agri-industrial complex.

We will need to scrutinize our courses, and re-evaluate the adequacy of our facilities. Are we sure that our students are learning the potential of high lysine corn; of the microwave oven; of environmental control for livestock production? Do we have to organize a field trip to a commercial operation to demonstrate even small scale modern production or processing techniques? Are we attempting to teach in outmoded campus and college farm laboratories?

Our speakers here have helped make us aware of the rapidly changing career areas for graduates in agriculture. They have helped to identify the opportunities for technicians, managers and professional personnel needed for the agri-businesses of suburbia. Garden centers, turf farms, lawn equipment sales and service and landscape businesses are but a few who will bid for our graduates.

We as members of NACTA might well consider, during our meeting next year, what effects these changing career patterns should have on our curricula in Agriculture. NACTA can take the initiative in suggesting directions which curricular revisions might take.

Another area of service in which NACTA might give leadership is in providing reliable annual statistics on such program factors as faculty salaries; full teacher equivalents as related to instructional loads; departmental operating expenses; organized research; and organized fiscal activities, including appropriations, allocations, and income.

I am involved at present with the Coordinating Board for the Texas College and University System in developing guidelines for instructional programs in Agriculture for the State during the next decade. The state colleges and universities have been given the opportunity to suggest standards and criteria for excellence in agricultural education and teacher certification. We shall look at organized activities to examine the role and nature of financial support of agricultural teaching laboratories. We shall study the need for a two-year curriculum. The relevance of research programs to teaching will be discussed. The relationships of continuing education and public service to the teaching mission in agriculture will be investigated. And the need for an increased emphasis on two-year technical programs will be studied. All of these areas should have guidelines developed on the basis of reliable indices of local, state and national trends. I am not sure that such indices are now available, but I believe that through NACTA, such information could be developed.

Lastly, all of us need to work hard during this next year to widen the scope of NACTA, and our student affiliate Delta Tau Alpha. Let each of us become an active campaigner for memberships in our home states. Set the goal of having NACTA represented by active members wherever Agriculture is taught in junior colleges, technical institutes, senior colleges or universities. Let us especially promote the sustaining membership by persuading our friends in industry to support our aims and purposes by making a substantial contribution to our organization.

Two-Year Technical Education Curriculums in Agriculture and Natural Resources in the United States of America

Fred William Manley
State Consultant of Agricultural and Biological Education
Department of Community Colleges
Board of Education
State of North Carolina
Raleigh

References are made in the report to "Handouts" by number; these are found at the end of the article.

I am both honored and pleased to be in your presence today – honored because of my invitation to be a part of this distinguished group and pleased to have the opportunity to return to one of my favorite states.

Back home in North Carolina, I try to be one of New York's ambassadors and help my friends there distinguish between the State of New York and the City of New York. As most of you know, there is a lot of difference! On previous visits to the State, I have toured the City, Long Island, and the regions of the Hudson Valley, the Catskill Mountains, the Adirondack Mountains, and the eastern part of the Appalachian Plateau. These visits have taken me to the Agricultural and Technical Colleges at Farmingdale, Cobleskill, Delhi, and Morrisville, and the New York State Ranger School at Wanakena and Paul Smith's College at Paul Smiths.

Now, with this visit, I am pleased to add the western portion of the Appalachian Plateau and the Great Lakes Plain along with my first visit here at the Agricultural and Technical College at Alfred. This now leaves only one of the six Agricultural and Technical Colleges that I have not visited, and that is the one at Canton.

Although I haven't been at Alfred before, Dr. Huntington, the president of the college here, and I appeared on a symposium about one and one-half years ago in New York City that devoted some time to technical education. This was in conjunction with the annual meeting of the American Association for the Advancement of Science.

In addition to having met Dr. Huntington, I count it a real privilege to be a friend to many appearing on the program at this convention. In addition, it makes me feel "right at home" to look into the faces of so many others that I have met in times past. I just hope that they "will pardon" the repetition of hearing some of the things I shall say here today and some of those past times. It appears that there is the same "core group" that always supports such professional programs as this, and it just happens that the program planners have tended to ask me to perform quite similar tasks.

In any event, I am pleased to have been first on the program. This means I did not have to make last-minute changes in my presentation, and, secondly, I can enjoy the remainder of the convention much better. In addition, I would point out that I shall not stand before you for an entire hour. I certainly wouldn't want us to be late for the steak supper at Lake Lodge.

Title of Address

Getting on with what I have been asked to do, I would point out that the full title of my presentation is "Two-Year Technical Education Curriculums in Agriculture and Natural Resources in the United States of America." I shall attempt to give you my concept of what two-year technical programs are

with my examples being in the category of agriculture and natural resources. Furthermore, since Howard Sidney is going to follow me with the situation in the State of New York, I shall have to give my presentation a "North Carolina flavor," that is, "in addition to my version of the Queen's English."

Concepts and Definitions

The question posed for me in the convention program is "What Are Two-Year Technical Programs?" If it were simple enough to answer that these were curriculums to prepare technicians, then I could stop right here, and the conference could be adjourned. However, the term "technician" is quite a widely and popularly used one in which there is usually imprecise understanding transmitted. This being the case, I shall dwell for some time on concepts and definitions of the terms "technical" and "technician."

First of all, I want to identify my concept or definition of the term "technical" in context with the terms "vocational" and "professional." My main point is that these are levels of education or employment and not categories of education or employment. If you would now open the packet which is before you and refer to the first handout, I believe this will aid me in making my distinction among the levels of education and employment of "vocational," "technical," and "professional." (See Handout No. 1)

You can see from this chart that two types of skills – manipulative and cognitive – are theoretically proportioned among the four occupational levels of "semi-skilled," "skilled," "technical," and "professional." As you move on the chart from the "semi-skilled" occupational level to that of the "professional," the proportion of manipulative skills decreases while that of the cognitive skills increases. The relationship between the occupational levels and the educational levels of "high school," "two-year college," and "four-year college and above" is a direct one. Now I would like to use the occupational level terms of "vocational," "technical," "professional." If you were now to write in the term "vocational" to encompass the terms "semi-skilled" and "skilled," then we would have, theoretically, a direct relationship between the occupational levels of "vocational" and "technical" and the education levels of "high school" and "two-year college." A further refinement of this would be a direct relationship between "vocational" and "high school" and "technical" and "two-year college." Of course, the relationship between the occupational level of "professional" is directly related to the educational level of "four-year college and above."

