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The Organization of Content for Agricultural
Teaching in Western Kansas
High Schools

being

A Thesis presented to the Graduate Faculty
of the Fort Hays Kansas State College in
partial fulfillment of the requirements for
the Degree of Master of Science.

by

Leo Virgil Wedel, B. S.

Fort Hays Kansas State College

Date Sept. 15, 1938 Approved: Robert I. McGrath
Major Professor

713 Streeter
Acting Chairman Graduate Council

Acknowledgments

In the preparation of this thesis, Dr. R. T. McGrath, has been my sponsor. I have appreciated his practical point of view and his tolerant and sympathetic attitude.

I sat under the instruction of Dr. F. B. Streeter in the class on Bibliography and Thesis Writing. It is hoped that his comprehensive and clarifying instructions concerning the nature and preparation of a thesis have in some degree improved this particular offering.

Many scores of agriculture teachers, county agricultural agents, county home demonstration agents, master farmers, experiment station supervisors and county superintendents from all parts of the western half of Kansas gave their time and attention to writing outlines and personal letters of this study. Without their cooperation the effort would have been fruitless.

I trust I have not in any important degree misinterpreted the information they so kindly furnished.

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The Organization of Content for Agricultural

Teaching in Western Kansas

High Schools

Chapter I

Introduction

The development of agricultural education is necessarily due to the large number of people who are dependent upon agriculture for a livelihood. Any improvements which may be made in the methods of raising crops or livestock are of importance to a large body of people. The economic value of the products of agriculture has made it important for the community at large to organize state and county agencies for the improvement of agricultural conditions throughout the country. The Federal government has found it necessary to organize bureaus of investigation and there have thus arisen organized centers for the collection and distribution of agricultural information.

Federal and local grants have made possible agricultural courses in various levels of school work. There is a large body of literature relating to scientific agriculture. In recognition of these motives for the development of agriculture, it becomes a part of the educational program to promote opportunities for agricultural education. Whatever furthers the progress and development of agriculture as a vocation thereby contributes to national welfare.

Agriculture has many problems calling for solution. One of which concerns agricultural instruction, that is, subject matter to be taught in the high school classes, its selection, organization and practical utility. The problem of this thesis has to do with the selection of content and its organization for the High Schools in Western Kansas. There is no criticism of existing texts. The content and organization of a text for agricultural needs to be general to fill its purpose. The purpose of this study is to obtain more specific teaching material for this area. Because of the problem of preventing soil blowing, conserving moisture to produce vegetation is of immediate importance to the people of Western Kansas. This problem includes many parts for consideration such as the selection and proper use of farm machinery in tillage practices, the selection of drouth resistant crops and in their utilization either as feed for livestock or for marketing in the form in which they are produced. Thus land-use practices demand consideration and study, if agriculture is to be maintained here.

Agriculture predominates in Kansas. The welfare of Kansas business and Kansas institutions is determined largely by the welfare of agriculture. Public schools, colleges, and universities derive their support largely from agriculture. Kansas soils are her richest heritage. To safeguard and nurture this heritage is a public duty. A good program of education in agriculture is capable of doing its part in this direction. This is a justification for this particular study, an endeavor to contribute to the general field of agricultural education by making available a course of study adapted to the agricultural facts of this area.

Chapter II

Statement of the Problem, Its Method and Procedure.

The specific problem of this investigation pertains to, "The Organization of Content for Agricultural Teaching in Western Kansas High Schools."

The study deals with the course of instruction in all high schools in the western half of the state teaching agriculture, except those teaching vocational agriculture. Schools teaching vocational agriculture are organized under the Smith-Hughes law. A school teaching agriculture organized under this law has a definitely prescribed course of study which does not apply to non-vocational schools. Thus, the necessity for the organization of a course of study for this latter type of school. This is a course that is elective and for a school term of thirty-six weeks, five days a week with a daily lesson period approximately forty minutes in length.

The geographic area in this study is limited to the fifty-four counties of the western half of Kansas. The correspondents which submitted information for the development of the content in the above problem are; fifty-eight non-vocational agriculture teachers, forty-six County Agricultural Agents, eight County Home Demonstration Agents, seventeen Master Farmers, and four supervisors of the Fort Hays State Experiment Station. From each of these groups

the writer secured material for the topics for study and organization. Thus the problem is one of organizing the topics to formulate a course of study for the teacher to follow in teaching agriculture.

Related Studies

A similar investigation was made in 1933 by Chester L. Mink of Twin Falls, Idaho. He secured the opinions of leading farmers as to what they thought were the important considerations in the formation of a course of study. One hundred and fifty farmers submitted reports which were analyzed and classified.¹

Another study was made by Thomas Maberly of Rupert, Idaho in 1933. It consisted of an analysis of reports from teachers of agriculture in Idaho, to indicate the relative importance of different phases of agriculture. He also compiled a list of reference books most commonly used in teaching agriculture in that state.²

The studies made by Chester L. Mink and Thomas Maberly are similar in purpose to the problem of this thesis, but they differ in content for their leading enterprises are, alfalfa and clover, beans, sugar beets, potatoes, onions, apples, prunes, dairying, poultry, sheep and swine.

-
1. Mink Chester L. "Outline of Contents for Agricultural Teaching." Masters Thesis. Dept. of Agriculture, University of Idaho. 1933.
 2. Maberly Thomas. "A Study of the Agricultural Instruction in the High Schools of Idaho." Masters Thesis. Dept. of Agriculture, University of Idaho. 1933.

The Method of Investigation.

The method used in obtaining the information for this study was by personal letter to each of the correspondents herein before mentioned.

In the letter to the agriculture teachers was a request for an outline of a course of study in agriculture as taught by them in their school.

The outlines from the agriculture teachers are the source from which topics to be used as units of study were accumulated.

The topics suggested by the agriculture teachers were referred to County Agricultural Agents, County Demonstration Agents, Master Farmers and supervisors of the Fort Hays State Experiment Station in a letter, on which each submitted statements based on the operation of a farm, as related to the above mentioned topics.

In this manner the information for this study was obtained and thence organized as in chapter III.

The Procedure

In order to get the names and addresses of the agriculture teachers of this section for contact and communication, it was necessary to secure the cooperation of the County Superintendent in each county. To obtain this information, a double form of reply card was mailed to each of the fifty-four County Superintendents on which they sent in return the names and addresses of non-vocational agriculture teachers of their respective counties.

The results of the reports from the County Superintendents show that there are fourteen counties where non-vocational agriculture is not taught. Six County Superintendents made no reply. There are thirty-four counties where non-vocational agriculture is taught. The counties where non-vocational agriculture is not taught are; Barber, Cheyenne, Clark, Comanche, Decatur, Ellis, Grant, Greeley, Morton, Rawlins, Scott, Sheridan, Stevens, and Trego. The County Superintendents of the following six counties made no reply; Ellsworth, Harper, Kearney, Reno, Sherman, and Thomas. The thirty-four counties where non-vocational agriculture is taught are; Barton, Edwards, Finney, Ford, Gove, Graham, Gray, Hamilton, Haskell, Hodgeman, Jewell, Kingman, Kiowa, Lane, Lincoln, Logan, Meade, Mitchell, Ness, Norton, Osborne, Pawnee, Phillips, Pratt, Rice, Rooks, Russell, Rush, Seward, Smith, Stafford, Stanton, Wallace, and Wichita.

From the cards of the thirty-four County Superintendents of the counties where non-vocational agriculture is taught, eighty-three names and addresses of non-vocational agriculture teachers were obtained.

The following letter was sent to each of the teachers:

Larned, Kansas,
223 West 10th St.
January 6, 1938.

Dear Agriculture Teacher:

Under the present set-up of agriculture teaching for teachers not under the Smith-Hughes plan, there is no outline of procedure as a course of study for the teacher to follow.

