DOCUMENT RESUME

ED 086 877 CE 000 914

TITLE A Guide for Planning Occupational Programs in Farm Production and Management.

INSTITUTION New York State Education Dept., Albany. Bureau of Secondary Curriculum Development.

PUB DATE 70

NOTE 54p.

EDRS PRICE MF-$0.65 HC-$3.29

DESCRIPTORS *Agricultural Education; Agricultural Machinery; *Agricultural Production; Agricultural Supplies; Agricultural Trends; *Curriculum Guides; Educational Programs; Equipment; *Farm Management; Farm Occupations; Instructional Materials; Planning (Facilities); *Program Planning; Units of Study (Subject Fields); Young Farmer Education

ABSTRACT

Intended for personnel in charge of establishing and conducting programs in farm production and management, the guide reflects the changes in farming by emphasizing farm business management and farm mechanization. The introductory chapter suggests criteria for selecting students and lists some of the occupations for which the program will provide preparation. The second chapter cites various areas of study and suggested content for each. It is recommended that each course of study contain four basic areas: orientation, supervised occupational experience programs, leadership training, and applied mechanics in agriculture. The following areas would be emphasized according to local occupational needs: field and forage crops, vegetable crops, apple production, grape production, soil science, livestock, farm business management, and farm business economics. Chapter Three contains suggestions for planning facilities--space allocations, classrooms, applied mechanics and land laboratories--for the program. Suggestions for selecting equipment and supplies with a list of necessary items comprise Chapter Four. The final chapter lists instructional materials available. The textbook and reference book section is divided into subject areas. Periodicals, audiovisual aids, teaching aids, bulletins, and various sources of educational materials are also listed. (AG)

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A GUIDE FOR PLANNING OCCUPATIONAL PROGRAMS IN FARM PRODUCTION AND MANAGEMENT

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

CE 000 914

ED 036877

A Guide

For Planning Occupational Programs

In

FARM PRODUCTION AND MANAGEMENT

The University of the State of New York/The State Education Department
Bureau of Secondary Curriculum Development/Albany/1970

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FOREWORD

Occupational instruction in agriculture as preparation for farming has been a primary course in many secondary schools of the State for over 50 years. The operation of successful farms in the State by those who were enrolled in agriculture while in high school is one of the reasons that farming is the State's largest industry. Preparation for mechanized farming requires training in the operation, service, and maintenance of many farm machines. A knowledge of farm business management and of the science of plant and animal production is also required.

Realizing that the area of farming is subject to change, the State Education Department in August 1967 convened an advisory committee composed of Richard Engelbrecht, 1966 Star Farmer of America; Donald Hanks, Dairy Farmer, Salem; Lucian Hills, Potato Farmer, Wayland; and Marcel Mulbury, Fruit Farmer, Peru, to develop an outline for a teaching guide in Farm Production and Management.

Using the suggestions of this committee, a writing committee then met to develop the actual guide. Kenneth Carey, Teacher, Wellsville; Stuart Lamb, Instructor, Cobleskill Agricultural and Technical College; Allan Lines, Teacher, Brushton-Moira; Edward Schaehrer, Teacher, Pine Plains; and Carl Stevens, Teacher, Cayuga County BOCES, served on the committee.

This guide for planning and organizing programs in farm production and management is intended to aid school administrators, directors of occupational education, instructors, and others in establishing and conducting such programs. The material included is based primarily upon the experience of schools offering the course for many years and the judgment of successful farmers and agricultural leaders.

During the various stages of development, the guide was under the supervision of Ernest Nohle, Charles Wiggins, and William Wakefield, Associates in the Bureau of Agricultural Education.

Guidance of the project, coordination, and preparation for printing were the responsibility of G. Earl Hay, Supervisor, Bureau of Secondary Curriculum Development and John W. Surra, formerly of this Bureau.

Gordon E. Van Hooft
Chief, Bureau of Secondary Curriculum Development

William E. Young
Director, Curriculum Development Center

TO THE TEACHER

The program in Farm Production and Management is designed to prepare students for establishment in farming. As farm businesses become increasingly efficient, it is important that those who are to be engaged in farming have a thorough preparation.

Through the use of modern methods and materials made possible by increased mechanization one farmer can now do the work formerly done by many only a few years ago. This course of study reflects the changes with increased emphasis being placed upon the areas of farm business management and farm mechanization.

Farm production and management includes the growing of crops; acquiring knowledge and skill in managing soils; livestock, production of meat, eggs, milk, and fur; the application of mechanics to farming both in regard to installations and their operation in buildings, and to farm power units on field machinery and equipment; and to the business management of a farm by correlating the factors of production, finance, and marketing.

Farming is a biologic business, dealing with the nature and nurture of living things to produce the food we eat and the raw materials for making the clothes we wear. The farmer must contend with the natural hazards of weather, insects, diseases, and pests. The successful farmer must be capable of interpreting agricultural reports in areas such as agronomy, chemistry, and animal science. In addition he must be an effective business manager. The course content in Farm Production and Management includes the fundamental knowledge required in each of these areas and the practical applications of this knowledge in farming.

In addition to training students to become owners and operators of farms, the farm production and management curriculum also prepares students to be employees on various types of farms. As the technology of farming becomes increasingly diverse, the employment opportunities in farming become more specialized.

Employees of the farmer, such as foreman, workers, equipment operators all require an understanding of farming principles in order to function effectively.

Harold L. Noakes
Chief, Bureau of Agricultural Education

John E. Whitcraft
Director, Division of Occupational Education

CONTENTS

CHAPTER I

PLANNING PROGRAMS IN FARM PRODUCTION AND MANAGEMENT

IDENTIFYING AND SELECTING PUPILS

Program and course descriptions should be prepared and disseminated to pupils, parents, guidance counselors, teachers, potential employers, and to other interested individuals and groups using the most appropriate media.

The farm production and management instructor(s) should cooperate closely with guidance and administrative personnel in identifying and selecting pupils to be admitted to the program.

Some suggested criteria to be used in selecting students include:

1. Expressed occupational interests
2. Observed work habits
3. Recommendations
4. Results of interview by the instructor

Programs in farm production and management should be designed to serve the needs of pupils who are seeking occupational training in preparation for immediate employment, including self-employment, after leaving high school and those who plan to seek further preparation by matriculation in post high school institutions such as 2-and 4-year colleges.

SOME OCCUPATIONS FOR WHICH THE PROGRAM WILL PROVIDE PREPARATION WITH SECONDARY SCHOOL TRAINING[1]

Typical opportunities which exist for those persons who have completed an occupational sequence in farm production and management and who are available for employment immediately after leaving high school are listed below.

1. Self employment in the production of food and fiber

TITLE	D.O.T. No.
Dairy Farmer	411.181
Grain Farmer	401.181
Vegetable Grower	404.181
Orchardist	404.181
Poultryman	412.181
Rancher	413.181
Tenant Farmer	408.181

2. Employment for wages in production of food and fiber

TITLE	D.O.T. No.
Farm Foreman	429.131
Farm Worker	401.884
Farm Equipment Operator	409.883
Milking Machine Operator	411.181
Animal Breeder	419.181
Dairy Tester	469.381
Artificial Breeding Technician	467.384
Farm Manager	409.168
Livestock Caretaker	466.887
Dairy Helper	529.886

WITH POST SECONDARY TRAINING[1]

These typical occupational titles are merely illustrative of even greater opportunities which exist. In addition to those listed above, persons who secure further preparation at 2-and 4-year colleges are likely to find employment prospects which include:

TITLE	D.O.T. No.
Fieldman	180.118
Agricultural Engineer	013.081
Veterinarian	073.081
Soil Scientist	040.181
County Agricultural Agent	096.128
Teacher of Agriculture	090.228
Agricultural Journalist	132.268
Breed Association Fieldman	293.358

COURSE ORGANIZATION OPTIONS

Farm Production, Management, and Mechanics 1; and Farm Production, Management, and Mechanics 2 are courses designed to train pupils for farm employment, management, and ownership. Instruction includes farm business management; production of crops, livestock, and livestock products; soil management; and related mechanics. Both courses are offered on a double-period, 2 unit basis.