Now, I would be the first to admit that these levels of occupations and education do not fit into simple compartments as they appear here; however, I am suggesting that this might be useful as a model – a theoretical model at best.

I would now like to support this "level of education" concept with two examples.

First of all, refer to "Handout No. 2." On this sheet, we find a brief concept or definition of the phrases "Vocational Education in Agriculture" and "Technical Education in Agriculture" as agreed upon by the state leadership in agricultural education in North Carolina.

I believe you can denote some reference to the chart which was "Handout No. 1."

Now, if you will look at "Handout No. 3," you can see how the "levels concept" has been identified with the high schools, two-year colleges, and four-year colleges or universities in North Carolina. In addition, please note in the far right column that I have indicated "levels of careers" of occupations which relate directly to the "levels of education" which are given in the other columns.

If you are getting tired of hearing about "levels" and would simply like to think in terms of "people" and "programs," then look at "Handout No. 4." This chart starts with people in the elementary schools and follows through with those adults desiring continuing education at our technical institutes and community colleges. I would point out that the program titles for the seventh and eighth grades are not confirmed as those listed; however, the point I wish to make is that formal programs of agricultural education are being planned for the grades below high school, or the ninth grade. In addition, you will notice a total of twenty year-long courses at the high school level. These replace the old titles of "Agriculture I, Agriculture II, Agriculture III, and Agriculture IV" which were discarded in North Carolina about five years ago.

Agricultural and Forest Technicians and Mid-Management Specialists

Now, if we can accept this concept of technical education as being the level between that of vocational and professional, let's focus our attention on some rather restrictive definitions which some of you probably gave some contributions a few years ago. This is "Handout No. 5," and I would like for us to consider it together. Please follow me as I read.

Looking back at the last sentence of the first paragraph of "Handout No. 5," you will find a statement which is rather agreeable to most technical educators. It states, "The best definitions of technicians may be obtained from an analysis of what the technicians must know, what special abilities they must possess, and what they must be able to do."

"Criteria for Technician Education – "A Suggested Guide" (1)

At this point, I would like to urge you to obtain a copy of a U.S. Office of Education publication entitled, "Criteria for Technician Education – A Suggested Guide." "Handout No. 6" is a copy of the title page of this publication, and the reverse side indicates the price and where you may order it. I am aware that a number of you here reviewed drafts of this guide.

This publication gives a rather comprehensive coverage of technical education, and its contents indicate not only "what technicians must know, what special abilities they must possess, and what they must be able to do," but it deals with administration of programs, physical facilities, faculty, student selection and services, and curriculum.

The Growth of Institutions and Curriculums to Prepare Agricultural Technicians

Before we look closer at some of the characteristics of curriculums to prepare technicians, let's briefly review the growth of these institutions that prepare agricultural technicians and some of the needs for agricultural technicians and mid-management specialists.

The education of technicians and mid-management specialists has only recently been recognized as so essential to the Nation's total work force as to require the involvement of a large number of educational institutions to meet the growing needs.

A relatively small number of public and private schools have been providing excellent education for various kinds of technicians for many years. Among some of the earlier started technical education programs in agriculture would be those found in the states of New York, New Hampshire, Massachusetts, and Michigan. For example, institutions having a long and rich heritage would be those known today as the New York State Ranger School at Wanakena (started in 1912 as a division of the State University, College of Forestry at Syracuse University), the Thompson School of Applied Science at Durham, New Hampshire (with initial beginnings dating back to 1898 and now a division of the College of Agriculture at the University of New Hampshire), the Stockbridge School of Agriculture at Amherst, Massachusetts (founded in 1918 and now a part of the College of Agriculture at the University of Massachusetts), the Institute of Agricultural Technology at East Lansing, Michigan (started in 1894 and now a part of the College of Agriculture and Natural Resources at Michigan State University), and the six

agricultural and technical colleges of the State University of New York located at Farmingdale, Cobleskill, Delhi, Morrisville, Canton, and here at Alfred (these being founded during the approximate years of 1908-1915).

Since the number of institutions providing technical education has been small until the last few years, the special nature and problems of technical education programs is just becoming known to many people who are now required to consider initiating them to meet the challenge of technological change. (As a matter of fact, a panel tomorrow morning is going to handle the topic, "How to Organize Two-Year Colleges.")

According to the U.S. Office of Education, highly skilled technicians are becoming an increasingly essential part of the scientific and management team in modern scientific research, development, production, and services in all fields of applied science. There should probably be as many as 6 to 10 technicians for every medical doctor or professional researcher in the health field or 4 or 5 for each professional biological or agricultural scientist. In addition, the managers and operators of the Nation's farms must increasingly have preparation equivalent to that of a technician.

Our scientific knowledge now doubles every 10 to 20 years. This explosion rate has caused so many changes in scientific education that the recently graduated professional scientist, specialized physician, or engineer often has had limited laboratory experience. He functions more as a theorist, diagnostician, interpreter, inventor, or administrator than he did in the past and delegates many of the laboratory duties of his scientific work to skilled assistants and other members of the scientific team. Highly skilled technicians are therefore using the skills of applied laboratory knowledge and practices which once belonged only to the professional scientist. It is estimated that over 200,000 technicians of all kinds are needed each year. New kinds of technicians are also increasingly demanded. **The total number of technicians graduating from preparatory programs each year is less than half the number required to meet the Nation's needs.**(2)

For the past several years the demand for professional employees at the four-year level has exceeded the supply. Universities and colleges have reported that from three to seven jobs exist for each graduate with the number much higher in certain specialized areas. The use of technicians to extend the influence of the professional workers has been one of the solutions to this shortage.