Would you please mail in the self addressed envelope an outline of the course you teach in high school agriculture.

If your outline is long and would require considerable time to recopy, would you please send it, allowing me to copy the desired information, and it will be returned to you.

Also, would you please suggest references, and activities that you have used as teaching devices which were interesting and instructive for any of the units in high school agriculture. In other words please give any helpful suggestions for teaching agriculture.

A summary of the results of this study will be sent to respondents desiring them.

Your help in this matter will be appreciated.

Sincerely yours,

L. V. Wedel.

Within two months time seventy-four teachers had replied, fifty-eight of whom sent outlines and sixteen stated that they did not follow an outline. In the fifty-eight outlines, fourteen important topics were given as units of study with related items.

Table I: "Topics Designated by Agriculture Teachers," indicates the sources, distribution and the total number of times each topic was mentioned by the fifty-eight agriculture teachers from thirty-four counties in western Kansas. These topics constitute the units of study in the organization of materials in this investigation. The topics are exhibited in Table I below.

TABLE I: Topics Designated by Agriculture Teachers.

County	Agriculture Teachers	The Fourteen Important Topics													
		Wheat Enterprise	Soil Conservation	Livestock Production	Sorghum Enterprise	Farm Management	Poultry Enterprise	Machinery	Grasses for Pasture	Alfalfa Enterprise	Home Gardening	Plant & Animal Impro.	Small Grains	Corn Enterprise	Silos & Silage

As to County Agricultural Agents and County Home Demonstration Agents; each deals with the practical application of issues and plans set up by the County Farm Bureau, and the State and National Departments of Agriculture.

A list of names and addresses of fifty-two County Agricultural Agents and nine County Home Demonstration Agents was obtained from the Kansas State Agricultural College, Department of Extension.

The Master Farmer Award is an accepted incentive to better farming and farm living. The selections are made by the Secretary of the State Board of Agriculture, the Dean of Agriculture at Kansas State College, and the Chairman of the State Board of Administration sponsored by Senator Arthur Capper, through Kansas Farmer publications. Since 1927 there have been thirty-two Master Farmer selections in western Kansas. A list of their names and addresses was obtained from Tudor Charles, Associate Editor of Kansas Farmer.

For further consideration the letter that follows was sent to each of the correspondents herein before mentioned, except the agriculture teachers.

The letter contains a list of the fourteen topics, which were given as units of study by the fifty-eight agriculture teachers mentioned before. The letter follows:

Larned, Kansas,
223 West 10th St.,
March 11, 1938.

Dear Sir:

I am gathering material to be used in a course of study for teaching agriculture in western Kansas High Schools. Your knowledge of agriculture and close contact with it gives you a practical viewpoint.

Would you please write under the units listed below some topics having to do with the operation of the farm, that should be studied by high school boys and girls. Please omit any of the units listed that do not apply to farming in your community. If you have any other suggestions not mentioned in the list please write them below.

WHEAT ENTERPRISE

1. (Your suggestion)
- 2.

SOIL CONSERVATION

- 1.
- 2.

LIVESTOCK PRODUCTION

- 1.
- 2.

SORGHUM ENTERPRISE

- 1.
- 2.

POULTRY ENTERPRISE

- 1.
- 2.

FARM MANAGEMENT

- 1.
- 2.

SILOS & SILAGE

- 1.
- 2.

PLANT & ANIMAL IMPROVEMENT

- 1.
- 2.

ALFALFA ENTERPRISE

- 1.
- 2.

MACHINERY

1.

2.

CORN ENTERPRISE

1.

2.

SMALL GRAINS

1.

2.

GRASSES FOR PASTURE

1.

2.

HOME GARDENING

1.

2.

FURTHER SUGGESTIONS

I will appreciate your help in this matter very much. May I hear from you soon, and for convenience mail reply in the enclosed self-addressed envelope.

Sincerely yours,

L. V. Wedel.

After a period of time, and in most instances less than a month, forty-six of the fifty-two County Agricultural Agents, eight of the nine County Home Demonstration Agents, and seventeen of the thirty-two Master Farmers had replied.

Since the Master Farmer Award is one of honor their names are given below:

H. L. Brownlee, Sylvia, Reno Co.
Lee E. Porter, Stafford, Stafford Co.
H. W. Hickert, Bird City, Cheyenne Co.
John W. Briggs, Protection, Comanche Co.
H. A. Praeger, Claflin, Barton Co.
R. E. Parcel, Coldwater, Comanche Co.
W. V. Stutz, Utica, Ness Co.
D. W. Osborne, Rexford, Thomas Co.
T. G. Wilkins, McDonald, Cheyenne Co.
C. F. McCauley, Coldwater, Comanche Co.
Julian M. Hulpren, Dodge City, Ford Co.
Roy W. Ellis, Coldwater, Comanche Co.
Wm. Long, Fowler, Ford Co.
Frank J. Schaffer, Pratt, Pratt Co.
F. J. Habiger, Bushton, Rice Co.
A. L. Stockwell, Iarned, Pawnee Co.
R. H. Goodman, St. John, Stafford Co.

Replies in the form of outlines from the Fort Hays Experiment Station; L. C. Aicher, Superintendent of the Experiment Station, A. F. Swanson in charge of Cereal Crop Investigations, F. G. Ackerman in charge of soil Conservation Studies, F. L. Timmons in charge of Bindweed Control Practices.

Table II illustrates in detail the extent of the geographic area studied, indicating the inquiries made and the replies received.

The tabulation indicates by counties, Agriculture teachers, County Agents, Home Demonstration Agents, Master Farmers and Experiment Station Supervisors to whom the letters Number 1 and 2

TABLE II: Tabulation of Inquiries and Replies by Counties
Indicating the Number and Their Sources.

Counties in Survey	Sources of Information									
	Agriculture Teachers		County Agents		Home Demonstr- ation Agents		Master Farmers		TOTALS	
	Inq- uiry	Reply	Inq- uiry	Reply	Inq- uiry	Reply	Inq- uiry	Reply	Inqu- iries	Replies
Barber	0	0	1	1	0	0	0	0	1	1
Barton	2	2	1	1	1	1	2	1	6	5

TABLE III: Tabulation of Reports Received on Topics in the survey.

	Sources of Information					TOTALS
	Agric- culture Teach- ers	County Agents	Master Farm- ers	Home Demons- tration Agents	Exper- iment Stat- ions	
Number of Reports Received-----	58	46	17	8	4	133
The Fourteen Important Topics	Number of times each Topic was mentioned and the Per Cent					
Wheat Enterprise	56	46	17	8	4	131
Per Cent	96%	100%	100%	100%	100%	99%
Soil Conservation	53	46	17	7	4	127
Per Cent	91%	100%	100%	87%	100%	97%
Livestock Production	41	46	17	7	4	115
Per Cent	70%	100%	100%	87%	100%	87%
Sorghum Enterprise	41	45	17	7	4	114
Per Cent	70%	98%	100%	87%	100%	85%
Farm Management	21	46	17	8	4	96
Per Cent	36%	100%	100%	100%	100%	72%
Poultry Enterprise	22	43	16	8	4	93
Per Cent	38%	93%	94%	100%	100%	70%
Machinery	12	44	17	7	4	84
Per Cent	20%	95%	100%	87%	100%	63%
Grasses for Pasture	12	43	16	7	4	82
Per Cent	20%	93%	94%	87%	100%	61%
Alfalfa Enterprise	16	38	16	6	3	79
Per Cent	27%	82%	93%	75%	75%	59%
Home Gardening	10	42	15	8	4	79
Per Cent	17%	91%	88%	100%	100%	59%
Plant & Animal Imp-	15	38	14	6	4	77
Per Cent	26%	82%	82%	75%	100%	58%
Small Grains	13	35	15	6	3	72
Per Cent	22%	76%	88%	75%	75%	54%
Corn Enterprise	16	28	11	5	4	64
Per Cent	27%	61%	65%	62%	100%	48%
Silos & Silage	15	41	17	7	3	63
Per Cent	26%	88%	100%	87%	75%	47%

Chapter III

Organization of Content Materials

The following course in agriculture is based on the outlines received from sources mentioned in Chapter II.

