalism between the North, South, East and West have been dissipated as a result of easier communication and the opportunities to understand the special problems of the other fellow. This integration and development has enabled us to make full use of the great resources of our nation, material resources as well as human resources of enterprise and genius. The freedom of movement and the right of venture and the protection of opportunities that have been developed within a reliable government have produced a strength that has never been equaled or approached in the world heretofore. If this strength and this system is preserved by the clear thinking and the vigorous defense of the people whose system it is, then the years to come can hold at least as great promise of hope, progress and comfort as we have enjoyed in the past.

There are certain elements of broad similarity between our position as a nation now in a world of nations and our situation as a sectionalized country when this college was founded. It was then realized by most of the people in the United States that economic and social development could not go forward in full measure unless the vision of unity and the determination to accept the responsibility of leadership were accepted and resolutely carried out as a determined national policy. The American people then realized that sectional policies that disregarded the common human interest of all were stumbling blocks in the way of progress, and that in most instances these sectional policies were not fundamentally rooted as essentials in the American system but were superimposed upon the fundamentals of our system of common freedom and universal application of basic human rights. Once the issues had been clearly defined, America recognized her responsibilities and met them. The American people redefined their goals, crystallized their basic tenets and have since applied them from border to border. The benefits have proved the soundness of our policies, and the strength they have brought to us socially and economically is unassailable.

In attaining this unity we did not destroy the integrity or the sovereignty, if you please, of the states of the union, and in preserving the sovereignty of the states, under which problems of unquestioned local responsibility can be completely solved, we added strength to the whole. We preserved the very fundamentals of the constitutional union which was first set up as our charter. Matters of national importance and concern were delegated to the federal government, but the province of the states was respected. It is true, of course, that as time has gone on, as our economy and society have grown more complex, the field of governmental activity has, of necessity, been increased in various ways in the public interest and in the interest of national unity and national coordination. There are many, and I am one of those, who believe that in some fields the national authority has been too greatly enlarged, even to the point of usurpation of certain rights of states which should properly be retained exclusively by the states. That, however, is a matter which the American people will decide from time to time in their own good judgment and based upon their own analysis and evaluation. The net result, however, of our entire development is an integration, socially and economically, of our nation that has produced and supported the greatest moral and physical system of strength in all history.



The very development, however, of the startling and fantastic economy of our nation and the world during the past 90 years has produced world conditions and situations of comparable magnitude and here lies a rough parallel, perhaps, within our own national history.

Communication and access to all parts of the world, regardless of how remote, have stirred a restlessness in people whose vision has been boundlessly enlarged. Many who still live on the terms of yesterday can glimpse the hopes and feel the practical aspirations for their tomorrow. Two great world wars of progressive intensity have been fought with the tools and the weapons of progressing genius. World War II ended with the flash and shock of the greatest weapon of destruction ever conceived before by man, the atomic bomb. Without doubt, in many ways and aside and apart from the desire for conquest on the part of those who instigated these wars, there was a restlessness of people for greater latitude and for the seeking of greater opportunities. World War I, in many aspects, was a preliminary to World War II, and World War II may have been the training ground for World War III unless fundamental causes and irritants can be clearly recognized and vigorously faced. People and nations are living closer together today. Those who *have* are enviously and covetously watched by those who *have not*. Those who *have not* usually are not aware of the rules of progress and know only the rules of brute force and conquest for the accomplishment of their ends.

This, of course, brings sharply into focus the matter of the responsibilities of our country in this shrinking, troubled world. In the first place and above all else, we must preserve our own strength and our own vision. We, as a people, do not want war and never have. It is difficult for us to understand why people in other parts of the world of different backgrounds cannot get along as our people of different backgrounds have been able to get along in this country. Still, however, we have had our internal period of struggles and development and violent emotion. It took us many years as a nation to secure our unity. The world is now in the throes of groping for solution of the problem of reliable peace among nations.

In the case of many of the nations of Europe where freedom and self-government have been historic, the struggle for the preservation of that freedom against conquest by brute force has sapped their strength. It no doubt is characteristic of free systems that they do not conspire together to overrun others and that they have mutual respect for the rights of their neighbors, but this very attitude has worked against a united front on the part of these nations that would have stopped conquest in its inception. In addition, this attitude has afforded opportunity in the past for those who plan conquest to unite in their programs and purposes, and twice in the last 30 years it has allowed aggressor nations to reach the threshold of victory.

Much as we dislike it, the American people find themselves still involved in world catastrophe. We have no choice but to grimly examine the situation and to assume, in our own best interests, those responsibilities which we know inevitably must be faced. It brings



no comfort to review the mistakes of the past, but those mistakes must be a warning for the future unless we wish to court danger of further disaster. Our foreign policy for years has been nebulous and uncertain. It has been spotted by secret agreements, a policy often condemned by those who later made the agreements; in our war activities and aims the high-sounding declarations of the Atlantic Charter were cast aside as fundamentals in the appeasement agreements made with Russia at Yalta, Teheran and later and more offensively at Potsdam. The record of Russian aims for world conquest through Communism was clear when these negotiations were under way and the agreements were made. Full documentary proof of the conspiracy between Hitler and Stalin clearly expressing their aims had been seized by American troops before the Potsdam agreement was entered into and before authority had so glibly been given to Russia to occupy the territories of Eastern Europe. It is not my intention to discuss in detail the inept and shortsighted agreements in which our leadership permitted us to become entrapped. The American public was not informed at that time in the matter and the information has only come out bit by bit, but I must say that it is now apparent that full information and knowledge of the Soviet's and Communism's unswerving purposes was then secretly available to our representatives.

But regardless of the mistakes of the past, we find ourselves now vitally concerned with the conditions of the present, and these conditions are not good. While we, together with other allies, have approved peace treaties with enemy nations—and remember this was one of the prime objectives following the close of the war—Russia has adamantly refused to approve these treaties and has blocked their final acceptance. Under the guise of occupation, pending the settlement of peace, great numbers of Russian troops have infested the Balkans, Poland and the eastern zone of Germany. Under the cover of Russian guns Communism has captured the governments of the Balkan nations, and of Poland; their last seizure is Czechoslovakia, with Finland next on the list, and the pattern of their conquest is again being clearly laid out. They are probing into Italy, France and Scandinavia, and their agents are on the march in Central America.

We have sought for peaceful settlement of the troubles of the world and we have done much to try to bring about peace. We have contributed billions of dollars since the close of the war to assist other nations of the world to get back on their feet. There are those who may have felt in the past that such postwar assistance has been largely wasted, but I have no doubt that had we not given such assistance to England, France and other countries, they might not have survived economically or politically. No one can say with certainty whether they would have collapsed or not, but certainly our aid has been of great help to them both materially and morally and it has done much toward maintaining a spearhead of free institutions in Europe. It has provided a firmer base upon which their recovery can be built and has established the beginnings of a unity among free nations, a unity of purpose and determination that gives promise of successful, peaceful resistance to and victory over communistic encroachment.

We know, and other nations of the world know, that we want peace, a reliable peace



and an honest peace. However, it is not a matter now of preventing isolated wars between two or three quarreling countries over local situations, as might have been the case many years ago. Communication and transportation have brought nations so close together that the firing of guns in any international conflict instantly endangers and violates the peace of all other nations.