Even with the increased efficiency in output per worker, agriculture still employs six million workers on our farms. What's more, the labor on the farm accounts for a small part of the entire labor requirements – either directly or indirectly associated with agriculture. According to the USDA reports, six million people have jobs providing the supplies that farmers use for production and farm living. Eight to ten million people have jobs storing, transporting, processing, and merchandising the products of agriculture. In fact, three out of every ten jobs in private employment are related to agriculture.

Farming will continue to become more efficient. The farms of the future will be larger and have larger capital requirements. Production techniques will have to be improved to increase output per acre and dollar or capital employed to feed an ever-increasing world population. Production patterns will also change to meet the requirements of processing and marketing. The farmer of tomorrow will need to know more about what happens to his product as it leaves the farm and proceeds through the marketing and processing channels to the ultimate consumer.

As each product leaves the farm and proceeds through these channels, it must be tested, graded, transported, processed, packaged, and priced. All of these changes not only have a direct effect upon the income the farmer receives, but they also increase the need for technically competent people in all areas of employment associated with agriculture and natural resources.

On-the-farm production will require fewer labor inputs per unit of production – including fewer farmers. However, as the farm labor decreases, a corresponding increase will take place in the jobs closely associated with farming. These jobs will be in the areas that service the farms with both product and advice, in processing, marketing, and in entirely new areas not yet known. The net result – more and more jobs associated with agriculture in all areas requiring workers with a technical background.

Reflecting upon all the changes and progress which have been made in technical education in agriculture and natural resources during the past few years, I would have to say that the most marked change and progress has been that of greatly increased opportunities for technical education and the number of different curriculums that are being offered in all classifications in the field of agriculture and natural resources. As the number of newly established two-year colleges in 1967 was approximately seventy-eight and the number in 1968 was around one hundred, growth in numbers of institutions, programs, and students in two-year technical education programs in agriculture and natural resources has increased remarkably.

Please refer now to "Handout No. 7." This table indicates that the number of institutions, programs, and students increased by about one-third in 1967-68 as compared to 1966-67. You will note that it is the two-year colleges where the fantastic growth is taking place – not at the divisions of four-year institutions.

This information comes from a study and directory which I completed of these programs about a year ago.(3) Other findings which might interest you are these: (1) the number of states having programs in 1967-68 was thirty-six; and (2) the top five states in total enrollment during 1967-68, in order, are California, New York, North Carolina, Illinois, and Massachusetts. These five states enrolled 65% of the total students with California, alone, enrolling 28%.

At the present time, I am completing a new directory which will give 1968-69 information. On the basis of incomplete returns, I would estimate that the enrollment for 1968-69 will approximate 15,000 students.

Demand for these technically educated graduates is increasing each year as more two-year colleges initiate programs and as employers learn to appreciate what the technicians can do. However, much study still needs to be done to determine the number of various types of agricultural and natural resource technicians needed. Likewise, more liaison between educational institutions and employers is needed to acquaint prospective employers with the capability and availability of graduates.

Selected Characteristics of Technical Curriculums

I hope that I have now impressed you enough with the amazing growth and importance of technical curriculums in agriculture and natural resources that you will be inquisitive of the particular characteristics of these organized programs of study.

Remember our question, "What Are Two-Year Technical Programs?" Let us now be concerned not only with the level of the curriculum but with the objectives, content, and organization as well.

To do this, I would now direct your attention to "Handout No. 8." Since the publication I mentioned earlier, "Criteria for Technician Education – A Suggested Guide," was so widely critiqued before it was printed, I have decided to quote from it and allow you to have these statements before you now and during the remainder of the convention. Please follow me as I read.

I am sure there are other characteristics which should be listed along with these, and there are some of these which you might question. Let's hope that you will express yourselves not only after my presentation but all during this convention.

Before we leave the guide from which I have so generously

quoted. I want to share with you an illustrative curriculum in ornamental horticulture which appears in the publication. This is "Handout No. 9."

Offerings in the North Carolina Comprehensive Community College System

Finally, I want to share with you a directory of the educational programs in agriculture and natural resources in the North Carolina Comprehensive Community College System. Please refer to "Handout No. 10."

Most of this pamphlet describes two-year technical or mid-management curriculums which lead to the degree of Associate in Applied Science. The map on page two indicates the locations of the fifty two-year colleges and institutes as now chartered. The symbols for the institutions which are encircled indicate those that will be offering one or more curriculums in agriculture and natural resources during 1969-70. There are nineteen of these institutions. Four new institutions will probably be approved by our General Assembly which is currently in session. These would not be fully operational until the 1970-71 year. Pages fourteen and fifteen give other information such as admission requirements, costs, and enrollment information. (Editor's Note: This bulletin is not reproduced here but may be obtained in mimeographed form by corresponding with the author of this article.)

The Community College Movement

Since the theme of this convention is "Two-Year Technical Colleges," and I have indicated that it is these institutions where most of the technical curriculums in agriculture and natural resources are offered. I would like to quote just a few sentences from the report of the National Science Foundation to the U.S. House of Representatives during the first session of the Ninetieth Congress.