The course is planned for use in the making of assignments and presentation of lessons in the single unit course in high school agriculture. A single unit is understood to mean the credit given for the satisfactory completion of the subject requiring preparation outside of the recitation, with five recitations a week for a full school year of not less than thirty-six weeks and with daily recitation periods of approximately 40 minutes in length.

Fifty-two of the teachers who reported make the suggestion to keep in mind the order of performance of farm operations and teach the lessons in this order when possible. This means just before or at the time the farmer is drilling wheat, the teacher should have lessons about seeding wheat. However, the teacher should keep in mind the farm operations necessary before drilling is possible, which for best order ought to be developed first. Teachers often refer to this plan of teaching as the "seasonal order," "order of performance of farm operations" or "seasonal sequence."

By referring to the list of topics as units of study the teacher can make his lesson plans and arrange them as nearly as possible in "seasonal sequence," or in other words just before or at the time of

the performance of the operation on the farm. This makes it possible to secure first hand information from field trips and laboratory studies.

The course which follows may be used on the seasonal order. Fifty-two of the fifty-eight outlines submitted by agriculture teachers had the topics and subtopics in order of performance of farm operations.

The number following each topic indicates the number of times the topic was mentioned. For example the number 57 appears after the first subtopic under, "Preparation Of Seedbed." This means that 57 of the 131 replies to requests in this study listed the topic, "When and How to Prepare the Seedbed for Wheat." This indicates the significance of the problem involved in the organization of the outlines.

The following topics as units of study have been arranged in their order of importance as listed in Table III, "Tabulation Of Reports Received In The Survey," page 17.

WHEAT ENTERPRISE

Preparation Of Seed Bed:

When and how to prepare the seed bed for wheat	(57)
Tillage practices when summer fallowing	(57)
Methods of farming to conserve moisture; listing, leaving stubble, time and depth of cultivation.	(57)
Plans for crop rotation and partial fallowing to prevent soil erosion and increase the yield.	(8)

Varieties Of Wheat.

Varieties of wheat for western Kansas; Turkey, Kanred, Blackhull, Kharkoff and Tenmarq.	(40)
---	------

List the desirable features of each variety to compare their respective values. (40)

Selection Of Seed Wheat.

Factors to consider when selecting seed wheat; free from weed seed, smut, and rye. (19)

Cleaning Of Wheat.

Purposes and results from cleaning of seed wheat; removes diseased seed, weed seeds, shrunken and cracked kernels, chaff and straw. (11)

Treating Seed Wheat.

Methods of treating seed wheat for smut; use of copper carbonate dust or formaldehyde. (12)

Consider cost of treating, operation and results of treatment. (12)

Time to Seed Wheat.

Conditions that affect the time of sowing wheat; moisture supply in soil, Hessian fly, volunteer wheat, dry ground, Wire worm, winter killing. (39)

Methods of Seeding Wheat.

Methods and depth of seeding wheat compared with rate of seeding for moisture supply and time of sowing. (39)

Compare; time, rate, and depth of seeding for using deep furrow, semi-furrow, and surface drilling. (39)

List the points that are desirable and undesirable about; deep furrow, semi-furrow, and surface drills for sowing wheat. (37)

Pasturing Wheat.

Advantages from properly managed wheat pasture; excellent livestock gains, conserves dry feed. (11)

The problem of properly managing wheat pasture is controlled by; moisture supply, weather conditions, season, timeliness and the abundance of rainfall on well cultivated fields. (11)

Insects Of Wheat.

Insects harmful to wheat; Hessian fly, Chinch Bug, False Wire Worm, Grasshoppers, Straw Worm, Weevils, Angoumois moth. (43)

Diseases Of Wheat.

Diseases harmful to wheat; Stinking Smut, Loose Smut, Flag Smut, Black Stem Rust, Orange Leaf Rust, Foot Rot and Crinkle Joint. (43)

Weeds In Wheat.

Troublesome weeds of wheat fields; Bindweed, Cheat, June Grass, Russian Thistles. (7)

Harvesting Wheat.

The problem of harvesting wheat; machines, operation of machinery, labor, time and expenses. (21)

Marketing Wheat.

The problem of marketing wheat; when to sell, study of market grades and classes, and fluctuation of market. (20)

Cost Of Wheat Production.

Calculate the total cost of producing wheat by the use of the following items; Seed bed Preparation, Seeding, Harvesting, Marketing. (10)

SOIL CONSERVATION

Types of Soils.

Compare the formation, composition, and the ability to retain moisture of residual soils, northern wind deposits, outwash plains, southern brown residual areas, plains marl soils, and dune sands. (107)

Loss of Soil Fertility.

Account for losses of soil fertility through crops, soil erosion by water, erosion by wind blowing. (144)

Maintaining Soil Fertility.

Develop assignments to learn how cropping systems when in rotation help to control soil erosion, how to manage contour farming, building of obstructions to control gullying, how to construct terraces, various combinations of tillage practices with the possibilities of retaining the soil. (100)

Study the problem of controlling soil blowing under the following preventive measures: 1. cultivate to make a rough surface, 2. Have ground covered with a crop when blowing season occurs, 3. Leaving much stubble or straw on the field, 4. Apply straw or manure, 5. Cultivate with a shovel cultivator strips at right angles to the wind, 6. List ground in strips if blowing severely. (37)

Make charts to show plans for periods of crop rotation. (15)

Compare tillage practices as in plowing and listing for moisture conservation, cost of tilling, fall listing and plowing for seed bed preparation of spring crops and summer fallowing. (77)

Irrigation.

Study possibilities of irrigating from creeks, or by underflow with pumps. Get items involved in irrigating as cost of equipment, cost of putting in a well and pump, preparation of ground for irrigation, labor and cost of labor involved when producing crops by irrigation, comparison of crop yields for irrigation and dry farming methods. (19)

LIVESTOCK PRODUCTION

BEEF CATTLE

The production of beef cattle utilizes grains, roughages and grasses. (16)

How beef cattle provide for permanent type of agriculture (16)

Breeds Of Beef Cattle.

Study characteristics, purposes, ruggedness, and ability to fatten of Hereford, Shorthorn, Aberdeen Angus and Galloway. (42)

Selection Of the Breed.

Factors in selecting a breed; relation of type of farming to selection of breed, e.g. Hereford favored for rustling on large range pasture, Angus suited for feed lot fattening, Shorthorn adapted for dual farm purposes, Galloway considered for ruggedness. (23)

Breeding Stock.

List the desirable characteristics of a herd bull. (23)

Qualities that make a good feeder. (41)

Desirable characteristics of a beef cow. (25)
 Emphasize true beef form, early maturing, easy
 fattening qualities, important of characteristics
 transmitted to offspring. (6)

Judging Beef Cattle.

Learn location and names of different parts of the animal.
 In judging the animal note the outline by viewing from front, side and rear. Examine closely various parts from head to hips, give particular attention to evenness and thickness in covering of flesh for quality. For feeder cattle note compactness and depth of body. For fat cattle check smoothness and thickness of flesh as roughness indicates loss in killing. (25)

Size of Herd And Equipment.

Determine size of herd by amount of pasture available, quantity of hay and feed produced on the farm.
 Learn of such items as: Water supply and equipment, securely fenced pasture, shelter for cattle during severe weather, special pens for bull and young stock. (15)

Feeding Beef Cattle.