Moreover, we are faced with a world-wide struggle of ideologies and I am convinced that these ideologies cannot live together in a divided world. The great human freedoms and progress that have developed under self-government have raised the individual to new heights and to startling levels of comfort. World progress has been measured to proportion as these principles have been protected and safeguarded. Nations following these tenets have grown strong and have carried their ideals to others less fortunate and have generally advanced the entire level of world hopes and world comforts.

On the other hand, Communism, which masquerades under the cry of democracy and which often appeals to unfortunate people through deceptive promises of Utopia, has proved beyond doubt that it accomplishes nothing but the demoralization and degradation of the individual and of the governments it captures. It destroys the dignity of man, it enslaves his intellect and throttles his progress. While we hope and pray for peace and that we merely be left alone to work out our own destiny, yet we know in our own hearts that we cannot afford to take the chance of Communism capturing the rest of the world nor can we take the chance of sleeping on our own rights again until the destroyer is knocking at our doors and has driven the rest of the world to its knees. Past experience must prove to us that the united strength of freedom-loving people must be brought to bear *before* conquest begins if there is any hope of preventing conquest and of retaining peace. There are many who feel that we did not finish this war when our armies were on the march; they may be right, but we did withdraw our troops and we have sought honestly for peace; it has not come but it must come now and in the immediate future or we may face before long an armed struggle that will be devastating indeed.

The economic strength of any nation is vital to its morale and to the determination with which it defends its rights. The aftermath of the war in Europe left the countries in Western Europe, especially, in a chaotic condition. Their currencies, their factories, their transportation and the morale of their people were seriously damaged. A number of these nations lost most of their foreign investments, and their access to raw materials was greatly reduced.

Our country, in addition to other aids and emergency contributions, is now proposing to support a vigorous economic recovery of Europe through the Marshall plan. In response to the suggestions made by the Secretary of State last spring, 16 nations of Western Europe joined together to examine carefully their economy and to devise ways and means to coordinate that economy for the most rapid production and recovery possible; in other words, to see what they could do and what sacrifices they could make with a united front to get back on their feet. That has been done and they have given us the results. They have set their



own goals, and if they meet them, recovery is practically assured. I was in Europe last September and October, and while the disorganization of Europe was everywhere apparent, yet there was also evident a renewed stimulus and renewed hope on the part of the people of Western Europe, based upon the Marshall plan suggestions, and there was an evident determination on their part to bring their resources, their management and their genius together into a well-knit future economy.

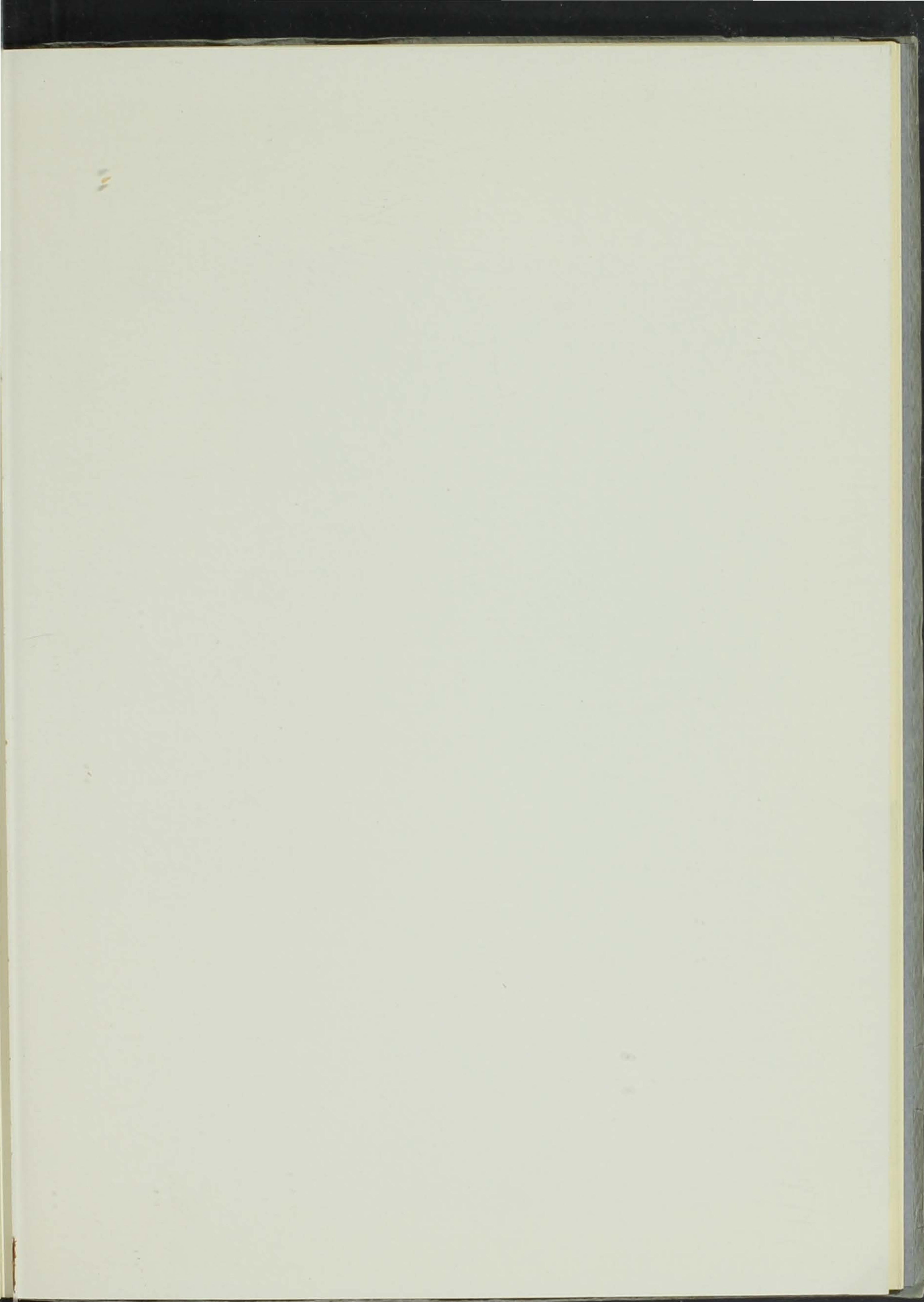
We have examined their plans and their goals and we now propose to underwrite and stimulate the recovery of their economy in keeping with those plans and with our evaluation of their success. While the economic recovery program has not passed both houses of the Congress as yet, it has passed the Senate and I have no doubt that it will speedily pass the House. Under it we propose to examine carefully and periodically the accomplishments of the European countries and the degree of their recovery; if they make the progress that they themselves have set, then the money will be well spent; if we administer our assistance in a practical and businesslike manner, there is every reason to believe that their chances are good to reach their goals.

We propose to guard against foolish waste of this aid, by constant examination of its success, and we are not committed to continue any aid if the results are not forthcoming. Personally, I feel the chances of success of their recovery under this program are good, although no person can guarantee that fact. I feel that there is a grim realization on the part of these 16 countries that they must succeed or face collapse and misery. I also feel that should we not support this program in Europe, the probabilities are real that we will soon have to face the life and death struggle of a world conflict of greater proportions than any we have ever imagined. Therefore, the chance is one that we must take because the consequences of not taking it are all too ominous.