Dated June 8, 1967, and entitled "The Junior College and Education in the Sciences," some excerpts from the report summary are:

> It is to the 2-year institution, and, more especially, to the community junior college that America is turning further to advance the democratization of college education in the United States.
>
> The capacity for absorbing larger and larger enrollments is one of the most striking features of the 2-year college segment of higher education. Related to this seemingly infinite capacity is a ready responsiveness to student needs which gives rise to a heterogeneous student body, a comprehensive program, uniquely qualified staff, and an uncrystallized conglomeration of institutions. The junior college, and more particularly the community junior college, places great emphasis on satisfying felt local educational (and "cultural") needs.
>
> One of the most remarkable educational phenomena of the last decade or two, junior colleges are being established at a rate of about one per week. To talk in terms of a "current" situation becomes hazardous.
>
> There are a number of elements of similarity between the land-grant college phenomenon and the junior college movement. The former, it has been said, applied to higher education "The challenge of useful relevance." Can not the same be said of today's junior college situation? In terms of social pressures, of needed educational programs, of the existence of educable populations, of the existence of a dynamic, activist association (the American Association of Junior Colleges) – the ingredients exist for an advance in the democratization of college education to rival that which was brought about by the land-grant college legislation.(4)

This section of the report concludes with this rather challenging statement:

> To quote a popular refrain, the 2-year sector of higher education "is bursting out all over." This phenomenon reflects an attempt on the part of society to deploy higher education resources as efficiently as possible. The question at issue is whether the junior college sector can accommodate to its increasing responsibilities; whether it can responsibly discharge its responsibilities to the American public.(4)

Closing

During the past forty minutes or so, I have attempted to answer the question assigned me, "What Are Two-Year Technical Programs?" In addition to that, however, I hope that I have given you some of the enthusiasm and excitement surrounding technical education in agriculture. Furthermore, I hope that I have raised some questions or have made some statements which you would like to challenge. If so, please let yourself be heard.

I should point out that you should not think for one second that all of these programs are yet obtaining respectable objectives and are turning out completely competent graduates. I know of many that are not, and many other educators join me in devoting ourselves toward improving the quality of these programs.

But, during anyone's rush to be destructively critical, let him remember that everything had its originating point, and I suspect that all of our alma maters are just a "little bit better" today than they were during their infant years.

In closing, I would like to quote the Executive Director of The American Association of Junior Colleges, Dr. Edmund J. Gleazer, Jr., who in making a speech on the topic, "The Golden Age of the Junior College," stated:

> We talk many times about people not having a sense of motivation when they get into our great universities and colleges. They are not sure what they want to do. I don't blame them for this. The world and the economy is becoming more complex all the time. We should get those people into a kind of situation where they can give their attention not only to book-learning but where they can learn something about working with their hands. They are not making a life-long commitment. But they can make an entry into a respectable job. They begin to get a sense of motion and movement and with this sense of movement, hopefully, eventually, there comes not only motivation for learning but there comes a sense of direction. We are long past the time in this country when one prepared oneself for life; then it was all over. Now, one starts the educational process and gets into a job, but he must continue to have educational resources available to him.
>
> In this country we've got to make it possible in every community to have a great educational resource-center so that people can be prepared for job entry. When they come up against a new opportunity, a new position offered, something else they want to do now, or a problem, then they have the opportunity easily to take advantage of whatever educational resource would be necessary to move along with this opportunity.(5)

For the most part, I think Dr. Gleazer is absolutely on "solid ground."

Preparing functionally competent agricultural and natural resource technicians and mid-management personnel makes three major demands upon this level of education:

1. The education should equip the graduate to take an entry job in which he will be productive;
2. The education should enable him to advance to positions of increasing responsibility after a reasonable amount of experience; and
3. The education should provide a comprehensive foundation to support further study within the graduate's field of agriculture and natural resources.

This concludes my formal presentation; I gratefully appreciate your attention and interest and, acknowledge graditude to those who arranged my invitation to be here.

BIBLIOGRAPHY

1. U. S. Department of Health, Education, and Welfare, Office of Education. Criteria for Technician Education – A Suggested Guide, OE-80056, United States Government Printing Office, Washington, D. C., 1968.

2. U. S. Office of Education. Pretechnical Post High School Programs, A Suggested Guide, Technical Education Program Series No. 12, OE-80049, United States Government Printing Office, Washington, D. C., 1967.