Problem of providing pasture for summer and winter use.
 Feed requirements of cows giving milk, and young calves during severe weather.
 Figure rations for cows, calves and feeders, using those feeds best for type of animal.
 Conclude the value of silage, grains, cotton seed meal, linseed meal and alfalfa hay in the ration. Determine the cost of feeding a ration for a given period. (53)

Diseases.

Study controls and treatment for the following calf ailments, constipation, diarrhea and blackleg.
 Study symptoms, treatment and remedy to control losses from abortion, prussic acid poisoning, warbles, bloating and wheat poisoning. (22)

DAIRYING.

The dairy industry, its growth and importance.
 Advantages of having dairy cows on the farm. The problem of producing suitable feeds as alfalfa hay, wheat pasture, sorghum silage and grain for a balanced ration to maintain the dairy herd. (21)

Breeds.

Compare the Jersey, Guernsey, Ayrshire, Brown Swiss, and Holstein for the following characteristics; color size and weight, richness of milk, quantity of milk and disposition.

(34)

Selection and Judging.

Compare selecting dairy cows by records, by general appearance by both methods as given by records produced, and general appearance. Enumerate the points to consider in selecting dairy cows.

(13)

Feeding.

Importance of providing pasture for all seasons.

Compare the following as grown for pasture: rye, sudan grass, winter barley, wheat. Alfalfa hay valuable to dairy cows.

Use of silage in the ration for dairy cows.

Use of individual records to determine amount of feed each cow should have in the daily ration.

(29)

Care of Dairy Calves.

Feeds for young calves; whole milk, skim milk, calf meal, linseed meal, cotton seed meal, ground grain and alfalfa hay. Consider age of calf and what should be fed for best results.

Emphasize the importance of proper care and feeding of dairy heifers.

(14)

Use and Care of Milk Products.

Study food nutrients in milk and milk products as important factors of a balanced diet for man.

(34)

How to have clean milk by keeping all utensils and cows clean demands attention as the proper care of milk often determines its flavor and purity.

(34)

How to make butter and cheese

(11)

How to test milk and Cream

(11)

How cooling of milk, cream and butter may be best accomplished.

(11)

SHEEP.

Opportunities and advantages of sheep raising; utilization of waste land, waste feeds, as grass weeds

and hay that may be found about the farm. The products of the farm flock may be profitable as the demand for wool, mutton, and lamb market indicates. (3)

Types and Breeds.

Compare the breeds of sheep for characteristics of color, weight, and kind of wool. (22)

Selecting For Small Farm Flocks.

Make a list of the points to consider when selecting an ewe. (5)

Make a list of the points to consider when selecting a ram. (5)

Feed For Sheep.

Most essential to provide pasture for all seasons. Study the pasture and hay crops of this region, that are suited for sheep. (25)

Feeds to include in the ration for fattening lambs; alfalfa, corn, milo, silage, oil meal, bran, oats, barley, of which four may be included. (10)

Care And Management Of Ewe And Lamb.

Develop the items as; Feeding the ewe during lambing time, Causes for ewe disowning lamb and how they may be overcome, Weaning and feeding the lamb, Docking the lambs, Effect of long tails on marketable lambs. (5)

Marketing Sheep.

Study factors that influence the market which often determines the best time to market sheep and the lamb crop. Early June is considered the best time to market lambs. (3)

Shearing Sheep and Marketing Wool.

When and how to shear sheep should be studied to develop the following objectives: shear before fly time to prevent fouling of wool with maggots, proper handling of sheep to avoid abuse and damage to either the sheep or the wool. (3)

Learn about the following methods of marketing wool: County Pools, fostered by County Farm Bureaus, Consignment to wool commission houses, or to local buyers. (3)

Parasites And Diseases Of Sheep.

Study the means of identification and control of the most common parasites; lice, sheep tick, sheep scab, mite, screw worm maggot, grub in the head, tapeworms, and bladderworms. (3)

The common diseases, sheep measles, liver fluke, and disturbances caused by stomach worms. (3)

SWINE.

Types and Breeds.

Compare lard and bacon hogs for conformation, weight, uses and demands as of the market. Compare the breeds of lard and bacon hogs for color, conformation, type of snout if dished or straight, position of ears if erect or drooping, disposition and average weight. (33)

Judging Swine.

Learn to discern weak points, such as, low back, narrowness of back, shallow in depth of body, flat and weak feet, bad pastern, snout too long, coarse shaggy coat and bad disposition. (7)

Brood Sow Management.

The ration for the brood sow.
Farrowing quarters for the brood sow.
Care of the sow during farrowing time.
The best time to have sows with pigs.
How to supply the sow with plenty of minerals, and protein to keep her from eating pigs.
The value of shade and pasture to hog production. (24)

Small Pig Management.

Importance of new ground, use of self feeders, provision for water and pasture.
Provide some whole milk and some skim milk at weaning time. (24)

Feeding Swine.

Importance of sanitary feeding in hog production to prevent disease and loss of feed. (24)
What to include in the ration for fattening. (24)
How to produce growth and economical gains by providing alfalfa or sudan grass for summer pasture and rye for fall, winter and early spring pasture. (24)

Swine Housing.

Compare stationary and movable houses for; cost, upkeep, serviceableness, and use to hog production, convenience during farrowing, problem of controlling disease, maintaining sanitary surroundings.

(3)

Diseases.

How to control hog cholera, tuberculosis, worms, and skin diseases. (Emphasize sanitation)

(7)

SORGHUM ENTERPRISE

Varieties Of Sorghums.

Compare varieties of grain and forage sorghums for; size of seed, whether seed is bitter or sweet, for stems; whether dry and pithy or sweet and juicy, for abundance of leaves and amount of fodder produced. Learn to recognize varieties of kafir, dwarf milo, standard milo and feterita of the grain sorghums. Learn to recognize for forage purposes as; Atlas, Early sumac, Leoti Red, Black Amber, Red Amber, and Japanese Honey Dip. Which varieties are best for hay, pasture, grain, and silage?

(99)

Preparation Of Seed Bed.

Methods of preparing the seed bed.
Confirm advantages by blank listing in the fall.
Discuss care needed in preventing rain from washing furrows and covering seed or young plants too deep.

(33)

Selecting Seed.

Select seed from stalks in the field. Select only those seeds which have the qualities desired for which the crop is produced. Select grain sorghum seeds from heads of strong, sturdy, upright stalks without suckers and side branches, and with a maximum number of leaves. Select heads of sweet sorghum seeds from stalks that have abundant leaves, paying less attention to type of head and giving preference to stalks that sucker and yield foliage, but are not too coarse.

(16)

Planting Sorghums.

Study the methods of planting by using the lister, furrow drill, and surface drill. How does use of the crop and

type of soil help determine the method of seeding? Compare rate and depth of planting on wet heavy soils and on light sandy soils. One to two inches may be about the right depth of planting sorghums on heavy soils, while on sandy soils two inches or more may be necessary.

Sorghum for grain may be seeded at the rate of 4 pounds per acre, for stover twice the amount may be planted, when used for hay from one to two bushels might be planted depending on soil and moisture conditions

(36)

Cultivating.

Methods of cultivating, by use of harrow, disk weeders, and shovel cultivators.

Reasons for cultivating; cultivate often enough to control weeds, and to keep soil in condition to absorb rain. Often advisable to cultivate no deeper than necessary to accomplish these purposes.

(32)

Insects.

Learn how to identify and the methods of controlling the chinch bug, kafir ant, corn leaf aphid, grasshopper, maize bill bug, and sorghum webworm. How to prevent losses caused by common grain weevils and Angoumois grain moth to stored sorghum seed.