> Optional pattern for farm production and management: Farm Production and Management 1 and Farm Production and Management 2 may be offered on a single period, 1 unit basis in combination with Farm Mechanics 1 and Farm Mechanics 2 respectively. Farm mechanics instruction includes farm shop work; farm power and machinery selection, servicing, and operation; farm structures; farm electrification; and soil and water management.

A background in ninth grade and/or tenth grade agriculture, while not a prerequisite for farm production and management education, can be a sound preparation for training in this area. Courses in general science, biology, mathematics, and industrial arts are also helpful in providing a foundation for the advanced course.

COURSE APPROVAL

All courses in farm production and management which are offered for Regents diploma credit must be approved. Application forms for course approval are obtained from and, when completed, submitted to the Bureau of Secondary Curriculum Development, The State Education Department, Albany, New York 12224.

Approved courses may be used for credit as part of the group II major sequence and/or as group III electives as outlined in the Administrators Handbook of the Secondary School Curriculum.

SEQUENCES

A major sequence for a general high school diploma may be earned through completion of three or more units of credit in agriculture. Completion of four units in Farm Production and Management is required for a diploma endorsement in "Farm Production and Management".

SUPERVISED OCCUPATIONAL EXPERIENCE

Appropriate occupational experience programs are recommended for all students enrolled in farm production and management classes. Such experience may be obtained at the school operated land laboratory,or, be gained on the home farm,or a cooperating farmer's business. Each individual program should be planned jointly by the pupil, his parents,the prospective employer, and the instructor. In terms of student working environment, the instructor must be assured that all applicable Federal, State, and local labor laws and regulations are observed.

The nature of the experiences provided should be in harmony with the occupational objectives of the pupil and the training programs provided by the school.

[1] A complete job description for each title and D.O.T. number may be found in the Dictionary of Occupational Titles, Volume I, and II and their supplements, published by the Government Printing Office, Superintendent of Documents, Washington, D. C.

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CHAPTER II

DEVELOPING THE COURSE OF STUDY

GENERAL SUGGESTIONS

The emphasis given to various areas of instruction in farm production and management will differ from one community to another depending upon the relative importance of the crop and animal enterprises. For this reason no specific recommendations are made concerning the amount of time to be devoted to any units or subject matter areas.

It is expected that teachers and administrators, in consultation with advisory committees, will determine the areas of instruction needed, the degree of emphasis to be given to each area in the course of study and will develop the course accordingly. Within each area judgments should be made locally regarding the units of instruction, the most appropriate season(s) to teach each of them, the year each should be taught, and the number of periods to be devoted to each unit.

It is recommended that the first four instructional areas of this course of study be included in all farm production and management programs. The areas of instruction following the orientation, experience programs, leadership training, and applied mechanics in agriculture should be emphasized according to local occupational needs.

The occupational experience program of the pupils should be used to correlate their practical experiences with the work of the classroom and laboratory.

A teaching calendar should be developed from the course of study to guide the teacher in his day-to-day instruction. With a completed teaching calendar the teacher is in a position to devote his energies to making lesson plans. These call for teaching objectives, teaching procedures and methods, materials of instruction, specific references, and other details necessary for proper instruction.

A. ORIENTATION

UNIT	SUGGESTED CONTENT
Review of opportunities and requirements in production agriculture	- Occupations . Farm owner . Livestock foreman . Crops foreman . Farm manager . Service . Sales . Professional extension workers agriculture teachers - Educational requirements and training offered - Desirable aptitudes and abilities - Attitudes needed

B. SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAMS

Identifying and utilizing opportunities for obtaining work experience	- Home farm . Wages . Partnership . Enterprises - Placement on a farm - Work with school-owned facilities such as land laboratories
Planning and conducting an experience program	- Purpose of the work experience program - The cooperating farmer's role - Planning individual programs - Carrying out the program - Keeping experience records - Observing labor regulations
Applying for a job	- Locating possible employment . Through resource people . Through agencies - Requesting a personal interview - Providing credentials and references
Job Success	- Loyalty to employer - Attitude towards . Superiors . Fellow workers . Customers - Productivity

UNIT	SUGGESTED CONTENT
	- Developing additional managerial and operative skills . Experience . On-the-job training . Short Courses . Continuing education

C. LEADERSHIP TRAINING

Area Occupational Centers and/or multiple teacher programs may need to place more emphasis on using class time to initiate FFA activities which may then be further developed in the local chapters at the home school or through the chapter at the Center.

FFA as an intracurricular activity	- History, aims, and purposes - Degrees - Motto, creed, and responsibility to FFA - Foundation and other awards - Financing through dues - Personality development

D. APPLIED MECHANICS IN AGRICULTURE

MECHANICAL SKILLS NEEDED IN FARMING

Introduction to the school shop	- Shop organization . Location of tools, supplies, lumber, metal, paint . Wash-up area . Shop clothing storage - Shop regulations . Clean-up system . Use of power tools . Admittance to the shop - Safety . Need for awareness . Power switches . Use of masks and goggles . Removing paint and exhaust fumes . Safety rules for particular machines and situations
Electric arc welding	- Review basic fundamentals - Practice acquired skills - Hardfacing . Selection of proper electrode . Practice technique

UNIT	SUGGESTED CONTENT
	- Welding cast iron - Overhead and vertical welding - Construction and repair using arc welding skills . Integrate with farm power units, field machinery and equipment, and with farm structures and service facilities
Oxyacetylene welding	- Running a bead - Welding - Brazing - Cutting - Heating, bending, and tempering
Plumbing	- Selecting plumbing materials . Requirements for distance, pressure, and temperature . Types of plumbing materials and adaptations including iron, copper, plastic, and other pipe . Threading . Bending . Flaring . Soldering . Connecting
Electricity	- Review basic electricity - Wiring circuits, outlets, and fixtures . Determine required wire size . Wiring code regulations - Safe use of electricity . Overload protection devices . Insulating wires, fixtures . Grounding . Polarization - Electric motors . Selection . Application . Maintenance
Concrete and Masonry	- Making forms for pouring concrete . Adequate bracing . Leveling transit line and bubble - Ready-mixed concrete . Calculating quantity needed . Specifying mix

UNIT	SUGGESTED CONTENT
	- Pouring, finishing, and curing . Leveling and tamping . Use of trowels, floats, and other tools to finish to desired surface smoothness - Laying masonry blocks . Size and style of blocks . Need for straight lines, level and plumb surface . Building a corner in a masonry wall . Overlapping blocks . Cleaning
Carpentry	- Reviewing woodworking tools and their use - Constructing building framing . Building requirements . Methods of framing . Identification of parts of framing . Developing skills in framing - Repairing and remodeling . Feasibility . Structural details . Safety . Tools needed
Painting	- Preparation of surface to be painted . Use of steam cleaner, wire brushes, air blast, scrapers, and other cleaning tools . Masking surfaces not to be painted - Developing proper painting techniques . Proper consistency of paint . Use of paint brush . Use of paint sprayer - Cleaning painting equipment
FARM POWER UNITS, FIELD MACHINERY, AND EQUIPMENT	
Farm machinery management	- Developing effective work plans - Refilling planters, sprayers, fertilizer spreaders, and other similar machines - Refueling tractors and other engine operated machinery - Moving machines between fields - Changing wagons in the field - Moving harvested crops from field to storage for road transportation