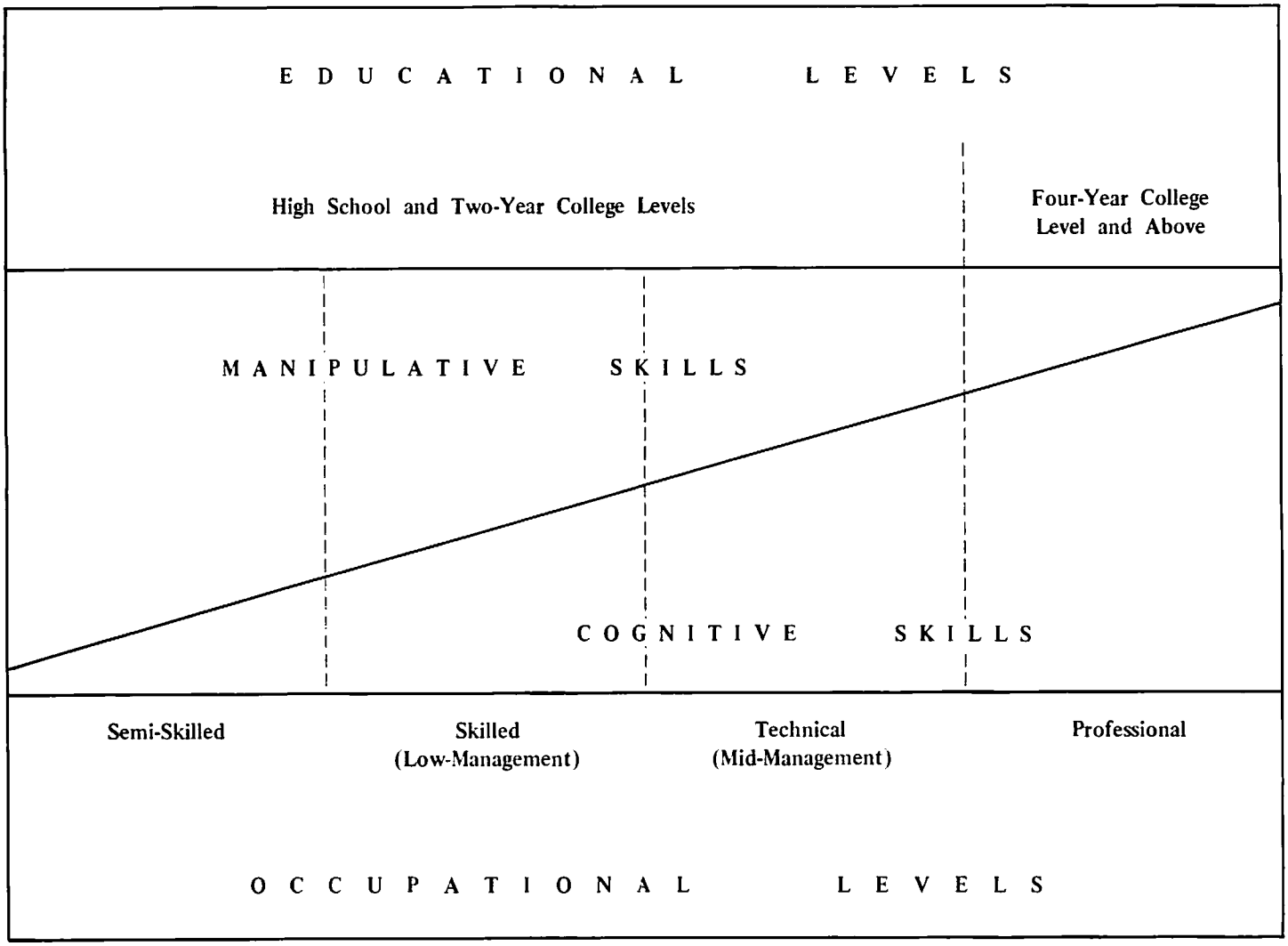
3. Manley, Fred W., Two-Year Technical Education Curriculums in Agriculture and Natural Resources in the United States of America – 1966-67 and 1967-68, A Study, Directory, and Statistical Summary, a Study for the Panel on Two-Year Programs of the Commission on Education in Agriculture and Natural Resources of the National Research Council, Department of Community Colleges, Board of Education, Raleigh, North Carolina, NACTA Journal, June, 1968.

4. National Science Foundation. The Junior College and Education in the Sciences, A Report to the Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics, U. S. House of Representatives, Ninetieth Congress, First Session, Serial H, United States Government Printing Office, Washington, D. C., 1967.

5. American Association of Junior Colleges. Emphasis: Occupational Education in the Two-Year College, Addresses and Recommendations Presented at a Conference Sponsored by The Midwest Technical Education Center and The American Association of Junior Colleges at St. Louis, Missouri, on May 12-14, 1966, Washington, D. C., 1966.

HANDOUT NO. 1

PROPORTION OF TWO TYPES OF SKILLS IN EDUCATIONAL PROGRAMS FOR DIFFERENT OCCUPATIONAL LEVELS*



*Using Curriculum Developments, Association for Supervisors and Curriculum Development, National Education Association, Washington, D. C. 1963. Adapted by Fred W. Manley.

HANDOUT NO. 2

DEFINITIONS OF VOCATIONAL EDUCATION AND TECHNICAL EDUCATION IN AGRICULTURE AS USED BY THE STATE AGRICULTURAL EDUCATION LEADERSHIP IN NORTH CAROLINA

Vocational Education in Agriculture

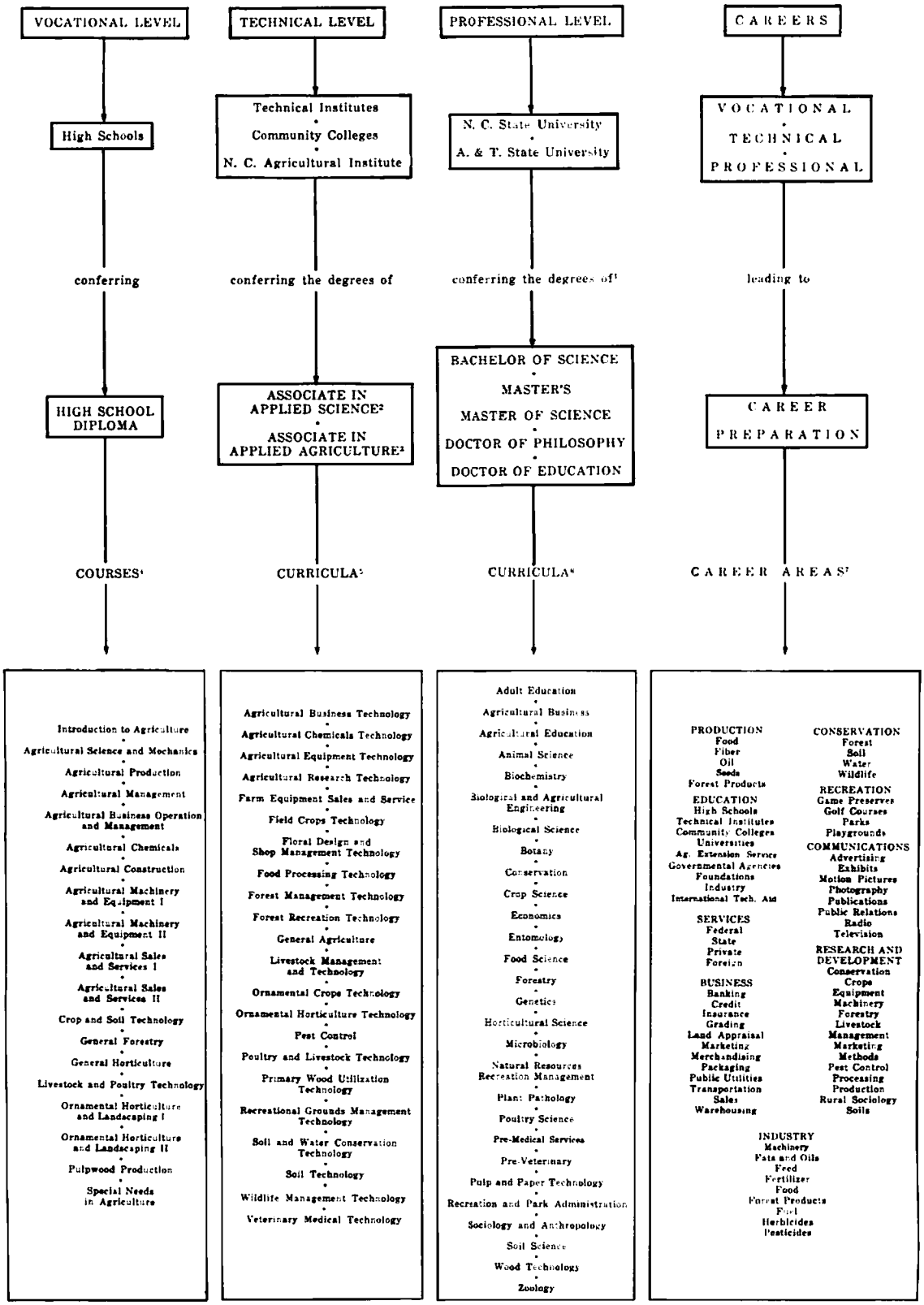
Such occupational education that is concerned largely with the development of knowledge, understandings, skills, attitudes, and leadership abilities in the broad field of agriculture. Emphasis is upon the development of a person for (1) entrance into a vocational level occupation (skilled or semi-skilled) or one of a low-management level and/or (2) the preparation of a person for technical or professional level education in agriculture.