(14)

Diseases.

Give the treatment to control the following most common diseases: 1. Covered kernel smut, 2. Loose kernel smut, 3. Head smut, 4. Root crown and shoot rot of milo, 5. Mouldy seed. Those not so common are bacterial stripe, bacterial streak, bacterial spot and rust. Pay special attention to seed treatment to control kernel smut.

(14)

Harvesting.

Methods of harvesting; hand topping, cutting with a wheat binder or corn binder, topping with a header, heading with a combine, cutting with a mowing machine and putting in shocks while raking. Study the factors that determine the time to harvest sorghums with reference to use of the above named machines for harvesting.

(37)

Crop Rotation.

The cropping system should provide for sorghums to be followed by fallow, then wheat. In some cases two crops of wheat may be followed by barley. Sorghum is preferable to most other crops where fall sown wheat has winter killed.

(11)

FARM MANAGEMENT

Shall I Be A Farmer?

Personal traits of successful farmers.
Profits to be expected in farming.
Cost of living on farms.
The farm from the standpoint of the tenant.
Farm investments.
The farm as a home. (11)

Types Of Farming.

Factors that determine the type of farming.
Relation of transportation to type of farming.
Relation of supply and market demand to type of farming.
Relation of land values to type of farming.
Relation of capital to type of farming.
Relation of labor to type of farming.
Effects of weeds, insects and diseases on type of farming. (11)

Diversified And Specialized Farming.

Comparative merits of specialized and diversified farming.
Seasonal distribution of labor.
Examples of successful types of farming. (5)

Intensive And Extensive Farming.

Ways of obtaining profits.
Intensive and extensive enterprises. (8)

Maintaining The Fertility Of The Land.

Maintaining the organic matter, nitrogen supply, mineral matter, and ability of soil to retain moisture. (4)

Problem Of Maintaining Livestock Production.

Amount of livestock to keep.
Feeding the animals.
Animal records.
Purebred vs. grade stock.
Depreciation on livestock. (4)

Size of Farms.

Relation of size of farm to farm efficiency.
Size of farm and profits. (2)

Capital.

- Relation of capital to profits.
- Distribution of capital.
- Relation of capital to type of farming.
- Economy of cash purchases.
- Farm mortgages.
- Keeping one's credit good.
- Ways of farming with small capital. (5)

Methods Of Renting Land.

- Cash payment plan.
- Crop payment plan. (2)

Farm Labor.

- The labor problem for the individual. (4)

Farm Equipment.

- The maintenance of equipment. (3)

Farm Layout Studies.

- Field arrangement.
- Pastures and fences.
- The farmstead.
- Farm buildings. (28)

Cropping Systems.

- Crop rotations used in different regions.
- Fixed cropping systems with irregular acreage.
- Relation of cropping and feeding systems. (7)

Marketing Farm Products.

- Time to sell products.
- Ways of selling products. (14)

Farm Records And Accounts.

- Kinds of accounts.
- Accounts with persons or firms.
- Annual inventory.
- Receipts and expenses. (41)

Choosing And Buying A Farm.

- Importance of securing a good farm.
- The lay of the land.
- Fertility of the soil.
- Physical properties of the soil.
- Water supply.
- Improvements.
- Healthfulness.
- Roads and markets.
- Community improvements.
- Prospective development.

(6)

POULTRY ENTERPRISE

Importance Of The Poultry Industry.

- Surprising valuation.
- Regularity and value of income.
- Food value of poultry products.
- Range of adaptability from small flocks to large production units.

(21)

Reasons For Poultry Being Profitable.

- Low investment, low risk, low feed cost, low housing cost, low labor cost.

(35)

Purposes Of Raising Poultry.

- To supply food for the family, profitable sideline for a steady income, and interesting as a hobby.

(35)

Classification Of Breeds.

- Learn to classify breeds and varieties for general purpose as Rhode Island Red, Plymouth Rocks, and Wyandottes; for egg production as Leghorns and Minorca; for meat production as Brahma and Jersey Giant.

(43)

Housing Poultry.

- Principles involved in housing poultry; ventilation without drafts, direct sunlight, freedom from excess moisture, proper size for flock to avoid crowding, average size suggested 20x70 feet with a gable roof and straw loft.

(28)

- Brooder houses usually 10x12 feet or 12x16 feet in size. Brooder houses had best be portable to permit moving to

new ground and if not movable provide sanitary runways of wire enclosures to prevent chicks from getting in contact with the droppings on the ground or floor. (28)

Feeding Poultry.

Feeding of rations in starting mash, growing mash, laying mash, and scratch feeds.
Equipment for sanitary and economical feeding; feeding hoppers and drinking fountains.
Balance of proteins, carbohydrates, minerals, and vitamins for starting chicks, growing chickens, and laying hens. (45)

Factors That Determine Poultry Profits.

Hatching chicks early, growing early maturing strains, proper feeding, clean surroundings, management of flock, care in selecting and managing the breeding stock, controlling pests and diseases. (18)

Culling For Egg Production.

Physical characteristics of a laying hen; width of three fingers between vent and pubic bones, short dull pointed beak, flattened shank, bright life like color of comb, wattles and ear lobes. Emphasize not to cull by vent measurement only to determine layers, but consider age, size of pullets, time and condition of feeding during moulting. (36)

Parasites And Diseases.

Common external parasites; mites and lice of many different kinds.
Learn when and how to use carbolineum or crude petroleum and sodium fluoride to control the different kinds of mites and lice.
What to do for the following diseases: tuberculosis, roup, white diarrhea in chicks, when in the flock, to prevent spreading. (21)

Raising Chicks.

The hatching, brooding, and feeding of chicks as special problems. (51)

Other Poultry.

Turkey raising as a profitable sideline. (4)
Raising ducks and geese for products of home use as an interesting sideline. (4)
Raising Guinea fowl as a substitute for game birds. (4)

MACHINERY

Selection of Farm Machinery.

Points that should be studied; possibility of doing work rapidly and well, durability of the machine, lightness of the draft, ease and convenience of operation. (12)

Care of Machinery.

To insure dependable service, learn which parts of machinery need repairing, the proper housing, oiling, and adjusting of each machine. (42)

Power Farming.

Account for the use and value of power on the farm as from types of tractors and gasoline engines. (13)

Consider situations where farm life is made better and more profitable by the use of power of engines and tractors. (13)

How the combine may be cost reducing and labor saving in harvesting operations, also add convenience to harvesting and return organic matter to the soil as the straw is scattered over the field. (13)

Enumerate items for proper operation, upkeep and repair in using tractors. (13)

Cost Of Machinery.

Compare the cost of different makes of farm machinery needed to produce wheat and row crops. (16)

Find the essential factors of upkeep in farm machinery for replacement of worn parts on each make. (6)

Types Of Machinery.

Make a list of the different kinds of machinery needed to produce crops as wheat, sorghums, alfalfa and corn.

Farm Shop.

The farm shop becomes important to help reduce expenses of repair and adjustment on machinery.
Itemize the equipment needed in the farm shop. (16)

GRASSES FOR PASTURE

Importance Of Pasture.

Stress the value of pasture as feed for the production of livestock. Pastures, necessary for the health and

growth of livestock. Pastures also make for economical feeding of stock.

Estimate the value of pasture, by comparing cost of pasturing per head per month and the gain made in growth and production of marketable product. (18)

Pasture Regions.

Compare the following non-tillable types of land as to value for pasture; sand hills, limestone hills, land adjacent to streams. (6)

Name and classify the native grasses that grow on most of the non-tillable land. (6)

Temporary Pasture Crops.

The problem of providing pasture by supplementing permanent pastures with winter wheat, winter rye, winter barley and sudan grass. (37)

Deferred Grazing.