There are always, of course, the questions of whether or not we can afford such assistance and what the impact will be upon our own economy here. I think it is fair, however, to ask also, "Can we afford not to make this effort?" It goes without saying, that we dare not weaken ourselves to the danger point in an effort to aid others, an effort which cannot be fully guaranteed as to success. But exhaustive study of this problem by sound and impartial people of highest ability in business has shown that such a program will not endanger our economic structure and that we can successfully carry it out. The amount of our underwriting for the first year of the program is \$5,300,000,000 and the executive department assures us that this is enough. We were spending this much or more each month during the late war, and experience has shown that every war costs more than the one before. Therefore, if war should be our lot in the near future, our expenditures would have to be so much greater as to defy comparison.

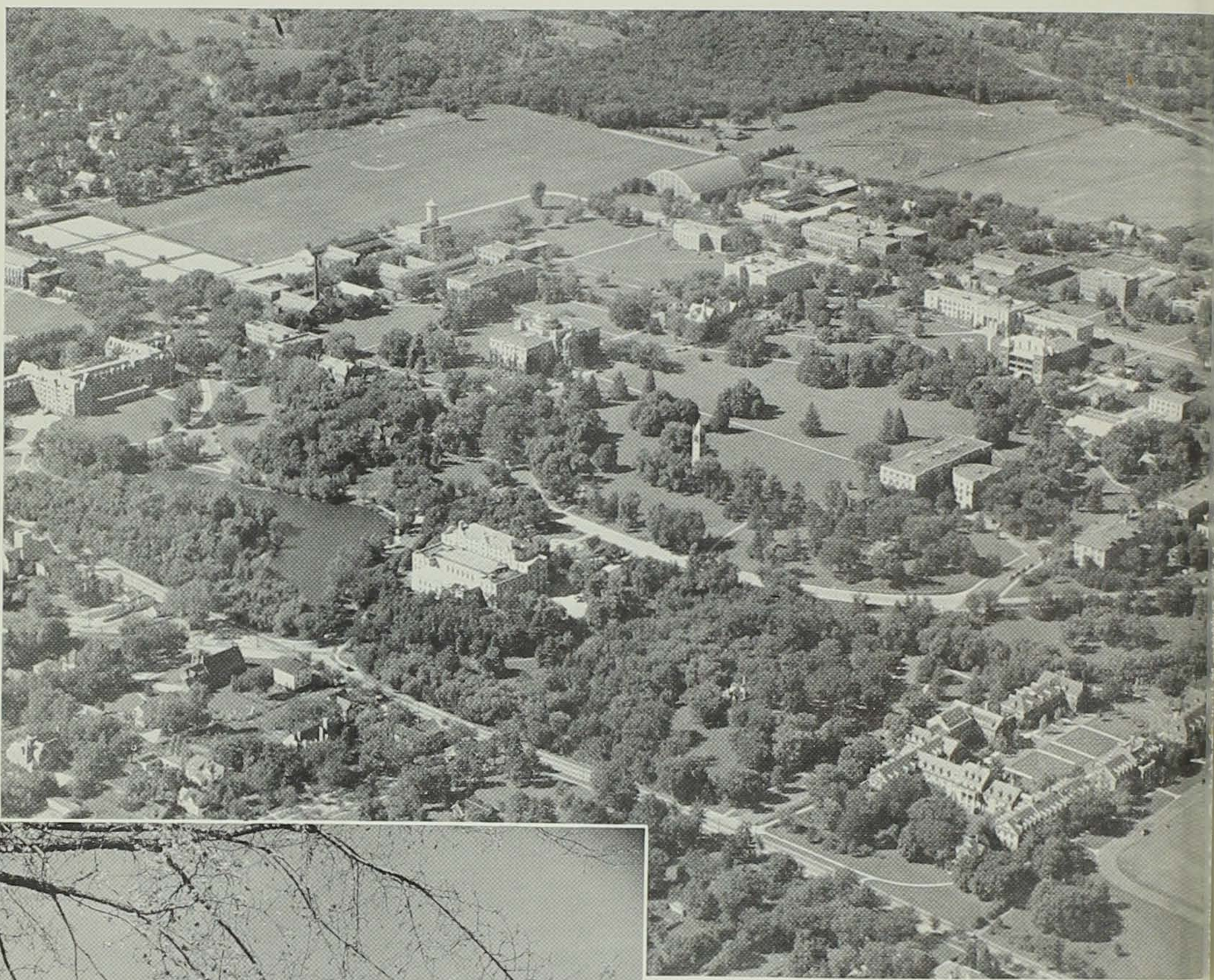
At home we still have a shortage of many goods, materials and services, and certainly any goods in short supply here that may be used in this program will increase the pressure, but again the executive department and others state that our foreign exports under this program will be less during the first year than they were in 1947, so that with sound adminis-







Below, the Iowa State College campus today. Lower left, Friley Hall,  
new residence for men on the campus.





tration and careful attention to our domestic economy there is every reason to believe that the tension will be no greater than and possibly not as great as it was in 1947.

Meanwhile, our own increasing production capacity can be expected to ease the strain considerably. This is especially true if we establish policies at home which will free production from many of the hampering restraints that now surround it and if we free American enterprise and genius to do the full peacetime job it is capable of doing.

The immediate future does not hold much promise of peaceful relaxation. We are in a trying period where vision and courage must be our support. We have freedom in this land of ours and we want security and comfort, but we dare not let the desire for security conceal or overshadow the principle of freedom. Men have had varying degrees of security from time to time in the past without having any measure of freedom, and, in fact, have unknowingly traded their freedom for what they imagined were the benefits of security. The slave has usually been fairly secure and often has enjoyed comforts that free men have not had, but the slave has no freedom. The people who value freedom today above all else, however, have always been willing to forego security in order to have and to hold their freedom and the dignity and responsibility that go with it.

Those who broke the prairie sod and founded this state, and before them those who ventured into the wilderness of the new world, and after them those who followed the unknown trails of desert and mountain into the far west had few comforts and very little security, but they did have freedom and responsibility and with that freedom and responsibility they acquired a dignity that can come only with intelligent and willing sacrifice and effort. It is vital to us and our institutions and to the posterity for whom we are trustees that we act in these times of tension with courage and with vision; determined that, regardless of the cost, if it be necessary we will continue such efforts as may be required to keep the beacon of freedom burning to mark the citadel of progress and to guide others hopefully toward those goals which mean a peaceful and ever progressive world.