UNIT	SUGGESTED CONTENT
	- Consider such factors as: . Availability of labor . Availability of machines to perform the various tasks . Time involved . Cost of alternatives . Skill level required of operator . Other factors appropriate to specific situations - Organizing and keeping farm machinery records . Types of records needed . Information necessary to record . Frequency of recording information . Commercial records available . Home designed records - Determining where and when a repair job should be done . Alternatives (farm labor at the farm, trained mechanic at a repair shop, or other) . Tools needed . Facilities needed . Skills required . Time involved . Costs - Determining whether to trade machines needing repairs or to make the repairs . Cost of repairs . Value as trade-in . Value after repair . Age of machine . Expected life and usefulness after repair - Determining replacement schedules for farm machinery . Amount of annual use . Trade-in value at various ages . Rate of obsolescence . Expected cost of repairs - Determining whether to purchase or trade when selecting new or used farm machinery . Cost if purchased . Cost if traded . Need for an additional machine size and condition of present machine

UNIT	SUGGESTED CONTENT
	. Size of proposed machine . Labor available to operate additional machine - Determining whether to own, rent, or custom-hire farm machinery . Amount of machine use . Convenience of owning . Availability of custom operators . Cost of owning vs. renting vs. custom-hiring initial cost operating costs depreciation - Determining which machine to purchase . Size or capacity . Standard equipment . Optional equipment . Cost . Reliability of dealer reputation for honesty reputation for service parts availability . Adaptability to present machines . Power take-off or engine operated
Operation of tractors, machinery, and equipment	- Tractor driving . Hauling self-unloading wagons hopper-bottom wagons hydraulic dump boxes . Materials handling hydraulic loaders fork-lift trucks conveyers (fruit, vegetable, egg, feed, waste products) - Other equipment operation . Milking equipment . Forest product equipment chain saws skidders loaders - Procedure in hitching implements - Use of hydraulic systems and power take-off

UNIT	SUGGESTED CONTENT
Farm machinery operation	- Operation and adjustment of specific farm machines . Selecting appropriate travel speed . Hitching equipment to tractor . Necessary adjustments (depth, leveling, power take-off speed, speed of moving parts, belt tension) . Developing a feel for the correct operation . Practicing actual use of specific equipment primary tillage plows secondary tillage harrows clodbusters discs spreaders manure fertilizer lime planting row broadcast grain drills transplanting weed controling equipment cultivators sprayers dusters combination harvesters mowers conditioners rakes balers forage harvesters grain harvesters vegetable harvesters fruit harvesters
Preventative maintenance	- Lubrication . Daily . Periodic . Use of operator's manual as guide . Types and uses of lubricants

UNIT	SUGGESTED CONTENT
	- Servicing components of engines . Daily maintenance . Periodic services . Cleaning . Adjustment - To include: . Batteries . Starters . Generators . Spark plugs . Distributor . Carburetor . Radiator . Water pump - Tractor, truck, and self-propelled machine adjustments . Brakes . Clutch . Wheel spacing . Steering system . Tires . Wheel bearings . Hydraulic systems - Diagnosing engine troubles . Troubleshooting procedure for general engine problems . Make necessary repair or adjustment called for on the farm or at the dealer - Maintaining electric motors . Cleaning . Replacing bearings . Providing air flow for cooling . Servicing switches
Machinery storage	- Reasons . Increase life of machine . Lower repair costs - Selecting a method of storing . Alternatives . Costs - Preparing machines for storage . Clean thoroughly . Remove chains, store in oil . Relieve tension on belts . Paint worn surfaces . Lubricate polished surfaces . Replace broken parts

UNIT	SUGGESTED CONTENT

FARM STRUCTURES AND SERVICE FACILITIES

Planning farm structures	- Determining the farm structures needed . Feasibility of remodeling . Farm enterprises carried out . Machinery involved . Method of handling crops marketed at harvest stored to be sold later - Developing plans for a particular farm structure . Size, dependent on number of livestock, others . Type of construction pole wood frame concrete block others . Efficiency reduce length of travel paths for labor, machinery, livestock, ease of materials handling including crops, feed, manure, others . Environmental conditions provision for water ventilation removal of fumes heat light humidity - Protecting farm structures from hazards . Lightning protection . Fire control farm ponds sprinkler systems extinguishers . Prevent freezing heated waterers insulation
Planning service facilities for farm structures	- Planning for electric service . Determine present need . Estimate future expansion . Consider new technology, possible future applications of electricity . Provide adequate service entrance . Provide needed number of circuits

UNIT	SUGGESTED CONTENT
	- Providing an adequate supply of water - Providing for a sewage disposal system for the farm home and other structures . Consider alternative methods . Soil types, drainage, slope - Providing for drainage from farm structures . Soil type, slope, elevation
Operation and maintenance of farm structures and service facilities	- Farm power units, field machinery and equipment . Water pumps . Milking systems . Feed handling equipment . Fruit equipment . Vegetable equipment . Other equipment - Gain experience in actual use of farm structures . Parlor milking systems . Automated feeding systems . Controlled atmosphere storage . Other appropriate structures - Refer to mechanical skills needed in farming . Carpentry, building repair, and remodeling . Welding, repairing equipment . Plumbing, repairing water systems . Electricity, changing fuses
Construction or improvement of farm structures and service facilities	- Developing an understanding of farm building or service facility construction . Understand blueprints and plans . Design for "complete package" . Farm structures and service . facilities could include livestock housing machinery storage crop storage milking parlor machinery repair center farm ponds diversion ditches fences, gates

UNIT	SUGGESTED CONTENT
	- Cooperate with agricultural agencies . Extension Service . Soil Conservation Service

E. FIELD AND FORAGE CROPS

(The general outline may be applied to any crops enterprise. Supplemental units are included for vegetable and fruit enterprises.)

Planning the crop program	- Selecting the seeds and plants - Selecting recommended varieties adapted to an area - Selecting the field(s) for the crop - Analysis of time, labor, and equipment needed - Treatment of seeds - Use of proper crop records
Growing the crop	- Preparing the soil . Conventional vs. minimum tillage . Fumigation . Sterilization - Planting . Depth . Population - Controlling weeds . Weed types and identification . Mechanical control Reasons - time - methods . Chemical control Methods of application Safety precautions Cost Residual factors - Cultivating and other measures - Fertilizing and liming . Crop requirements . Kinds, types, and amounts of fertilizers and lime to use . Method and time of application . Growing season, soil, and leaf analysis - Controlling insects, diseases, and other pests . Chemical method Time and amount of chemical Methods of application-costs Personal and residual precautions Laws and controls Spray and dust schedule