The problem of restoring eroded, denuded, permanent pastures: By allowing forage plants to get a good growth and mature seeds to be scattered, by preventing damage to seedling plants as of grazing and trampling, by controlling the growth of weeds, and on sustaining areas avoid pasturing too early and too close. (14)

Rotated Grazing.

Devise plans for restoring native vegetation by rotating pastures which prevents close grazing. (14)

Brush and Weed Control.

As pasture grasses are being restored, it is advised that weeds and brush be removed to allow for growth of native grasses. This may be done by cutting, grubbing, burning, and the use of herbicides. Decide where the above methods would be used in removing brush and weeds. (9)

Erosion Control.

What to do to control erosion in pastures.
Terracing and contouring the pasture.
Construction of dams to obstruct the flow of water.
Planting of shrubbery along the course of the gully. (11)

ALFALFA ENTERPRISE

Importance of Alfalfa.

Value of alfalfa as a feed for cattle, hogs, sheep and chickens.

Value of alfalfa to rotate with other crops to help restore the fertility of the soil.

(30)

Preparation Of The Seed Bed.

To prepare the seed bed for alfalfa consider the type of soil and the amount of stubble needed to prevent soil blowing.

Methods of preparing the seed bed usually followed are disking corn or sorghum stubble field and summer fallowing.

(17)

Time Of Seeding The Field.

Compare spring and fall seeding for methods and advantages.

(18)

Seeding The Field.

What methods may be used when seeding alfalfa?

Find what type of drill to use for best results.

Problem of amount of seed to sow and depth to sow the seed.

(18)

Insects.

Learn methods of controlling, and when to apply each for; grasshoppers, cutworms, pea aphids, army worms, corn ear worms, garden web worms, blister beetles, clover leaf weevils, and mound building prairie ants.

(8)

Time To Cut Alfalfa.

Points for consideration:

Producing quality hay.

Maintaining a stand, decreasing or increasing the yield.

Problem when plants fail to mature uniformly.

(19)

Curing The Hay.

Points to consider:

How to retain most of the leaves.

When to rake in windrows.

When to bale or stack the alfalfa.

Problem of purchasing and paying for haying machinery.

(19)

Irrigating Alfalfa.

Irrigate alfalfa for profitable production. (8)

Marketing Alfalfa.

Study the demand for and market value of alfalfa hay and alfalfa seed. (10)

Cost Of Production And Profits.

Compare the profits from the alfalfa crop with the profits of the wheat crop or any other cash crop. Compare the cost of producing alfalfa with the cost of producing wheat. (10)

HOME GARDENING

Value Of The Garden.

Study the value of a garden as a money saving enterprise, source of food supply, opportunity for employment and superiority of fresh vegetables. (20)

Soil Preparation.

Advantages of fall or early winter plowing and spading. Rough surface will catch more snow, absorb moisture, expose insect pests to be destroyed by freezing. Harrow and disk the ground in the spring to make a fine surface. Avoid working the ground when too wet. (15)

How to Fertilize Garden Soils.

Barn yard manure is most valuable to supply plant nutrients, add organic matter, to loosen and aerate the soil and increase water holding capacity. (6)

Selection of Crops.

Study of small fruits and perennial crops; strawberries, blackberries, raspberries, asparagus, rhubarb, horse radish and winter onions. Culture of annuals; lettuce, radish, peas, carrots, parsnips, beans, beets, turnips, tomatoes, cucumbers, squashes, cabbage, onions, spinach, potatoes. (24)

Planning The Garden.

Arrange a garden plan for the planting of crops before the last frost of spring such as potatoes, cabbage, lettuce, spinach and peas. Plan for the planting of those crops that must be planted when the soil has become warm after the last frost in the spring. The warm weather crops are beans, tomatoes, peppers, sweet potatoes and others. Plan for a succession of crops, especially those crops which will withstand both heat and cold. Of the last group some of the following will often meet the requirements: radish, kohlrabi, cabbage, carrots, parsnips, onions, and lettuce. (19)

Cultivation.

Purposes of cultivation; kill weeds to prevent loss of plant food and moisture. After a heavy rain cultivate to break the crust. (10)

Irrigating.

Devise plans for methods of irrigating by surface furrows or ditches, underground system, and overhead sprinkling with pressure through pipes. Learn about the depth to soak the soil and how often to irrigate for good results. It has been suggested to soak the soil to a depth of 10 to 18 inches and repeat in 10 to 20 days. (24)

Insects.

Learn how to identify and control cutworms, plant lice, blister beetles, flea beetles, grasshoppers, potato beetles, and wireworms, also cabbage worms, tomato worms and cucumber beetles. (11)

Diseases.

Find how damping off and wilt may be controlled. (11)

PLANT AND ANIMAL IMPROVEMENT

How The Plant Gets Its Food.

Importance of water to plants.
Examine root hairs and study how they absorb plant food. (Osmosis)
Examine some leaves under a microscope and study how they help to make plant food.
Photosynthesis. (16)

Study about the roots, stems, leaves, and flowers to learn their structure for obtaining and storing food. (18)
Develop an understanding of the forces that control plant growth. (12)

The Influence Of Heredity And Environment In Plant And Animal Improvement. (2)

Variation In Plants And Animals.

Make collections of flowers, leaves, and seeds to discover variation. (5)

Natural Selection.

How bindweed, thistles, and cactus have become weed pests.
The adaptation of plants to climate. (11)
The occurrence of mutations. (11)

Artificial Selection.

Give illustrations to show how plants have been improved by selection.
Explain how new varieties are developed by crossing. (8)

Means By Which Plants Reproduce.

Learn to locate and identify the seed producing organs; stamens, pistil, filament, anther, ovary, style, stigma. (6)
Name some plants that reproduce by each of the following methods: seed, spores, rootstocks, stolons, suckers or root sprouts, bulbs, corms and tubers. (6)

Artificial Means Of Reproducing Plants.

Which plants and by what manner reproduce by cuttings, layering, grafting and budding? (6)

Improvement Of Farm Animals.

Describe the domestication of some of the farm animals. (6)
Reasons for careful selection of breeding animals. (12)
The general crossing of closely related animals. (8)

Classes Of Livestock.

Explain the meaning of purebred stock, registered stock, cross bred, grades or grade stock, and mongrel when classifying livestock. (10)

High Quality Livestock.

Account for the following advantages of good livestock; usually produce more economically, mature quicker, more attractive, more likely to have good offspring. (16)

How to Procure And Keep Good Livestock.

Selecting and Using a purebred sire. (16)
Culling to keep only the best offspring.

SMALL GRAINS

Barley. (27)

Facts concerning the history of barley. (3)
Study types of barley. (27)
Seed bed preparation for barley. (15)
Methods of seeding barley. (7)
Harvesting barley. (10)
Uses of barley. (10)

Rye. (20)

History and the distribution of the production of rye. (15)
Varieties of rye. (20)
Seed bed preparation for rye. (15)
Methods of seeding rye. (6)
Harvesting rye. (10)
Uses of rye; pasture, crop rotation, green manure crop, nurse crop. (16)

Oats. (26)

Importance as a feed crop. (3)
Types and varieties of oats. (26)
Preparation of ground for seeding. Possible advantages of fall plowing, listing or disking. (16)
Most successful methods of seeding, time of season to sow oats, rate per acre to sow. (6)
How to prevent loss from smut in oats. (6)
Harvesting oats. (10)
Uses of oats. (3)

CORN ENTERPRISE

Seed Bed Preparation.

Methods of seed bed preparation; list the ground in the fall, if there is only slight danger of soil blowing.

Leave trash or stubble on the ground during winter months if the soil is likely to blow, in the spring disk the ground to kill weeds. (14)

Types of Corn.