## DELEGATES OF COLLEGES AND UNIVERSITIES

1636	HARVARD UNIVERSITY	Hiram Simonds Hunn
1701	YALE UNIVERSITY	Julius Ansgar Larsen
1740	UNIVERSITY OF PENNSYLVANIA	Raymond A. Kelser
1746	PRINCETON UNIVERSITY	Arthur Poe
1754	COLUMBIA UNIVERSITY	Walter P. Bordwell
1764	BROWN UNIVERSITY	Norman L. Kilpatrick
1766	RUTGERS UNIVERSITY	Charles Miller
1770	DARTMOUTH COLLEGE	Richard W. Husband
1780	TRANSYLVANIA COLLEGE	Charles A. Dutt
1783	DICKINSON COLLEGE	Fred M. Uber
1785	UNIVERSITY OF GEORGIA	Mrs. Lami Gittler
1787	UNIVERSITY OF PITTSBURGH	Chester A. Buckner
1789	GEORGETOWN UNIVERSITY	James S. Newman
1793	UNIVERSITY OF NORTH CAROLINA	Percy H. Carr
1794	BOWDOIN COLLEGE	Vincent Nowlis
1795	UNION COLLEGE	Morgan L. Williams
1802	UNITED STATES MILITARY ACADEMY	George Olmsted
1809	MIAMI UNIVERSITY	Harry M. Gerlach
1815	ALLEGHENY COLLEGE	Frederick G. Henke
1817	UNIVERSITY OF MICHIGAN	William Karl Niemann
1820	INDIANA UNIVERSITY	Fred Robertson
1821	AMHERST COLLEGE	James S. Schramm
1824	RENSSELAER POLYTECHNIC INSTITUTE	Herman M. Brown
1826	LAFAYETTE COLLEGE	Ralph A. Moyer
1827	LINDENWOOD COLLEGE	B. B. Branstetter
1827	UNIVERSITY OF TORONTO	Ellis I. Fulmer
1829	ILLINOIS COLLEGE	Merrill M. Barlow
1831	DENISON UNIVERSITY	Ronald Vale Wells
1831	UNIVERSITY OF ALABAMA	Edward A. White
1833	HAVERFORD COLLEGE	John W. Charles
1833	MERCER UNIVERSITY	Mrs. Joe E. Clarey
1833	OBERLIN COLLEGE	Francis J. Pyle
1834	TULANE UNIVERSITY OF LOUISIANA	Vernie Alton Moody
1835	MARIETTA COLLEGE	H. Virgil Meek
1838	DUKE UNIVERSITY	Anthony C. Westerhof
1839	BOSTON UNIVERSITY	Bishop Charles W. Brashares
1839	LORAS COLLEGE	Reverend S. D. Luby
1839	UNIVERSITY OF MISSOURI	Sam B. Shirky
1845	UNITED STATES NAVAL ACADEMY	Richard B. Levin
1845	WITTENBERG COLLEGE	Reverend G. K. Mykland
1846	CARROLL COLLEGE	Mrs. G. T. Vander Lugt
1846	GRINNELL COLLEGE	Earl D. Strong
1846	UNIVERSITY OF BUFFALO	Duncan Mallam
1847	STATE UNIVERSITY OF IOWA	President Virgil M. Hancher
1847	OTTERBEIN COLLEGE	W. F. Coover
1847	ROCKFORD COLLEGE	Lillian Watkins
1847	COLLEGE OF THE CITY OF NEW YORK	Herbert O. Lyte
1848	UNIVERSITY OF WISCONSIN	Merton A. Countryman
1850	DEFIANCE COLLEGE	Reverend Frederick Cooper
1851	COLLEGE OF THE PACIFIC	J. Haworth Jonte
1851	MILWAUKEE-DOWNER COLLEGE	Mrs. Byrl D. Houck
1851	NORTHWESTERN UNIVERSITY	Joseph H. Buchanan
1852	UNIVERSITY OF DUBUQUE	Maye D. Hagen
1853	CORNELL COLLEGE	President Russell D. Cole



1853	WASHINGTON UNIVERSITY	John J. Finan
1854	HAMLIN UNIVERSITY	Perry A. Moore
1855	CENTRAL COLLEGE OF IOWA	Richard G. Wendell
1855	MICHIGAN STATE COLLEGE	Ernest L. Anthony
1855	CHICAGO THEOLOGICAL SEMINARY	Reverend Fred Hoskins
1857	UNIVERSITY OF THE SOUTH	Quincy C. Ayres
1858	BAKER UNIVERSITY	Roy Lester Horn
1858	IOWA STATE COLLEGE	President Charles E. Friley
1860	AUGUSTANA COLLEGE	E. Irving Weiseth
1861	LUTHER COLLEGE	O. J. H. Preus
1861	UNIVERSITY OF WASHINGTON	C. R. Vander Linden
1861	VASSAR COLLEGE	Mrs. Catherine Patten
1863	BOSTON COLLEGE	Charles Buehle
1863	KANSAS STATE COLLEGE	T. M. Evans
1864	BATES COLLEGE	Evelyn G. Wimersberger
1864	SWARTHMORE COLLEGE	Edward P. Thatcher
1865	CORNELL UNIVERSITY	Francis M. Dawson
1865	UNIVERSITY OF KANSAS	Mrs. Cecil F. Marrs
1865	WORCESTER POLYTECHNIC INSTITUTE	Laurence C. Myers
1866	THIEL COLLEGE	Henry M. McLaughlin
1866	COLLEGE OF WOOSTER	Mrs. James E. Wert
1867	HOWARD UNIVERSITY	James B. Morris
1867	KING COLLEGE	Robert Ingham
1867	UNIVERSITY OF ILLINOIS	Robert R. Hudelson
1867	WEST VIRGINIA UNIVERSITY	DeWitt White
1868	UNIVERSITY OF CALIFORNIA	Reese Vaughan
1869	AUGSBURG COLLEGE	Waldemar Gjerde
1869	PURDUE UNIVERSITY	Harry J. Reed
1869	UNIVERSITY OF NEBRASKA	Ross V. Baumann
1870	SYRACUSE UNIVERSITY	Earle Dudley Ross
1870	COLORADO AGRICULTURAL AND MECHANICAL COLLEGE	I. A. Merchant
1870	OHIO STATE UNIVERSITY	James E. Wert
1870	WELLESLEY COLLEGE	Mrs. Philip R. Weaver
1874	COLORADO COLLEGE	E. W. Lindstrom
1874	ROSE POLYTECHNIC INSTITUTE	James R. Sage
1874	SAINT OLAF COLLEGE	A. M. Holmquist
1876	AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS	George M. Lewis
1876	GROVE CITY COLLEGE	James F. Edwards
1876	IOWA STATE TEACHERS COLLEGE	President Malcom Price
1876	MEHARRY MEDICAL COLLEGE	Mrs. Dollie D. Haughton
1876	UNIVERSITY OF COLORADO	Marion Clifford Boyer
1878	CREIGHTON UNIVERSITY	Folsom Everest
1881	BETHANY COLLEGE	Reverend Ruben Spong
1881	COE COLLEGE	Gene A. Wallar
1881	DRAKE UNIVERSITY	President Henry G. Harmon
1881	MARQUETTE UNIVERSITY	Frank J. McCarthy
1881	SOUTH DAKOTA STATE COLLEGE	President Fred H. Leinbach
1881	UNIVERSITY OF TEXAS	William Turrentine Jackson
1881	TUSKEGEE INSTITUTE	R. W. Brown, Roy C. Newton
1883	SIOUX FALLS COLLEGE	Alfred M. Gowan
1884	TEMPLE UNIVERSITY	David Guralnik
1885	GOUCHER COLLEGE	Mrs. Bruce James Flick
1885	MACALESTER COLLEGE	Elizabeth J. Manuel
1885	STANFORD UNIVERSITY	Evan Verle Zeidler
1885	COLLEGE OF ST. THOMAS	Robert Brennan, Daniel Marion
1885	UNIVERSITY OF ARIZONA	E. L. Kettenbach