UNIT	SUGGESTED CONTENT
	. Cultural method . Biological method
Harvesting and storing the crop	- Time to harvest - Harvesting methods and equipment - Moving the crop - farm - Handling, curing, and storing the crop
F. VEGETABLE CROPS	
Processing vegetable crops	(Beets, peas, snap beans, sweet corn, tomatoes) - Costs and returns on vegetable crop - Processor contract provisions - Selecting a suitable field - Fertilizing vegetable crops - Planting vegetable crops - Using plastic mulch - Chemical weed, insect, and disease control (includes soil fumigation) - Irrigating vegetable crops - Cultivating vegetable crops - Harvesting, grading, packing, and delivering the product
Fresh market vegetable crops	(Broccoli, cabbage, carrots, celery, cucumbers, lettuce, potatoes, sweet corn, tomatoes)
Celery Production	- Selecting varieties, buying and storing celery seed - Growing plants in greenhouse or coldframe - Setting plants in the field - Cultivating and blanching - Insect and disease control - Harvesting, handling, and marketing - Storing the celery crop
Onion Production	- Sources and quality of onion seed - Onion seed treatment (fungicide and insecticide) - Planting the onion crop - Selection, timing, and application of pre-emergence herbicides - Cultivation of the onion crop - Selecting, timing, and applying post-emergence herbicides - Controlling insect and disease in onions

UNIT	SUGGESTED CONTENT
	- Harvesting, curing, and storing onions - Grading and marketing the onion crop - Field fumigation for nematode and spider mites
Lettuce Production	- Selection and purchase of lettuce seed - Fertilizing lettuce - Planting lettuce - Blocking young lettuce plants - Cultivating the lettuce crop - Irrigating the lettuce crop - Controlling insects and disease in lettuce - Harvesting, grading, storing, and marketing lettuce (mule train operation, etc.)
Carrot Production	- Planting the crop - Controlling weeds in carrots - Controlling insects and diseases - Harvesting, washing, and grading - Storing and marketing carrots
Potato Production	- Selection of potato varieties - Cutting seed potato - Planting and fertilizing potatoes - Chemical and mechanical weed control in potatoes - Controlling insects and diseases in potatoes - Controlling size and growth of crops - Harvesting and storing potatoes - Grading, packaging, and marketing potatoes

UNIT	SUGGESTED CONTENT
G. APPLE PRODUCTION	
Establishing an orchard	- Selecting a site (frost protection) - Preparing soil - Selecting and buying varieties - Planting
Caring for the orchard	- Fertilizing, liming, cultivating - Dual cropping - Spraying - Irrigation protection - Pollinating varieties - Mouse control
Controlling insects and diseases	- Spray materials - Spray schedules - Application methods - Cause, symptoms,and controls
Fertilizing the orchard	- Mulching - Soil and leaf analysis
Pruning the mature orchard	- Suckers or sprouts - Light requirements - Tree height - Tree vigor - Tree bracing
Grafting and budding	- Protection - Varietal change - Propagation - Types - Pollinating
Managing the orchard floor	- Sod or cultivated - Chemical weed control - Mowing - mulching
Insuring a fruit set	- Bees - bouquets - insects - Plane - Frost control
Picking and drop control	- Equipment - Fruit handling - Maturity - Hormone sprays

UNIT	SUGGESTED CONTENT
Grading and Packing to control quality	- Machine - Hand - Packages - U.S. Grade standards
Storing the crop	- Controlled atmospheric storage - Refrigerated storage
Marketing the apple crop	- Securing information - Fall sales - Roadside - Storing - Retail - Wholesale - Consignment - Regional
Buying, handling and storing supplies	- Sprays - Cartons - Ladders - Crates
Renewing the old orchard	- Tree removal - Varieties - Dangers of excessive pruning
Controlling winter injury	- Fertilization - Pruning and timing of pruning - Repellants for deer and rodent injury
Organization associated with the apple industry	- International Apple Association - National Apple Institute - New York State Horticulture Society - Testing Association

H. GRAPE PRODUCTION

Selecting the variety of grapes to grow	- Identification - Uses, markets available - Soil and site
Setting out the new vineyard	- Propagation - grafting - Making cuttings, storing and planting - Buying 1- and 2-year rooted cuttings - Spacing - Harvesting methods

UNIT	SUGGESTED CONTENT
Caring for the first year vineyard	- Weed control - Training - Post and wire
Training and pruning the vineyard	- Training and pruning systems - Balanced pruning - Pulling brush - Handling the prunings
Controlling weeds in the vineyard	- Mechanical control - Chemical control
Determining the fertility program for the vineyard	- Leaf analysis - Soil tests
Controlling insects and diseases in the vineyard	- Symptoms - Chemical Controls . Tolerances and residues . Methods of application
Harvesting grapes	- Estimating yield - Measures of quality control - Taking samples for sugar test - Hand harvesting methods - Mechanical harvesting

I. SOIL SCIENCE

Understanding the science of soils	- Formation (Ag. 2) - Physical composition (Ag. 2) . Texture-structure . Soil life-soil water . Micro-organiams - Chemical composition - Types of soils - Classification of soils
Developing and improving soils	- Land use capabilities . Characteristics . Classes . Treatments - Determining nutrients . Taking and testing soil samples - Sources of nutrients . Commercial fertilizers . Manure . Green crops

UNIT	SUGGESTED CONTENT
Applying conservation practices to land use	- Areas of conservation . Soils . Water . Wildlife . Recreation farm commercial - Reasons for conservation - Using available conservation programs - Using conservation agencies - Methods of erosion control . Cropping programs . Grading and drainage - Costs and equipment needed - Making a plan

J. LIVESTOCK

This general outline may be adapted to any type of livestock to include beef cattle, dairy cattle, horses, poultry, sheep, and swine.

Selecting foundation and replacement stock	- Care and handling of young at birth - Housing . Ventilation . Light . Temperature . Humidity - Feeds and feeding practices - Health management . Sanitation . Innoculations . Growth stimulants - Registration . Transfers . Recording with breed association - Special management . Docking . Ear notching . Dehorning . Castrating . Dubbing . Debeaking . Tattooing . Hoof trimming - Changes to be made as young mature - Breeding - Others