Technical Education in Agriculture

Such occupational education that is concerned largely with the development of knowledge, understandings, skills, attitudes, and leadership abilities in the broad field of agriculture. Emphasis is upon the development of a person for entrance into a technical level occupation (semi-professional) or one of a mid-management level. (Although this education is designed for entrance into employment, certain courses may be accepted by a four-year college or university as transfer credit, usually on the basis of qualifying examinations.)

HANDOUT NO. 3

North Carolina Educational Opportunities For Preparing Careers in Agriculture & Natural Resources



[1] Not all conferred at both institutions
[2] Conferred by the technical institutes and community colleges
[3] Conferred by the N. C. Agricultural Institute
[4] Not all courses (except the first two) offered by all high schools
[5] Not all curricula offered by all institutions
[6] Not all curricula offered by both institutions
[7] Adapted from a publication prepared by a special committee of the Resident Instruction Section, Division of Agriculture, American Association of Land Grant Colleges and Universities

Prepared by:
Fred W. Manley, State Consultant for Agricultural and Biological Education
Division of Vocational-Technical Programs
Department of Community Colleges
State Board of Education
Raleigh, North Carolina 27602
June, 1968

HANDOUT NO. 4

VOCATIONAL AND TECHNICAL AGRICULTURAL EDUCATION IN NORTH CAROLINA

THE PEOPLE	AND	THE PROGRAMS
In Elementary Schools	7th Grade	Agriculture In Our Life
	8th Grade	Orientation To Agricultural Occupations
In High Schools	9th Grade	Introduction to Agriculture
	10th Grade	Agricultural Science and Mechanics
	11th Grade and 12th Grade	Agricultural Production Agricultural Management Agricultural Construction Agricultural Machinery And Equipment I, II General Horticulture Ornamental Horticulture and Landscaping I, II General Forestry Pulpwood Production Crop and Soil Technology Livestock And Poultry Technology Agricultural Chemicals Agricultural Business Operation And Management Agricultural Sales And Services I, II Agricultural Conservation And Recreation Special Needs In Agriculture
In Technical Institutes and Community Colleges	Certificate (3 Months)	Farriering
	Diploma (12 Months)	Dry Kiln Operating Log Sawing Lumber Inspecting Saw Filing
	Degree of Associate In Applied Science (A.A.S.) (21 Months)	Agricultural Business Technology Agricultural Chemicals Technology Agricultural Equipment Technology Agricultural Research Technology Fish and Wildlife Management Technology Floral Design And Shop Management Technology Food Processing Technology Forest Management Technology Forest Recreation Technology Ornamental Horticulture Technology Poultry And Livestock Technology Recreational Grounds Management Technology Soil And Water Conservation Technology Veterinary Medical Technology Wood Products Technology – Primary Wood Products Technology – Secondary
Desiring Continuing Education	High Schools Technical Institutes Community Colleges	Individual Instruction Short Courses General Programs Agricultural Seminars Farmers Clubs Veteran Farmer Education Community Development Clubs Educational Television

HANDOUT NO. 5

DEFINITIONS OF AGRICULTURAL AND FOREST TECHNICIANS AND MID-MANAGEMENT SPECIALISTS

Introduction
The term "Technician" has been widely and popularly used in occupational titles or work classifications; usually imprecisely, but generally to imply some degree of technological involvement. The best definition of technicians may be obtained from an analysis of what the technicians must know, what special abilities they must possess, and what they must be able to do.

The Agricultural Technician
At a July 1964 national seminar on "Preparing Agricultural Technicians" held at The Ohio State University at Columbus, the following definition of an agricultural technician was developed:

> An agricultural technician is a worker located between the skilled worker and the professional in the job classification structure, in his work performance, and in his educational attainment. He possesses the skill and ability, working independently or with minimal supervision from a professional, to analyze and interpret information, diagnose problems, make decisions, and make practical applications of theoretical knowledge in performing specific tasks in a specialized field in the production, processing, distribution, or marketing of goods and services in agriculture. He must exercise cognitive skills primarily but also must be able to supervise and perform manipulative skills.