1886	UNIVERSITY OF CHATTANOOGA . . . . .	Russell David Cole
1886	UNIVERSITY OF WYOMING . . . . .	Arnold J. King
1887	POMONA COLLEGE . . . . .	H. Halsey Jones, Jr.
1887	PRATT INSTITUTE . . . . .	Mrs. E. C. Voorhees
1887	CATHOLIC UNIVERSITY OF AMERICA . . . . .	Reverend Cornelius Lalley
1888	NEBRASKA WESLEYAN UNIVERSITY . . . . .	Roy W. Deal
1888	UTAH STATE AGRICULTURAL COLLEGE . . . . .	Clawson Y. Cannon
1889	MANCHESTER COLLEGE . . . . .	Dio L. Holl
1889	STATE COLLEGE OF WASHINGTON . . . . .	Mrs. Sherret S. Chase
1890	NORTH DAKOTA AGRICULTURAL COLLEGE . . . . .	Paul G. Kratzke
1890	UNIVERSITY OF OKLAHOMA . . . . .	Ben W. Schaefer
1891	AMERICAN UNIVERSITY . . . . .	Arthur Hopkinson
1891	OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE . . . . .	Oliver S. Willham
1891	UNIVERSITY OF CHICAGO . . . . .	Charles J. Ritchey
1893	HOOD COLLEGE . . . . .	Mrs. R. A. Moyer
1893	MONTANA STATE COLLEGE . . . . .	Virgil L. Hurlburt
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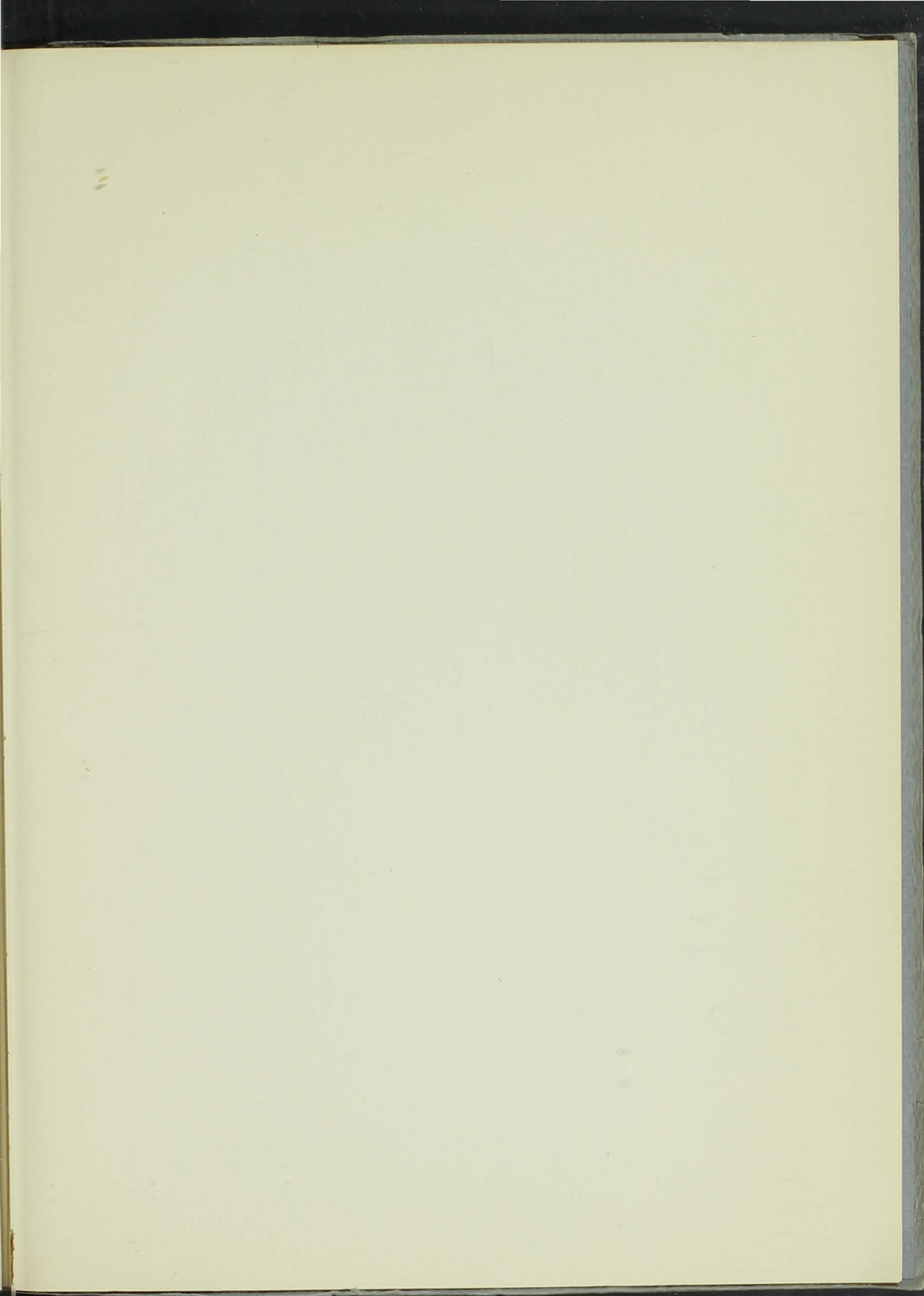
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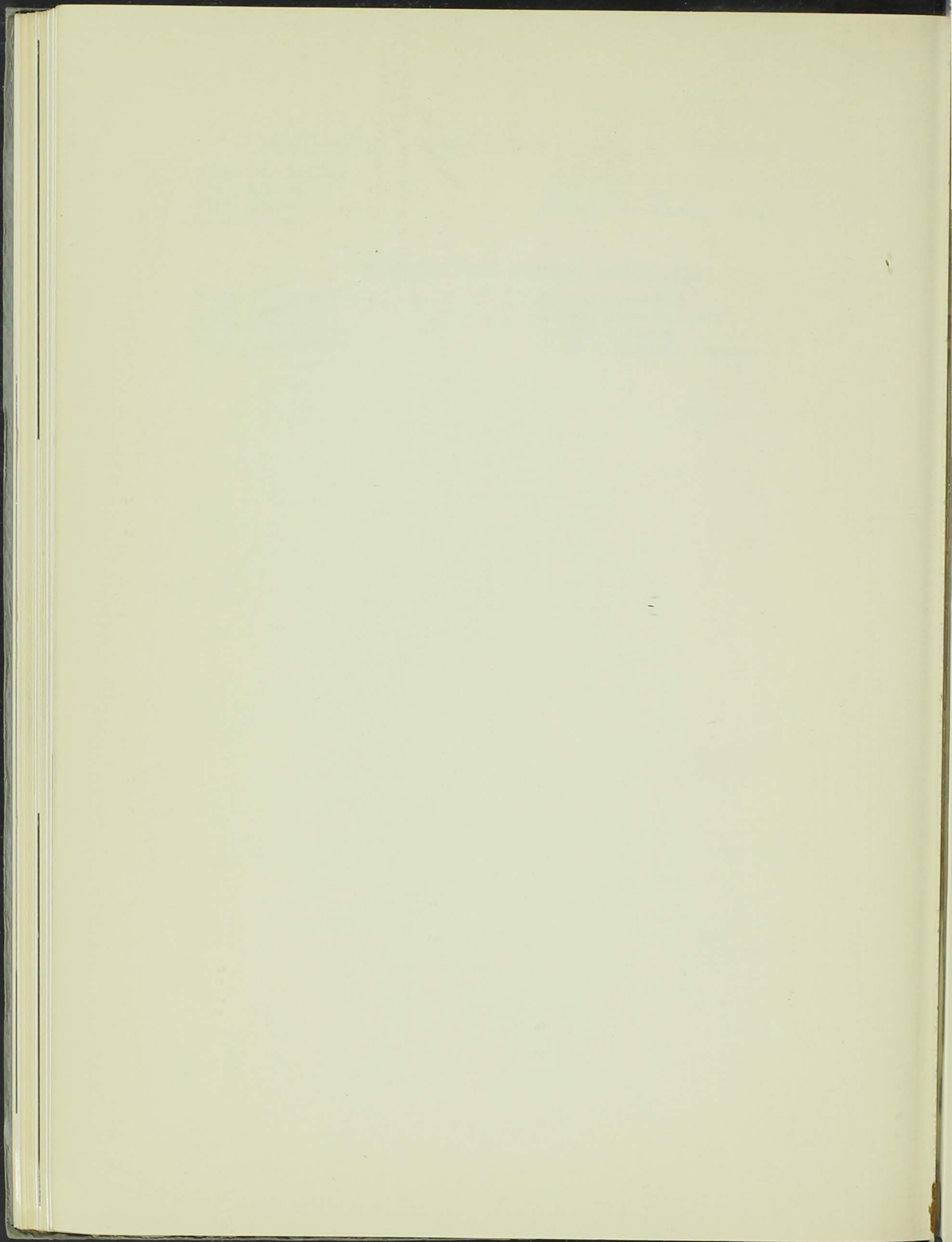
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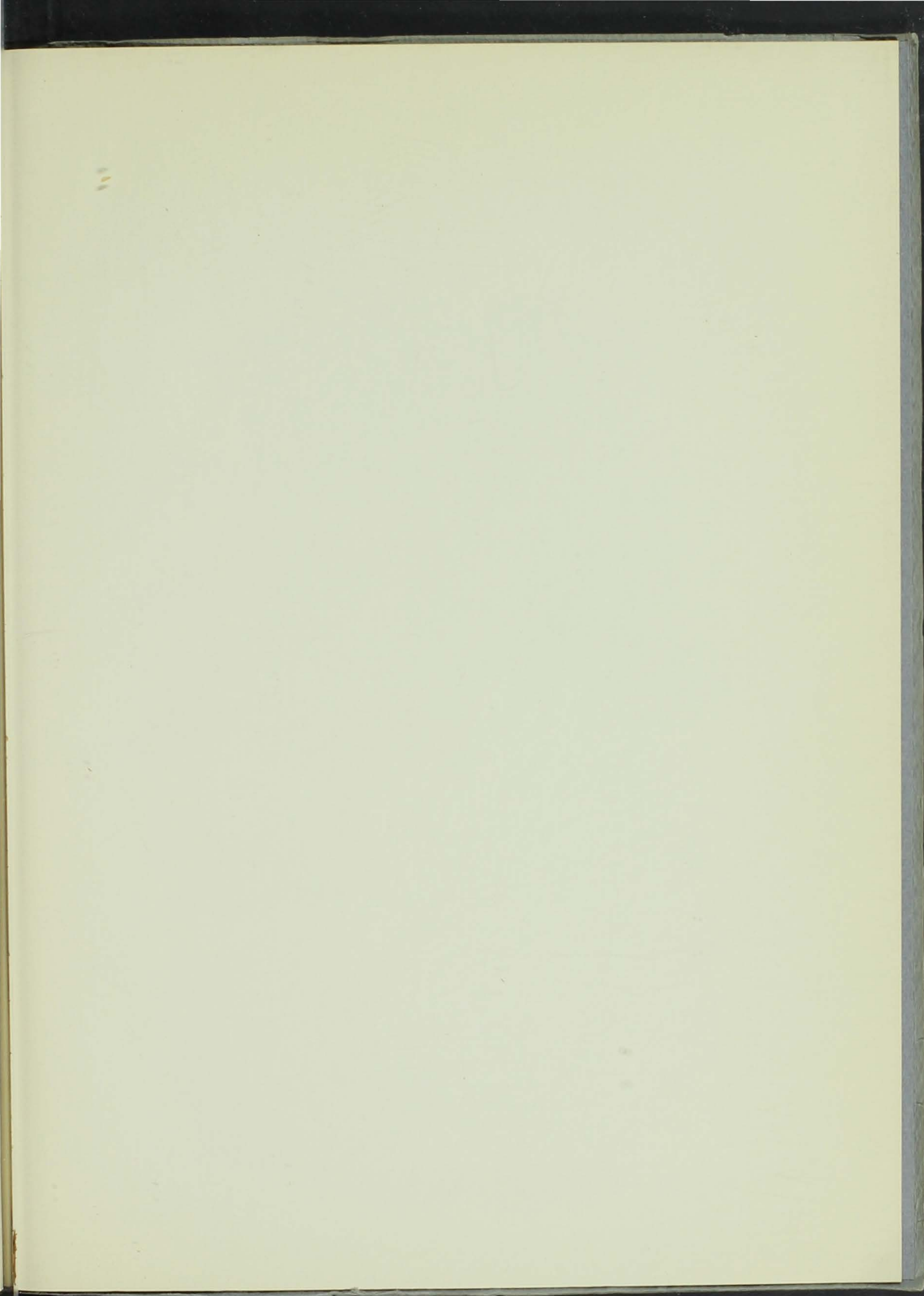