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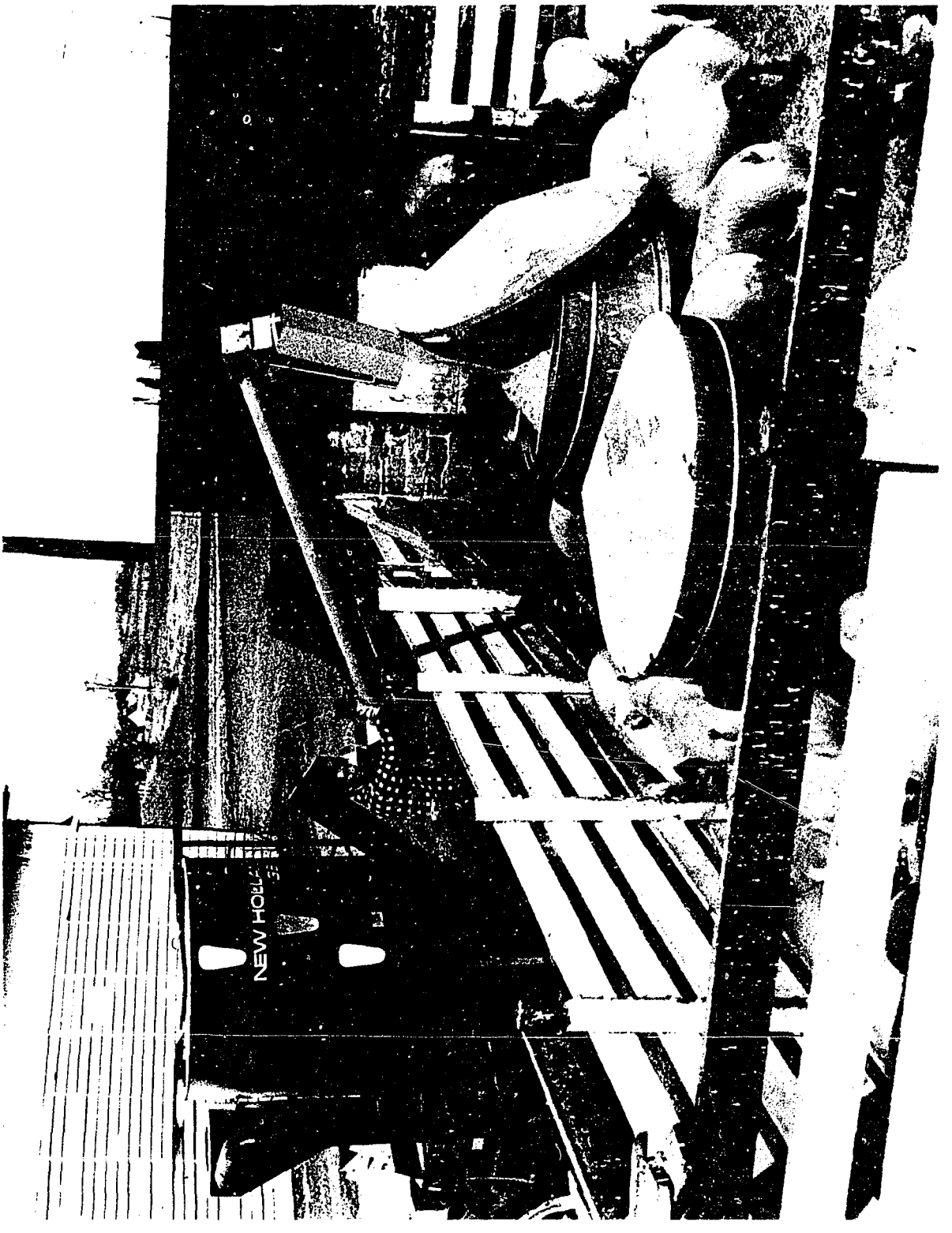
UNIT	SUGGESTED CONTENT
Feeds and feeding	- Review basic feeding requirements - Types of feeds - Physical form best adapted - Times and methods of feeding - Cost of ration - Balancing rations
Proper housing	- Review basic requirements - Special needs - Types available . Advantages and disadvantages of each . Original cost . Maintenance - Efficient use of labor - Adaptable to mechanization
Maintaining proper health	- Prevention of trouble - Use of health records - Understanding the cause, nature, and symptoms of diseases - Prevention and control of diseases, ailments, and parasites
Planning and developing the breeding program	- Review basics of livestock production - Breeding systems - Breeding methods - Use of records
Using records to improve production	- Growth - Production - Breeding - Performance - Progeny testing - Health
Marketing	- Review of fundamentals - Marketing stock . Purebred and breeding stock . Meat or slaughter stock Marketing livestock products . Milk . Wool . Eggs

UNIT	SUGGESTED CONTENT
Supplemental Units for Dairy Production	
Proper milking	- Need for good milking habits - Milking procedures - Relation to mastitis - prevention and control - Systems . Type . Operation . Time elements
Milk quality and marketing problems	- Need for quality product - Production guidelines to quality - Handling cost - Health requirements - Special marketing problems
Milk testing	- Benefits - Methods - Procedures
K. FARM BUSINESS MANAGEMENT	
Introduction	- Definition of farm management - Occupational opportunities
Starting a farm business	- Deciding to farm - Type of farm - Estimating needs . Probable investment . Operating expenses . Available resources - Selecting credit source . Interest rates . Length of loan . Loan limits . Reputation . Experience - Financial instruments . Financial statement . Mortgage . Notes - Maintaining good credit rating . Character . Records . Repayment . Frankness . Number of creditors

UNIT	SUGGESTED CONTENT
	- Selecting a farm . Soil types . Buildings . Type of farming . Elevation and topography - Legal instruments . Deeds . Abstracts - Gaining Control . Corporations . Saving . Borrowing . Partnership . Contract Purchase - Planning enterprises . Needs . Resources . Meeting needs - Budgeting - Planning buildings - Planning machinery
Reorganizing a farm business	- Determining problems . Production . Size . Labor efficiency . Enterprise emphasis . Capital distribution - Setting goals - Obtaining resources - Considering the alternatives - Weighing the consequences - Evaluating analyses - Making a decision - Developing a plan - Importance . Labor - primary input . Work force - numbers - Labor needed - Hiring labor - Training labor - Managing . Agreements . Incentives . Wages . Fringe benefits . Employer-employee relations . Efficiency vs. satisfaction

UNIT	SUGGESTED CONTENT
	- Future problems or considerations . Skills required . Knowledge required . Dealing with labor unions and/or employee associations . Keeping up with industry
Using service agencies	- Services available . Production . Construction . Financing . Management - Service agencies . Banks . Production Credit Association . Agricultural Stabilization and Conservation . Soil Conservation Service . Dealers . Cornell State Experiment Station . Dairy Herd Improvement Cooperative . Extension Service . Cooperatives
Farm business law	- Importance of having competent advice . Liability . Preventing legal problems - When counsel is needed - Selecting and retaining a competent counsel
L. FARM BUSINESS ECONOMICS	
Farm business analysis	- Importance . Evaluation . Reorganization - Information needed . Records production labor inventory . Analysis sheets . Standards of production and efficiency - Summarize records - Analysis factors . Size . Rates of production . Labor efficiency

UNITS	SUGGESTED CONTENT
	. Financial situation . Costs
Farm business insurance	- Importance of insurance . Protection . Savings - Types to consider - Sources - Program planning . Chances of loss or injury . Extent of loss . Replacement costs . Cost of coverage
Farm business records	- Reasons for keeping records . Analyzing business . Preparing tax forms . Planning a business . Business analysis . Credit statement . Required - Records to keep . Labor . Machinery . Production . Inventory . Cash - Forms needed - Keeping records
Marketing	- Importance of marketing - Methods of marketing . Cooperatives . Individual marketing . Contracts - Advertising - Distribution . Storage . Transportation . Marketing channels - Regulations . Public health laws . Labeling . Grading and grades . Marketing orders - Market reports - Market terms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CHAPTER III

SUGGESTIONS FOR PLANNING FACILITIES FOR PRODUCTION AND MANAGEMENT PROGRAMS

The nature and extent of the facilities needed will be influenced by the projected enrollments, the planned use of facilities by adult and young farmer programs, other groups, and the emphasis to be included in the course of study. The suggestions which follow are to be considered only as guidelines for school facilities planners and architects.

Space Allocations

Recommended minimum space allocations for accommodating 15 students per section:

Classroom - 600 sq. ft.
Applied Mechanics Laboratory - 2000 sq. ft.
Land Laboratory - 10 acres of tillable land
Machinery Storage Facility (outside of school) - 2000 sq. ft.

Classroom

The classroom should be adjacent to the mechanics laboratory equipped with the usual equipment common to classrooms. A laboratory area equipped for testing of agricultural products and supplies should be provided.

Applied Mechanics Laboratory

Appropriate facilities should be provided for instruction in the areas of applied mechanics. This area should have (1) concrete floor with drains (2) adequate lighting, ventilation, and heating (3) electrical outlets and water faucets appropriately located (4) large overhead door as well as smaller doors (5) storage provisions for materials and supplies (6) work benches (7) tool storage cabinets (8) washing area and drinking fountain (9) bulletin and chalk boards and (10) other furniture and facilities.

A careful consideration of the course of study relating to the mechanics area will provide additional guidelines in developing plans for the facility.