The Forest Technician
At an October 1965 meeting on "Training of Forest Technicians" held at Detroit, Michigan, the following definition of a forest technician was developed:

> The forest technician is a person competent to occupy a

responsible position in the line of authority between the skilled forest worker and the professional forester. He directs the activities of the former under the supervision of the latter and must apply in a responsible manner proven techniques which are recognized as being professionally sound. The techniques employed demand acquired experience and knowledge of forestry combined with the ability to work out the details of a task in the light of well established practices.

The forest technician differs from the semi-skilled (vocational) worker in his knowledge of forestry theory and methods. The senior forest technician occupies the area between the skilled forest worker and the forester at the end of the spectrum closest to the professional forester. Technical training suggests the practical aspects of a training program – the application of methods and techniques associated with an applied science and a profession. The forest technician requires an education in training sufficient to enable him to understand the reasons for and the purposes of the operations for which he is responsible. He must be able to speak the same language as the professional and appreciate the professional point of view. The technician does not require either the depth or extent of scientific understanding required of the professional but he must have a practical working knowledge of the identical subject matter.

The Mid-Management Specialist

In addition to agricultural and forest technicians, it is important to recognize a category of occupational specialists who support and assist professional management. As well as technicians who support professional agricultural and forest scientists and engineers, their occupational equivalent is required in the financial and administrative management sector of agricultural and natural resource business, and in the marketing, transporting, and servicing of the products of farms and natural resources. Although the characteristics of these specialized occupations meet all of the criteria to justify the term "technician," they are not popularly known as such.

HANDOUT NO. 6

OE-80056

CRITERIA FOR

Technician Education

A Suggested Guide

U.S. Department of Health, Education, and Welfare
WILBUR J. COHEN, *Secretary*

Office of Education
HAROLD HOWE II, *Commissioner*

Superintendent of Documents
Catalog No. FS 5.280:80056

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HANDOUT NO. 7

TABLE 1. Present Status and Trends in Two-Year Technical Education Programs in Agriculture and Natural Resources by Kinds of Institutions

ITEM	YEAR 1966-67	YEAR 1967-68	PERCENT CHANGE	PERCENT OF TOTAL 1966-67	PERCENT OF TOTAL 1967-68
NUMBER OF INSTITUTIONS	137	181	+32%	100%	100%
Two-Year	121	163	+35%	88%	90%
Four-Year	16	18	+13%	12%	10%
NUMBER OF PROGRAMS	362	462	+27%	100%	100%
Two-Year	284	379	+33%	78%	82%
Four-Year	78	83	+ 6%	22%	18%
NUMBER OF STUDENTS	10,338	13,665	+32%	100%	100%
Two-Year	8,088	11,008	+36%	78%	81%
Four-Year	2,250	2,657	+18%	22%	19%

HANDOUT NO. 8

SELECTED CHARACTERISTICS OF A TECHNICAL CURRICULUM

1. The curriculum must give the student competence in the following:

   a. Proficiency in the use of the disciplined and objective scientific method of inquiry and observation and in the application of the basic principles, concepts, and laws of physics, chemistry, and/or the biological science pertinent to the individual's field of technology;

   b. Facility with mathematics;

   c. A thorough understanding and facility in use of the materials, processes, apparatus, procedures, equipment, methods, and techniques commonly used to perform the laboratory, field, or clinical work; and the capability to use them to provide the specialized services required in the technology;

   d. An extensive knowledge of a field of specialization, with an understanding of the application of the underlying physical or biological sciences as they relate to the engineering, health, agricultural, or industrial processing or research activities that distinguish the technology of the field; and

   e. Communication skills that include the ability to record, analyze, interpret, and transmit facts and ideas orally, graphically, or in writing with complete objectivity; and to continuously locate and master new information pertinent to the technology.

2. The curriculum must contribute to the development of certain personal characteristics which are desirable and in some measure necessary. As employees and as citizens, technicians must have some understanding of social and economic factors, a knowledge of the organization of society in general and their employer's organization in particular, and acceptable personal attitudes based on an understanding of person-to-person relationships.

3. The curriculum must provide a broadly based competency in a field of applied science of sufficient depth that the graduate technician may be employed in one of a cluster of related work opportunities in his field. Upon employment, a brief period of orientation to his particular duties in the employer's organization, together with continued on-the-job study, permits him to advance to higher levels of productivity and increased responsibility.

4. The curriculum must be of "college level and intensity," providing the special knowledge, skills, competencies, and experience needed for beginning employment, within a period of about two years and usually less than four years. "College level," in this use of the term, describes the maturity, preparation, and attitude of the students; the quality, relationship, facilities, and environment for teaching; and the rigor, expected achievement, and nature of the educational objective.

5. The curriculum has no predetermined implication for transferability to a baccalaureate or a professional curriculum, but it does not preclude a student's continuation toward such an objective.

6. The curriculum should clearly be described as college education in terms readily recognizable by students, school, staff, parents, employers, legislators, other educational institutions, and the public-at-large. As a curriculum – and not a course – it should be described in terms of semester, trimester, or quarter hours. Credit awarded for lectures, laboratories, and shop periods should be that equivalent generally accepted at the college level.

7. The curricular description should specifically state the particular type of technician being educated; and that the program is designed to prepare the student for employment as a technician in a clearly defined cluster of present and reasonably predictable future employment opportunities.

8. The curriculum will contain courses which are usually grouped under the following classifications: (1) basic science, (2) mathematics, (3) technical specialty, (4) communications, and (5) social studies.

9. The curriculum will have a carefully coordinated grouping of courses which are arranged to blend smoothly from one into the next and not a loose collection of courses taken at random and independently of one another. In addition, specialized technical courses are introduced at the beginning term, and relatively large numbers of laboratory hours occur during the first year. (This is in sharp contrast to the arrangement of many baccalaureate or professional curriculums in which basic and relatively unrelated courses make up the first year or two with specialization deferred to subsequent years.)

10. The curriculum will allow a period of time for work experience which is carefully planned, closely supervised, and evaluated.

11. The curriculum will be under continuous evaluation not only by the faculty and administration of the institution, but by an advisory committee composed of representative employers and others.