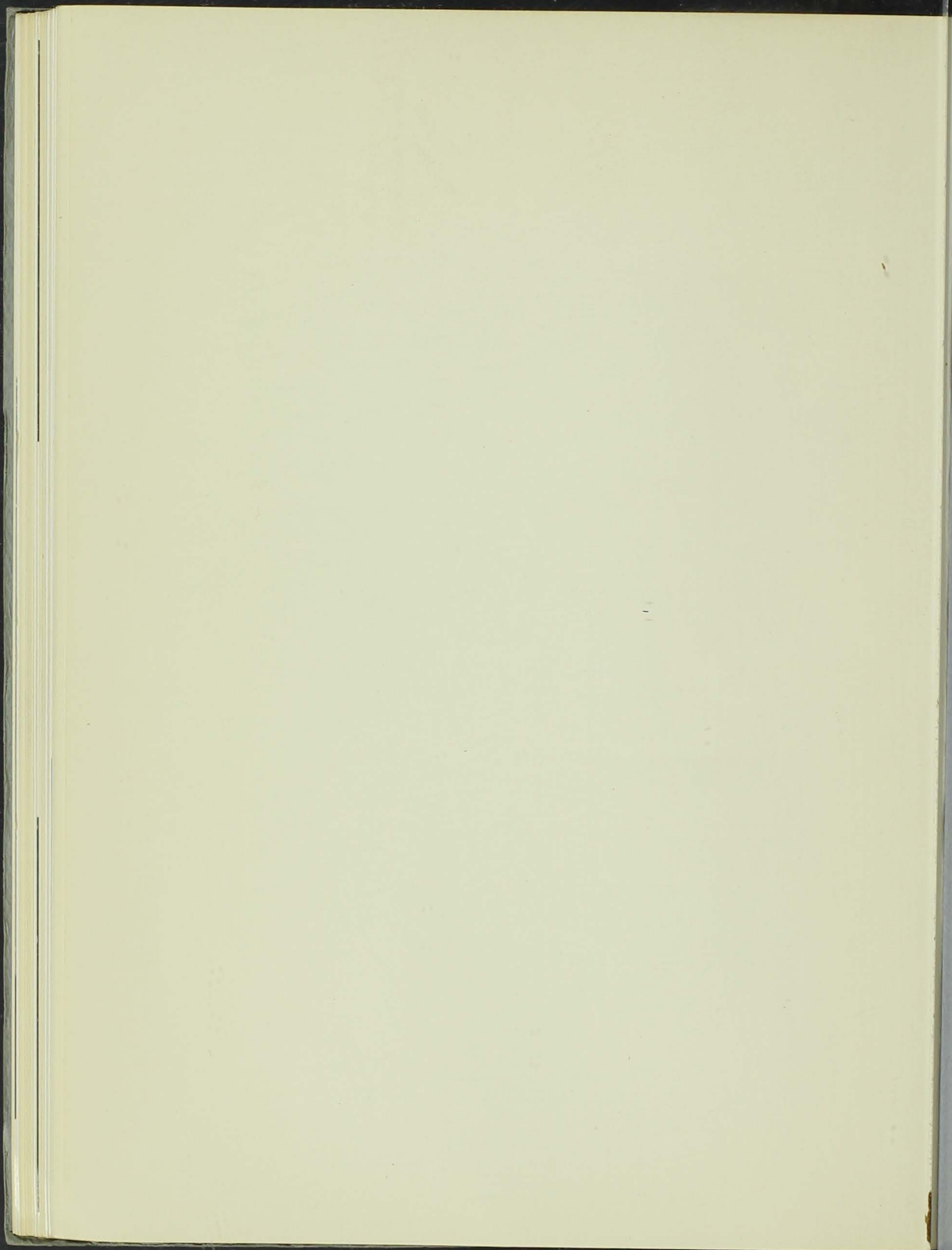




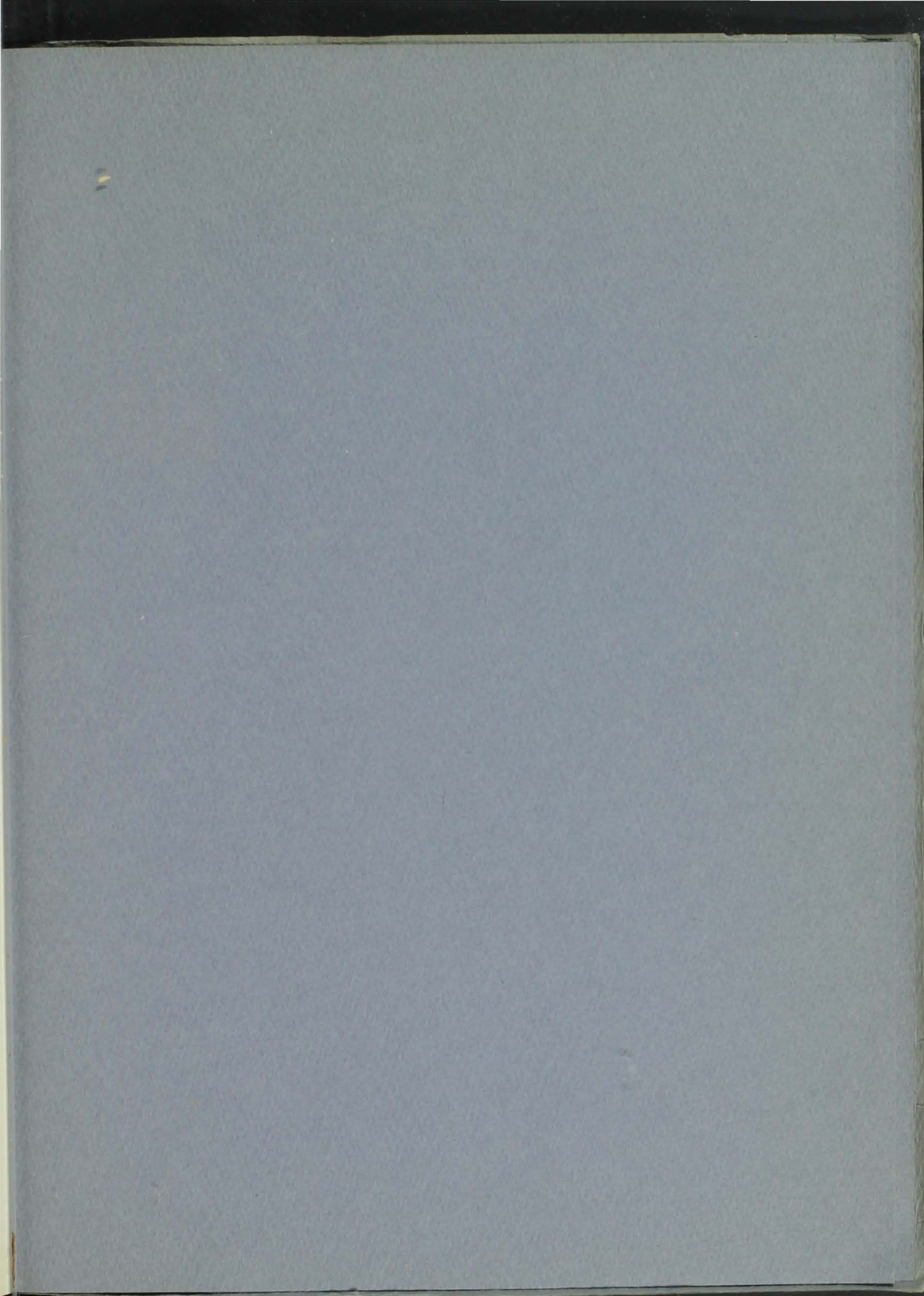




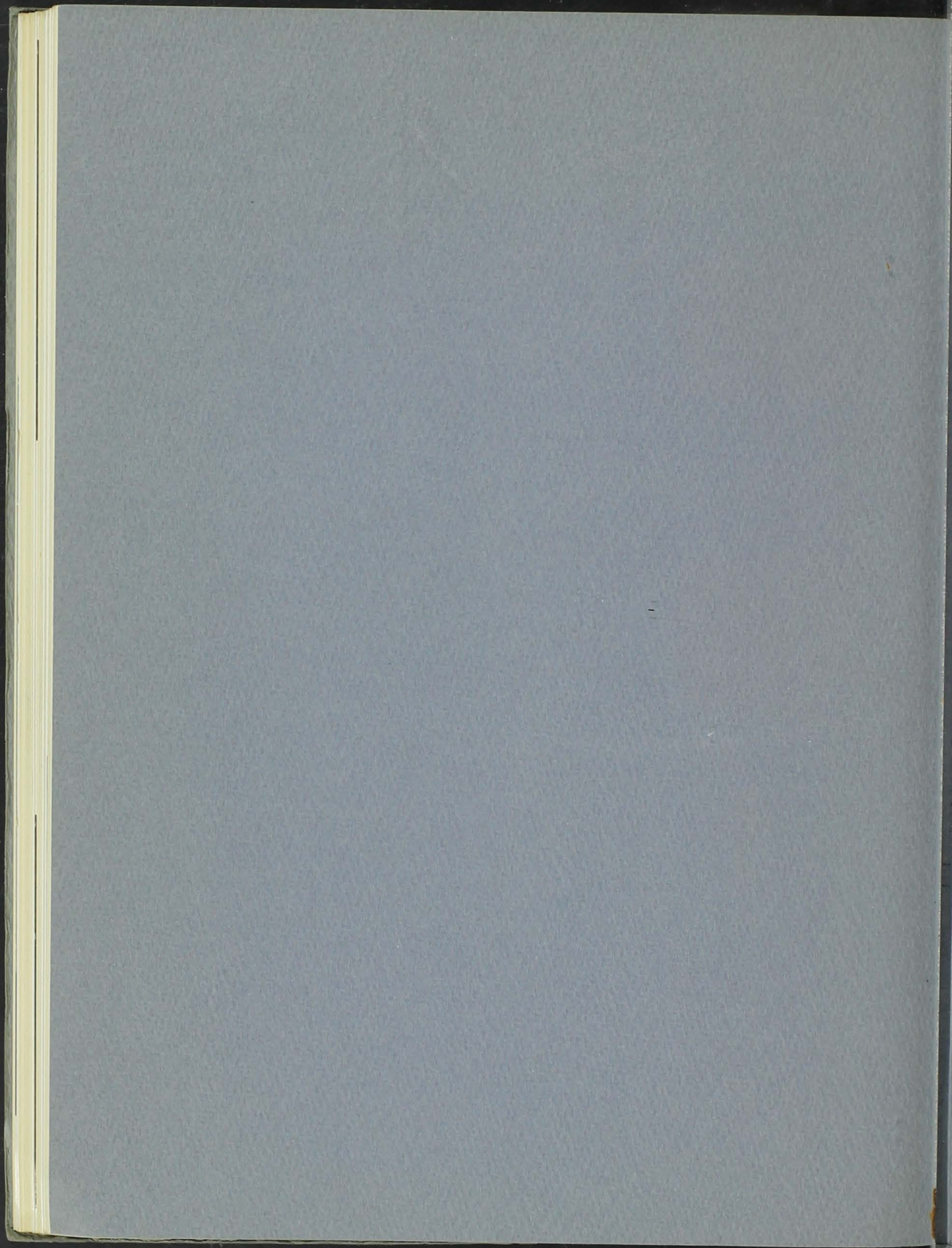