A shower-lavatory-locker area could be a shared facility between two or three adjoining shop areas.

Land Laboratory

Access should be provided to at least 10 acres of land for the development of the following appropriate areas:

1. Crop production
2. Demonstration plots
3. Equipment operation

It is desirable that this land laboratory be located as close to the school as possible. It should be established on reasonably good soil.

Machinery Storage Facility

Suitable facilities should be provided for the storage of farm machinery and certain teaching supplies in an unheated structure adjacent to the farm mechanics area. Some consideration should be given to developing a situation where some teaching and maintenance could be done in the facility in all but the coldest portion of the year. This building could be of simple construction, such as pole-type or prefabricated structure, located within a fenced in, paved area. Sliding or overhead doors should be a part of the building. Appropriate service outlets such as electricity, compressed air, and water should be provided.

Other Facility Requirements

Other facility needs may include:

1. Storage space for visual aids and small laboratory equipment.
2. Underground fuel storage, equipped with electric pumps for gasoline and diesel oil.

CHAPTER IV

SUGGESTIONS FOR SELECTING NEEDED EQUIPMENT AND SUPPLIES

The type and quantities of equipment and supplies required to provide effective occupational education in farm production and management will depend upon several factors. These include the anticipated sizes of the groups to be served and the emphasis placed in certain areas of instruction.

The optimum class size for planning purposes is considered to be about 15 pupils. Sufficient quantities of tools, equipment, and supplies should be provided to make maximum use of the time available for laboratory work (land and mechanics) and practical exercises.

An advisory committee composed of successful farmers and agricultural leaders can provide invaluable assistance in selecting the needed equipment and supplies. Because instruction in farm mechanics skills is recommended as part of a program in farm production and management, it will be necessary to provide tools and equipment to outfit a farm mechanics laboratory. The types and numbers of such items to be purchased will depend on the availability of these items in other occupational programs in operation or planned for inclusion at the school or area occupational education center.

Sufficient funds should be budgeted to provide the necessary equipment for the program as planned. Funds should provide for field items such as a tractor, primary and secondary tillage equipment, and planting and weed control equipment for use on a land laboratory.

The equipment for the applied mechanics laboratory will include the following general areas of hand and power tools for working metals and wood: measuring, cutting, drilling, threading, shaping, clamping, and fastening. In addition, there should be equipment for instruction in the areas of electricity; concrete and masonry, painting; plumbing; power units; structures; machinery repair, adjustment, maintenance, and operation; and sanitation.

Classroom equipment would include items for drafting; visual presentations of learning materials; products and materials testing and examination; and calculation, reproduction, and analysis of records.

Office equipment would include desk and chairs, file cabinets, telephone, book shelves, and other items required by the instructor.

An initial supply budget should be provided for such items as metal, wood, fasteners, lubricants, finishing materials, welding supplies, fuel, testing materials, and replacement parts.

The following list is a guide in ordering and assembling the tools, equipment, and supplies needed. More comprehensive lists may be requested from the Bureau of Agricultural Education. In addition, experience can be an important factor in developing lists.

Tools, equipment, and supplies for programs in Farm Production and Management

I. Small shop tools and equipment for:

Battery service	Glazing
Calibrating	Lubrication
Carpentry	Metal working
Cleaning	Pipe fitting
Diagnosing and testing	Plumbing
Electrical service	Power equipment adjustment
Field equipment disassembly	Power equipment maintenance
Field equipment maintenance	Sharpening
Fitting animals	Small engine repair
General repair	Tool fitting

II. Power shop tools and equipment for:

	Maintenance
Cleaning	Metal cutting
Clipping	Painting
Concrete	Power transmission
Drilling	Sawing
Grinding	Welding

III. Hand field tools and equipment for:

Concrete	Livestock care and treatment
Digging	Measuring
Fencing	Spraying and dusting
Grading and packaging	Testing
Handling liquids	Watering

IV. Power field equipment for:

Contouring	Materials handling
Cultivating	Preparing seedbed
Draining	Seeding and planting
Fertilizing	Spraying and dusting
Harvesting	Tilling

V. Classroom and laboratory equipment and furniture for:

- Display
- Field trips
- Filing
- Instructional media
- Library - reference facilities
- Microscopic study
- Overhead projection
- Photography
- Planning and drafting
- Seating and studying
- Storage
- Supporting demonstrations

VI. Safety equipment for:

- Chemical storage
- Fire prevention
- First aid
- Flammable liquids storage
- Oily waste disposal
- Personal safety
  - Eye
  - Apparel
  - Respiratory
  - Head
  - Hands
  - Feet
- Tractor operation

VII. Commonly used supplies:

- Cleaners
- Containers
- Fasteners
- Fertilizers
- Finishes and preservatives
- Lubricants
- Seeds
- Spray and dust materials
- Testing reagents
- Welding supplies

CHAPTER V

SELECTING INSTRUCTIONAL MATERIALS

An adequate library of instructional materials is essential. Adapted to the local community, it can serve class and individual needs for all secondary, young farmer, and adult farmer groups. The library should be systematically arranged and readily accessible. It should be reorganized as needed and brought up to date annually.

It is important that each teacher be aware of the comprehensive listings of instructional materials available. These lists are constantly being revised and should be reviewed periodically.

Text and Reference Books

The selection of text and reference books should be given careful consideration. Agriculture is changing rapidly and such things as farm practices, crop varieties, and equipment become obsolete. For this reason, books that deal with basic practices and concepts should have priority over those dealing with specific practices. Books, because of their cost, should be selected for use over a period of years.

Farm Management

Adams, R.L. & Bedford, W.W. *Everyday farm laws*. Interstate. 1955. $3.50.

Bender, Ralph E. *Profit-maximizing principles*. Ohio State. 1967. $2.25.

____ *Farm management handbook*. Cornell University. 1966. $1.00.

____ *Farm money management*. Meredith. 1967. $1.50.

Herbst, J.H. *Farm management - principles, budgets, plans*. Stipes. 1967. $5.90.

Murray, W.G. & Nelson, A.G. *Agricultural finance;* 7th ed. Iowa State. 1967. $8.95.

Roy, E.P. *Cooperatives - today and tomorrow*. Interstate. 1964. $6.76.

Wicks, Lyle L. *Principles of agricultural finance*. Farm Credit Banks of Springfield. 1967. s.c. free.

Crops and Soils

Berger, *Introductory soils*. MacMillan. 1965. $5.95.

Buckman, Ronald & Brady, N.C. *The nature and property of soils*. Macmillan. 1960. $7.95.

____ *Demonstrations in farm crops*. Michigan State. 1965. $1.25.

Foster, A.B. *Approved practices in soil conservation*. Interstate. 1964. $3.75.

Sheer, A.H. & Juergenson, E.M. *Approved practices in fruit production*. Interstate. 1964. $4.25.

Ware, G.W. & McCollum, J.P. *Producing vegetable crops*. Interstate. 1968. $6.00.

Wilson, H.K. & Richer, H.C. *Producing farm crops*. Interstate. 1960. $4.50.

Livestock

Biddle, G.H. & Juergenson, E.M. *Approved practices in poultry production*. Interstate. 1963. $3.75.

____ *Demonstrations in dairy*. Michigan State. 1962. $1.25.

Diggins, R.U. & Bundy, C.E. *Swine production*. Prentice-Hall. 1963. $7.16.

Ensminger, M.E. *Animal science*. Interstate. 1962. $7.95.

____ *Horses and horsemanship*. Interstate. $6.25.

Frandson, . *Principles of genetics*. Wiley. 1964. $8.00.