Study the economic importance of dent, flint, pop, sweet, and soft. (17)

Adapted Varieties.

The early maturing varieties most desired; Cassel white, Colby red, Freed white, Hays Golden, in the southwest part of the state Blue Squaw soft corn is grown for feed. (17)

Planting Corn.

Get reasons for the methods; wide rows, narrow rows, listing, and shallow furrows. (13)

How to determine time, depth and rate of planting; consider needed warmth of soil, soil moisture, and fertility of the soil. (13)

Cultivating Corn.

Purpose of cultivation; to kill small weeds, increase absorption of rain.
Methods of cultivation, use of harrow, ridge cutters, and cultivators. (17)

Insects Of Corn.

Study life history and control of chinch bug, corn worm, grasshopper, army worm, root louse. (8)

Diseases Of Corn.

Study control of smuts, root rots, ear rots, and molds. (8)

Harvesting Corn.

Methods: cutting and shocking with binder,
Cutting for silage with silage cutter,
Husking the ears from stalks in field. (6)

Seed Corn Selection And Storage.

Make points for selecting seed corn in the field.
Describe proper storage of seed corn. (19)

Cost Of Production.

Estimate the cost of planting, cultivating, and harvesting of the corn crop. (6)

SILOS AND SILAGE

Types Of Silos.

The advantages of a trench silo; easily constructed, small cash outlay, can be built almost anywhere, capacity limited by their length, easily filled, emptied, amount of spoilage small. (26)

The advantages of a pit silo; requires little cash expenditure, labor is the chief item, does not require a blower to fill it, silage will not freeze or spoil, silo will not blow down, no expensive forms are required. (26)

Value Of Silage.

Study importance and value of silage as a feed for livestock; from the standpoint of feeding value, economy and storage of feed. (18)

Crops For Silage.

Compare the use of sorghums and corn for silage. Value of green crops other than sorghums and corn for silage. (24)

Cutting The Crop And Filling The Silo.

Learn about the time to cut the silage crop to get maximum feed nutrients, the most convenient and economical method of cutting the crop, and how to pack the silage in the silo. (19)

Feeding Silage.

Get references in bulletins from Experiment Stations to learn of the amount of silage to feed in rations for the best results. Figure rations where silage is fed to cattle, sheep and hogs. (12)

ACTIVITIES USEFUL AS TEACHING DEVICES

The following activities for teaching agriculture were suggested only by the teachers in the survey. The suggestions make up activities that have been used as teaching devices of the topics in the outline of chapter III. Of the 58 teachers that contributed outlines; 51 report the use of charts and drawings to accomplish lesson assignments on the study of insects, drawings to show parts of seeds, flowers and animals, plans to illustrate arrangement of structure and landscaping the farm buildings, 48 make field trips to learn of the farm practices, 35 have laboratory exercises for the study of seed germination, tests of soils, and studies of the parts of a plant, 30 report the use of agricultural arithmetic as a definite part of the course, 22 have collections of seed, samples of soil, insects and weeds to illustrate some of the studies, 11 use some illustrated materials in the form of pictures from catalogues and farm magazines, 11 report the keeping of notebooks by each pupil as a part of the course, 10 have the pupils draw maps to show the leading states in the production of crops and livestock.

REFERENCES

The United States Department of Agriculture issues Farmers Bulletins on various topics and problems pertaining to agriculture. The Kansas State Agricultural College at Manhattan provides for the distribution of Circulars and Bulletins on agricultural topics related particularly to Kansas.

There were fifty-two of the fifty-eight agriculture teachers that reported the use of bulletins for reference material in their course of study. This has made it possible to accumulate the list named below.

The bulletins have been arranged in the order of topics for each of the units of study in this course. The first list is of Kansas State College Publications, and the second is of "Farmers Bulletins," from the United States Department of Agriculture, Washington, D.C.

The following lists of bulletins are available through Professor Hugh Durham, Kansas State College of Agriculture and Applied Science, Manhattan, Kansas, also from County Agricultural Agents, and State Representatives at Washington, D.C.

Kansas State College Publications.

WHEAT ENTERPRISE.

- Bulletin 219 Growing Wheat in Kansas.
- " 248 Wheat Production in Kansas.
- " 273 Soil Moisture and Winter Wheat.
- " 206 The Relation of Moisture to Yield of Winter Wheat
in Western Kansas.

SOIL CONSERVATION

- Bulletin 260 Soil Fertility.
- " 70 Terracing to Control Erosion.
- " 58 Terracing Farm Lands in Kansas.

Bulletin 213-B Dams on Dry Water Courses.

Circular 72 Winter Irrigation for Western Kansas.

LIVESTOCK PRODUCTION

Bulletin 78 Selection and Care of Beef Cattle.

1935 & 1936 Beef Cattle Investigations.

Circular 148 Farm Dairying.

Bulletin 67 Kansas Dairy Calf Management.

" 240 Sheep Production in Kansas.

" 243 Equipment for Pig Production.

Circular 46 Profitable Pig Production.

SORGHUM ENTERPRISE

Bulletin 265 Sorghum Production in Kansas.

" 266 Varieties of Sorghum in Kansas.

Circular 170 Growing Combine Grain Sorghums.

POULTRY ENTERPRISE

Bulletin 257 The Poultry Enterprise on Kansas Farms.

" 256 Farm Production and Consumption of Poultry in
Kansas.

Circular 178 Poultry Management.

MACHINERY

The Operation, Care and Repair of Farm Machinery, 10th Edition.

Published by John Deere & Co., Moline, Illinois.

GRASSES FOR PASTURE

- Bulletin 253 Tame Pastures in Kansas.
" 272 Management of Kansas Permanent Pastures.
" 271 Pasturing Winter Wheat in Kansas.

ALFALFA ENTERPRISE

- Bulletin 242 Alfalfa Production in Kansas
Circular 73 Growing Alfalfa in Western Kansas.
Biennial Report No. 29 "Insects Injurious to Alfalfa in Kansas.

GARDEN ENTERPRISE

- Circular 64 The Home Vegetable Garden.
" 101 A Garden Guide for Farm and Town.
Bulletin 77 Controlling Garden Pests.

SMALL GRAINS

- Bulletin 166 Spring Grains.

CORN ENTERPRISE

- Bulletin 227 Varieties of Corn in Kansas
" 250 A Report of the Tribune Branch Agricultural
Experiment Station.
Circular 72 Corn Seed Treatment--Does It Pay In Kansas?
Volume 48, No. 191 - Corn in Kansas.

SILOS AND SILAGE

- Circular 94 Inexpensive Silos for Kansas
" 139 Filling Silos.
Volume V, No. 14 - The Pit Silo for Western Kansas.

List of FARMERS BULLETINS, United States Department
of Agriculture.