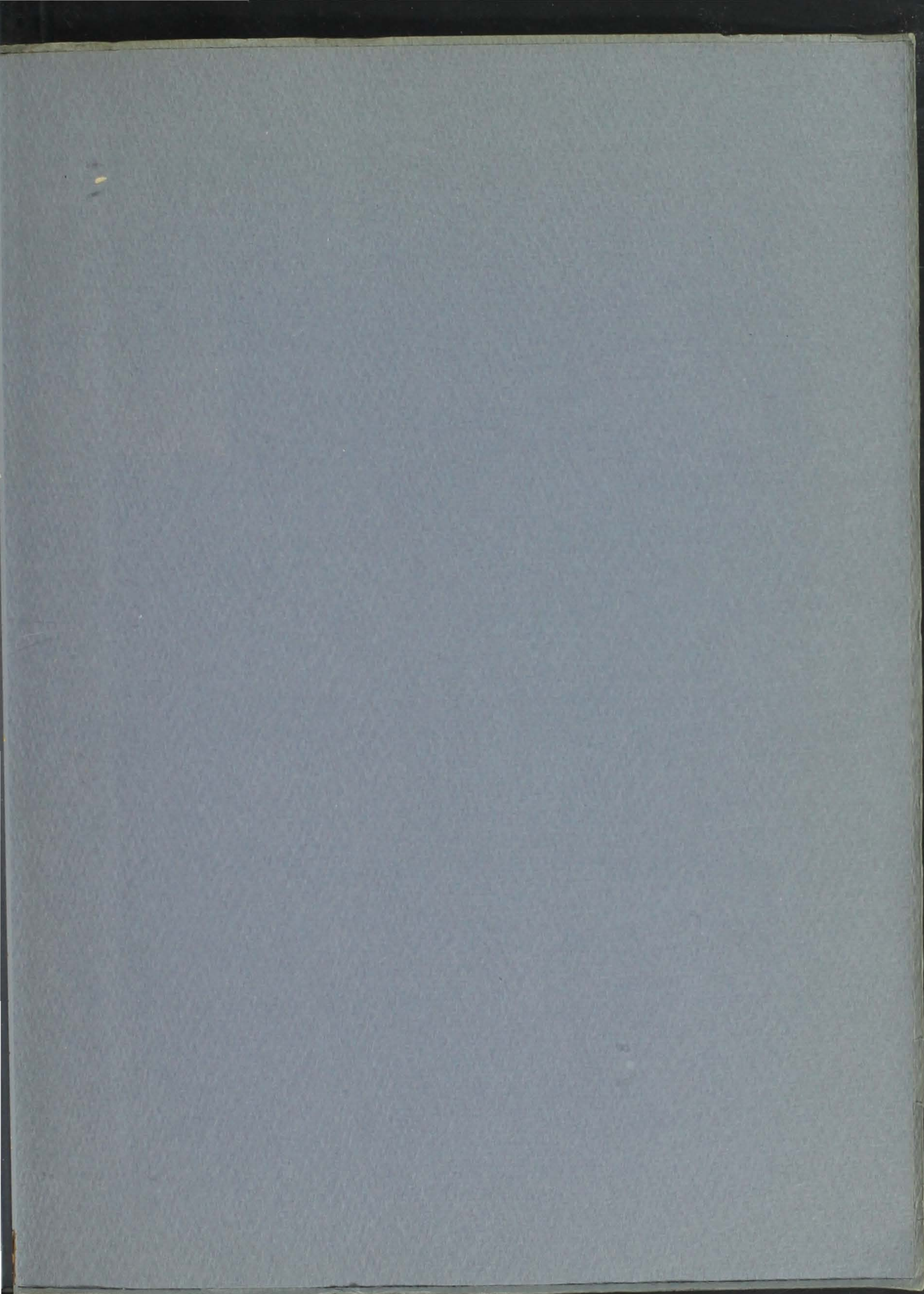














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