12. The curriculum should be assisted in achieving its objectives by the use of a student organization which allows for leadership, attitudinal, and personal development.

13. The curriculum should lead to a formal certification of accomplishment, such as the awarding of an associate degree, and the student's progress should be recorded and available as a formal transcript of college accomplishment.

14. The curriculum should have competent and enthusiastic teaching staff, laboratories equipped with apparatus representative of those used by the most up-to-date employers, a good library, adequate classrooms, and an administrative direction sincerely dedicated to quality occupational education.

HANDOUT NO. 9

ORNAMENTAL HORTICULTURE CURRICULUM
FLORICULTURE OPTION

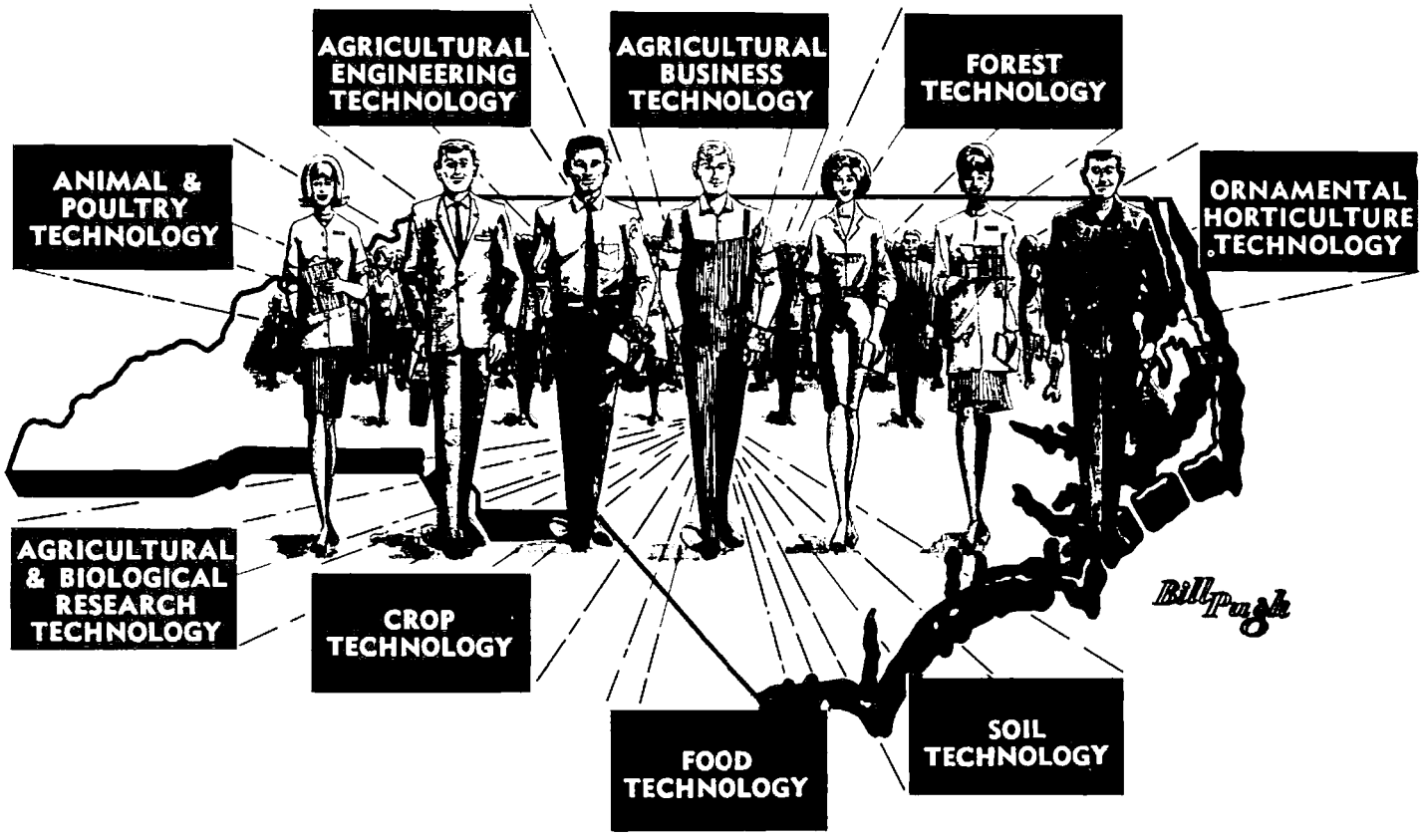
Courses	Hours Per Week: Class	Lab.	Outside Study	Total
First Semester				
Chemistry	3	3	6	12
Communication Skills	3	0	6	9
Mathematics	3	0	6	9
Horticultural Soils	2	2	4	8
Horticultural Applications	1	3	2	6
Botany	3	3	6	12
Total	15	11	30	56
Second Semester				
Technical Reporting	2	2	4	8
Floriculture	1	6	2	9
Herbaceous Plants I	1	2	2	5
Woody Plants I	2	2	4	8
Horticultural Science	2	6	4	12
Entomology and Plant Disease Control	3	3	6	12
Total	11	21	22	54

Summer Session

Occupational experience and studies to meet special requirements of State or institution; approximately 12 weeks of full-time practice in floriculture on the job, or as provided by the college.

Third Semester				
Floral Design	1	3	2	6
Greenhouse Operations I	2	6	4	12
Herbaceous Plants II	1	3	2	6
House and Conservatory Plants I	2	2	4	8
General Industrial Economics	3	0	6	9
Plant Pathology	3	3	6	12
Total	12	17	24	53
Fourth Semester				
Flower Shop	2	6	4	12
Greenhouse Operations II	2	6	4	12
House and Conservatory Plants II	1	2	2	5
Salesmanship	3	0	6	9
Indoor Landscaping	1	2	2	5
Business Organization and Management	3	0	6	9
Total	12	16	24	52

HANDOUT NO. 10



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