WHEAT ENTERPRISE

	Number
Varieties of Hard Winter Wheat. - - - - -	1385
Stored Grain Pests. - - - - -	1260

SOIL CONSERVATION

Pumping from Wells for Irrigation. - - - - -	1404
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LIVESTOCK PRODUCTION

Beef Production on the Farm. - - - - -	1592
Breeds of Beef Cattle. - - - - -	612
The Beef Calf, Its Growth and Development. - - - - -	1135
Judging Beef Cattle. - - - - -	1068
Milk For The Family. - - - - -	1705
Production of Clean Milk. - - - - -	602
Feeding Dairy Cows. - - - - -	1626
Feeding, Care & Management of Young Dairy Stock. - - - - -	1723
Parasites and Parasitic Diseases of Sheep. - - - - -	1330
Breeds of Swine. - - - - -	1263
Diseases, Ailments, and Abnormal Conditions of Swine. - - - - -	1244

SORGHUM ENTERPRISE

Milo a Valuable Grain Crop. - - - - -	1147
Harvesting Grain Sorghums. - - - - -	1577

FARM MANAGEMENT

	Number
Analyzing the Farm Business. - - - - -	1139
Selecting a Farm. - - - - -	1088
Farm Bookkeeping. - - - - -	511
The Family Living From the Farm. - - - - -	1338
Beautifying the Farmstead. - - - - -	1087

POULTRY ENTERPRISE

Farm Poultry Raising. - - - - -	1524
Feeding Chickens. - - - - -	1541
Feeding Hens for Egg Production. - - - - -	1067
Selecting Hens for Egg Production. - - - - -	1727
Diseases of Poultry. - - - - -	1337
Mites and Lice on Poultry. - - - - -	801
Turkey Raising. - - - - -	1409
Duck Raising. - - - - -	697
The Guinea Fowl. - - - - -	1391

MACHINERY

Combine Harvester and Thresher. - - - - -	1608
An Appraisal of Power Used on Farms in the U.S.- - - - -	1348
Choosing a Tractor. - - - - -	1300
Shall I Buy a Combine. - - - - -	1565
Tractor Flowing. - - - - -	1045
Shall I Buy A Tractor. - - - - -	1299

GRASSES FOR PASTURE

	Number
Important Cultivated Grasses. - - - - -	1254
Conservation of the Western Range - W. R. Leaflet.- - - - -	103

GARDEN ENTERPRISE

The Farm Garden. - - - - -	1673
Diseases and Insects of Garden Vegetables. - - - - -	1371

PLANT AND ANIMAL IMPROVEMENT

The Propagation of Plants.- - - - -	157
Improving Dairy Herds, Leaflet No. 19.	

SMALL GRAINS

Cultivation and Utilization of Barley. - - - - -	968
Growing Rye in the Western Half of the U.S. - - - - -	1358

SILOS AND SILAGE

The Making and Feeding of Silage. - - - - -	578
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The teachers are unanimous in the report of a shortage on reference material in the form of supplementary text books for agriculture teaching.

Below is a short list of references, found mentioned in the outlines received from the teachers.

Davis, Kary Cadmus. The New Agriculture. Chicago,
J. B. Lippincott, 1933. 495p.

Plumb, Charles S. Types and Breeds of Farm Animals. Chicago,
Ginn & Company, 1906. 563p.

Lippincott, William Adams. Poultry Production.
Philadelphia & New York, Lea and Febiger, 1916. 499p.

Gray, Carl Warren. Principles and Practicing of Judging Livestock.
New York, Macmillan Co., 1916. 413p.

Henry, W. A. and Morrison, F. B. Feeds and Feeding. Ithaca,
New York, Henry-Morrison Company, 1929. 440p.

Bailey, L. H. Manual of Gardening. New York,
Macmillan Company, 1917. 541p.

Georgia, Ada E. A Manual of Weeds. New York,
Macmillan Company, 1914. 593p.

Wilson, A. D. Warburton, C. W. Field Crops. St. Paul,

Webb Publishing Company, 1912. 544p.

Hunt, Thomas Forsyth. Burkett, Charles William. Soils and Crops.

New York, Orange Judd Company, 1913. 541p.

Warren, G. F. Elements of Agriculture. New York,

Macmillan Company, 1934. 434p.

Waters, Henry J. Elliff, Joseph D. Agriculture Laboratory

Exercises And Home Projects Adapted To Secondary Schools.

Chicago, Ginn and Company, 1925. 211p.

Chapter IV

Summary and Generalizations

Derived from the body of the thesis: The Agriculture teachers, County Agricultural Agents, County Home Demonstration Agents, Master Farmers and Experiment Station Supervisors emphasize study of the problems of soil conservation, with the proper use of farm machinery in tillage practices, the selection and production of crops that are drouth resistant, the utilization of adapted crops by livestock production for the maintenance of agricultural pursuits in western Kansas, as presented in Chapter III, pages 18-51.

Each of the sources mentioned above gives this suggestion in the arrangement of outlines for the order of teaching the subject matter in high school classes, to teach in the "order of performance of farm operations." This means that the presentation of the subject matter should be in the same order that the farmer follows in planning and conducting his farming operations. That is, pupils should be trained to think or work through a problem in the same order that the farmer must use in planning and operating his farm. This may be applied not only to the outline for the subject, but also to the recitation or group of recitations on each topic studied. Each recitation should be a clear cut definite problem whose solution is worth seeking. That is, the problem must be real and

tangible to be valuable and interesting. When a problem has practical features that apply to actual farm situations the pupils will obtain interest and pleasure in obtaining its solution. Thus the problems should be drawn from actual practice rather than from an artificial order or plan. This is clearly evident in Chapter III, pages 18-51.

The following statements are general objectives found in the organization of content materials. The meaning of objectives as here used is, as those concepts which are set up for pupils to achieve:

To develop an understanding and an appreciation of agriculture as an industry.

To help the pupil realize that agriculture is a science and depends upon the proper application of scientific principles.

To aid the pupil in interpreting his environment as related to the growth of plants and animals.

That the pupil may know how to provide proper soil conditions for the growth of plants.

To acquire an intelligent appreciation of the cost, effort, and equipment necessary for the production and distribution of food products.

That the student may know common breeds of domestic animals and varieties of farm crops.

That the student may know how to select good animals and best varieties of crops.

The ability to control insect injury to plants and animals.

The ability to control the common diseases of plants and animals.

To cultivate the ability to use current Federal and State bulletins for research and to apply the knowledge so gained.

Suggestions for Agriculture teachers by the author: A proper sense of balance and proportion should be maintained by the teacher in planning the work. Methods of management and of work in care and feeding of livestock are of more importance than matters of classification. Thus while it is of importance to know the breeds of beef cattle, it is of much more importance that the pupil understand the principles and practices of feeding, of producing high quality beef for the various markets. Also, while it is important to know the types and varieties of wheat, it is of much more importance that the pupil understand the proper use of farm machinery and tillage practices in the production of wheat. Further, while it is of importance to know the breeds of dairy cattle and their characteristics, it is of more importance that the pupil understand the principles of feeding for milk production, of producing clean milk, and of raising good dairy calves.

Certain general principles of breeding and improvement of animals and plants should be referred to and discussed when they apply to the definite part of a problem as a feature of the problem under consideration. Later, after having been used in this way for several illustrations the principles of breeding may be studied more in detail as outlined in the unit on "Plant and Animal Improvement."

Regardless of what methods a teacher may use the teacher should become acquainted with the actual agricultural operations of his locality. One desirable method of the teacher's becoming acquainted with the agricultural practices of the community and of assisting pupils to connect and apply the teaching in school with the farm practice at home is to have individual members of the class make a survey of the practice on their farm for a report. Surveys should be made for the leading crops and livestock produced in the community. The survey questions should be prepared by the teacher and placed in the hands of the pupils who should collect the information to be used for comparison during class discussions.

Bibliography

Davis, Marshall Benjamin. Agricultural Education in the
Public Schools. Chicago, The University Press, 1912. 163p.

Contains a bibliography of special help on the
broad aspects of the subject.

Stewart, Rolland Maclaren. Teaching Agricultural Vocations.
New York, John Wiley and Sons, Inc., 1927. 377p.

A general basic survey of problems pertaining to
the organization in agriculture teaching.

Storm, Ashley V. and Davis, Kary C. How To Teach Agriculture.
Philadelphia, J. B. Lippincott Company, 1921. 434p.

A general reference helpful for organizing a
course of study in agriculture.

U.S. Office of Education. List of Courses of Study for
Elementary and Secondary Schools. Washington,
Government Printing Office, 1930-1936. 46p.

(Circular Number 139 Washington, D.C.)

List of recent courses of study for elementary and
secondary schools. This is helpful in finding
courses of study.