Gorman, John A. *The western horse*. Interstate. $5.75.

Juergenson, E.M. *Approved practices in beef cattle production*. Interstate. 1964. $3.75.

____ *Approved practices in sheep production*. Interstate. 1963. $3.75.

____ *Livestock breeding*. Ohio State. 1967. $2.00.

Nordby, J.E. & Lattig, H.E. *Selecting, fitting and showing beef cattle*. Interstate. 1962. $1.50.

____ *Selecting, fitting and showing poultry*. Interstate. 1964. $1.50.

____ *Selecting, fitting and showing sheep*. Interstate. 1962. $1.50.

____ *Selecting, fitting and showing swine.* Interstate. 1961. $1.50.

Morrison, F.B. *Feeds and feeding,* 23d ed. Morrison. 1968. $15.50.

____ *Nutrient requirements of dairy cattle.* National Academy of Sciences. 1966. $1.50.

Porter, & others. *Dairy cattle in American agriculture.* Iowa State. 1965. $5.50.

____ *Standard of perfection for domesticated land and water fowl.* Interstate. $8.50.

Trimburger, George. *Dairy cattle judging techniques.* Prentice-Hall. 1958. $7.95.

Mechanics

AAAE & VA. *Building farm fences.* 1962. $0.90.

____ *Farm electric motors.* 1964. $0.85.

____ *Field mowers, selecting and maintaining.* 1966. $3.50.

____ *Maintaining the home lighting and wiring system.* 1965. $1.75.

____ *Planning a farm shop layout.* 1965. $1.40.

____ *Planning farm fences.* 1966. $1.40.

____ *Planning machinery protection.* 1968. $1.40.

____ *Planning water systems.* 1963. $2.90.

____ *Small engines; care, operation, maintenance and repairs;* Vol. 1. 1968. $5.30.

____ *Trailer operation and daily care.* 1967. $4.50.

Hunt, D.R. *Farm power and machinery management.* Iowa State. 1964. $10.50.

Lincoln Electric. *Arc welded projects for the school shop and farm,* ed. W.A. Sellon. The Company. 1958. $0.50.

____ *Arc welding instruction for the beginner - textbook,* ed. H.A. Sosnin. The Company. 1964. $2.00.

____ *Arc welding instructions for the beginner - teacher's manual,* ed. H.A. Sosnin. The Company. 1964. $0.50.

____ *New lessons in arc welding.* The Company. 1957. $1.00.

Phipps, Lloyd J. *Mechanics in agriculture.* Interstate. 1967. $5.95.

Portland Cement Association. *Concrete technology an instruction guide.* The Association. Single copy available. 1965.

____ *Concrete technology, a student manual.* Delmar. 1965. $2.25.

Union Carbide. *The oxy-acetylene handbook.* The Company. 1965. $2.70.

Wakeman, T.V. & McCoy, V.L. *The farm shop.* MacMillan. 1960. $6.28.

Publishers' Addresses - Texts and Reference Books

American Association for Agricultural Engineering and Vocational Agriculture
Athens, Georgia 30601

Cornell University
Department of Agricultural Economics
418 Warren Hall
Ithaca, New York 14850

Delmar Publishers
Mountainview Avenue
Albany, New York 12205

Education Publication Series
202 Erickson Hall
Michigan State University
East Lansing, Michigan 48823

Farm Credit Banks of Springfield
310 State Street
Springfield, Massachusetts 01101

Interstate Printers and Publishers
19-27 North Jackson Street
Danville, Illinois 61834

Iowa State University Press
Press Building
Ames, Iowa 50010

Lea and Febiger
600 S. Washington Square
Philadelphia, Pennsylvania 19106

Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, Ohio 44117

MacMillan Company, The
60 50th Avenue
New York, New York 10011

Morrison Publishing Company
515 Woodlands Drive
Clinton, Iowa 52732

National Academy of Sciences
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

Ohio State University
Curriculum Materials Service
2120 Fyffe Road
Columbus, Ohio 43210

Prentice-Hall, Inc.
Educational Book Division
Englewood Cliffs, New Jersey 07632

Portland Cement Association
33 West Grand Avenue
Chicago, Illinois 60610

Stepes Publishing Company
Champaign, Illinois 61820

Union Carbide Corporation
Linde Division
270 Park Avenue
New York, New York 10017

John Wiley and Son, Inc.
605 Third Avenue
New York, New York 10016

Periodicals

Consideration should be given to subscribing to a variety of commercial and popular periodicals.

Many good agricultural magazines are available, some of which are furnished free of charge. They range from the popularly written publications including many aspects of farming to highly technical publications. They often provide the latest information on prices, trends, practices, and research findings and usually are well illustrated.

Teachers can select appropriate publications from listings supplied from several sources. A letter written on school stationery explaining the use to be made of a periodical in an occupational education program should suffice in obtaining complimentary subscriptions to some agricultural magazines.

A Selected List of Periodicals

Agricultural Research
Agricultural Research Service
U. S. Department of Agriculture
Washington, D. C. 20250

Agway Cooperator
Box 1333
Syracuse, New York 13201

American Agriculturist
Box 516
Ithaca, New York 14850

Ayrshire Digest
Ayrshire Breeders Association
Brandon, Vermont 05733

Better Crops With Plant Foods
The American Potash Institute, Inc.
1649 Tullie Circle N. E.
Atlanta, Georgia 30329

Brown Swiss Bulletin
800 Pleasant Street
Beloit, Wisconsin 53511

Dairy Herd Management
Circulation Department
Dairy Herd Management
P. O. Box 67
Minneapolis, Minnesota 55440

Dairymen's League News
Dairymen's League Cooperative
Association, Inc.
100 Park Avenue
New York, New York 10017

The Eastern Milk Producer
Eastern Milk Producers Cooperative
Kinne Road
Syracuse, New York 13214

Electricity On The Farm
466 Lexington Avenue
New York, New York 10017

Farm Bureau Spokesman
New York Farm Bureau, Inc.
Glenmont, New York 12077

Farm Credit News
Farm Credit Banks of Springfield
310 State Street
Springfield, Massachusetts 01101

Farm Electrification
Edison Electric Institute
750 Third Avenue
New York, New York 10017
or
Local power supplier

The Farm Journal
Washington Square
Philadelphia, Pennsylvania 19106

The Farm Quarterly
F. & W. Publishing Company
22 East 12th Street
Cincinnati, Ohio 45210

Farm Safety Review
Farm Department
National Safety Council
425 N. Michigan Avenue
Chicago, Illinois 60611

Farm Technology
Meister Publishing Company
37481 Euclid Avenue
Willoughby, Ohio 44094

Food and Life Sciences
Cornell University Agricultural
Experiment Station
Roberts Hall
Ithaca, New York 14850

Guernsey Breeders Journal
70 Main Street
Peterborough, New Hampshire 03458

Hoard's Dairyman
W. D. Hoard & Sons Company
Fort Atkinson, Wisconsin 53538

Holstein-Friesian World
P. O. Box 808
Brattleboro, Vermont 05301

Jersey Journal
1521 E. Broad Street
Columbus, Ohio 43205

The Lincoln Stabilizer
The Lincoln Electric Company
22787 St. Claire Avenue
Cleveland, Ohio 44117

News for Farmer Cooperatives
Farmer Cooperative Service
U. S. Department of Agriculture
Washington, D. C. 20250

Plant Food Review
National Plant Food Institute
1700 K Street, N. W.
Washington, D. C. 20006

Safety Review
Farm Department
National Safety Council
425 N. Michigan Avenue
Chicago, Illinois 60611

Soil Conservation
Soil Conservation Service
U. S. Department of Agriculture
Washington, D. C. 20250

Successful Farming
1716 Locust Street
Des Moines, Iowa 50303

Audiovisual Aids

Some sources of films, filmstrips, slide sets, and similar materials are listed below. Generally, movies may be borrowed by the payment of postage and a modest rental feel. Catalogs of available items should be provided for teacher use.

Agricultural Education Curriculum Materials Service
The Ohio State University
Room 201, 2120 Fyffe Road
Columbus, Ohio 43210

Agricultural Education Instructional Materials Service
Agricultural Education Division
Cornell University
210 Stone Hall
Ithaca, New York 14850

American Association for Agricultural Engineering and Vocational Agriculture
Agricultural Engineering Building
Athens, Georgia 30601

Farm Credit Banks of Springfield
310 State Street
Springfield, Massachusetts 01101

Farm Film Foundation
Suite 819 - Southern Building
1425 H Street N. W.
Washington, D. C. 20005

Film Library
Roberts Hall
New York State College of Agriculture
Ithaca, New York 14850

Modern Talking Picture Service
122 West Chippewa Street
Buffalo, New York 14202

Motion Picture Service
Office of Information
U. S. Department of Agriculture
Washington, D. C. 20250

Portland Cement Association
33 West Grand Avenue
Chicago, Illinois 60650

Soil Conservation Service
Motion Picture Library
7600 West Chester Pike
Upper Darby, Pennsylvania 19082

U. S. D. A. Photo Lab Inc.
3825 Georgia Avenue, N. W.
Washington, D. C. 20011

United States Steel Corporation
New York Film Distribution Center
71 Broadway
New York, New York 10006

Venard Film Distribution Company
113 Northeast Madison Avenue
Peoria, Illinois 61602

Vocational Agriculture Service
434 Mumford Avenue
Urbana, Illinois 61801

Vocational Education Productions
California State Polytechnic College
San Luis Obispo, California 93401

Teaching Aids

Suggestions for developing and using various types of teaching aids can be found in the publication, Preparation and Use of Teaching Aids in Agriculture. This publication also lists many other sources of visual aids equipment and may be requested by a building principal from the Publications Distribution Unit, New York State Education Department, Albany, New York 12224.

Bulletins and Circulars

Teachers of agriculture should know the value of many bulletins, circulars, and booklets made available in classroom quantities, either free or at modest cost, from various State and Federal agencies as well as commercial firms. These materials usually are kept up to date and are especially useful where specific recommendations or technical information are needed.

Sources of Educational Materials - College and Government Agencies

Department of Agricultural Economics
442 Warren Hall
Cornell University
Ithaca, New York 14850

Department of Agricultural Engineering
Riley-Robb Hall
Cornell University
Ithaca, New York 14850

Instructional Materials Service
Division of Agricultural Education
210 Stone Hall
Cornell University
Ithaca, New York 14850

Mailing Room, Building 7
Research Park
Cornell University
Ithaca, New York 14850

Extension Service (local)

Soil Conservation Service (local)

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

United States Department of Agriculture
Publications Division
Office of Information
Washington, D. C. 20250

The University of the State of New York
The State Education Department
Bureau of Secondary Curriculum Development
Albany, New York 12224

Sources of Educational Materials - Commercial

Agrico Chemical Company
Division of Continental Oil Company
100 Church Street
New York, New York 10007

Agway, Inc.
Box 1333
Syracuse, New York 13210

Allis Chalmers Manufacturing Company
Box 512
Milwaukee, Wisconsin 53201

American Pulpwood Association
1119 A. Street
Tacoma, Washington 98401

Babson Brothers Dairy Research Service
2843 West 19th Street
Chicago, Illinois 60623

Behlen Manufacturing Company
Columbus, Nebraska 68601

Briggs and Stratton Corporation
P. O. Box 702
Milwaukee, Wisconsin 53201

Champion Spark Plug
School Aid Section
Toledo, Ohio 43601

Clay Equipment Corporation
Cedar Falls, Iowa 50613

DeLaval Separator Corporation
Poughkeepsie, New York 12600

Dow Chemical Company
Agricultural and Industrial
Bioproducts Sales
Midland, Michigan 48640

E. I. DuPont de Nemours and Company
Consumer Products Division
Wilmington, Delaware 19800

Ethyl Corporation
100 Park Avenue
New York, New York 10017

Ford Motor Company
Ford Tractor Division
2500 East Maple Road
Birmingham, Michigan 48012

Geigy Agricultural Chemicals
Division of Geigy Chemical Corporation
Ardsley, New York 10502

Gering Plastics Company
Division of Monsanto Chemical Company
Kenilworth, New Jersey 07033

Hercules, Inc.
910 Market Street
Wilmington, Delaware 09899

International Harvester
Farm Equipment Distributing Office
1065 West Washington Street
Indianapolis, Indiana 46207

The James F. Lincoln Arc Welding
Foundation
P. O. Box 3035
Cleveland, Ohio 44117

Massey-Ferguson, Inc.
12601 Southfield Road
Detroit, Michigan 48200

McCulloch Corporation
Service Department
6101 West Century Boulevard
Los Angeles, California 90045

The F. E. Myers & Brothers Company
Ashland, Ohio 44805

National Paint, Varnish, and
Lacquer Association, Inc.
1500 Rhode Island Avenue, N.W.
Washington, D. C. 20005

New Holland Division of
Sperry Rand Corporation
New Holland, Pennsylvania 17557

Ralston Purina Company
Educational Service Division
Checkerboard Square
St. Louis, Missouri 63199

Smith Welding Equipment
Division of Tescom Corporation
2633 South East 4th Street
Minneapolis, Minnesota 55414

Stanley Tools
New Britain, Connecticut 06051

U. S. Steel Corporation
525 William Penn Place
Pittsburgh, Pennsylvania 15200

Sources of Educational Materials - Associations and Trade Organizations

The American Potash Institute, Inc.
1102 - 16th Street, N. W.
Washington, D. C. 20036

Breed Associations (see periodical listing)

Chicago Board of Trade
141 West Jackson Boulevard
Chicago, Illinois 60604

Farm and Industrial Equipment
410 N. Michigan Avenue
Chicago, Illinois 60611

National Agricultural Chemicals Assn.
11215 Nineteenth Street, N. W.
Washington, D. C. 20006

National Fire Prevention Association
60 Batterymarch Street
Boston, Massachusetts 02110

National Livestock and Meat Board
36 South Wabash Avenue
Chicago, Illinois 60603

The National Mastitis Council Inc.
118 West First Street
Hinsdale, Illinois 60521

National Plant Food Institute
1700 K. Street, N. W.
Washington, D. C. 20006

National Safety Council
435 North Michigan Avenue
Chicago, Illinois 60606

National Sprayer & Duster Assn.
850 Wrigley Building North
410 North Michigan Avenue
Chicago, Illinois 60611

Instructional Materials Service

The Instructional Materials Service, Agricultural Education Division, Department of Education, New York State College of Agriculture, Cornell University, Ithaca 14850, provides a periodical listing of texts, reference materials, and audio visual aids for use in secondary agricultural programs. The periodical listings are distributed according to the agricultural course titles (Agricultural Business, Agricultural Mechanization, Conservation, Farm Production and Management, and Ornamental Horticulture). A request for such specific lists directed to the Instructional Materials Service, will prove helpful in selecting currently available recommended materials.