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TEACHING LANGUAGE
THROUGH AGRICULTURE AND
DOMESTIC SCIENCE

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CONTENTS

	Page.
Letter of transmittal	5
The rural-school problem	7
General principle of reorganization and correlation	8
Language exercises in rural schools	9
Rural-school libraries	14
I. Books of reference	15
II. Farmers' bulletins	16
III. Supplementary readers	18
Correlation subject lists	20

LETTER OF TRANSMITTAL

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, D. C., July 16, 1912.

SIR: One of the most difficult problems of modern school practice is how to prevent overcrowding the curriculum, breaking up the school day into small fragments of time devoted to disconnected tasks, and dissipating the energies of the children to such an extent that the process of education is hindered rather than helped by our attempts to enrich and modernize the courses of study.

The solution of the problem lies in a closer correlation of subjects and especially of formal subjects with content subjects, and it is fortunate that when the correlation is well made both subjects can be better taught and in less time than either alone. This is especially true of language, the most effective learning of which comes, in the elementary grades, as a by-product of the right study of content subjects.

How to teach language through the study of agriculture and domestic science is the theme of the accompanying manuscript by Prof. M. A. Leiper, of the Western Kentucky State Normal School. Prof. Leiper has chosen his content subjects wisely, since our language and those from which it has most freely borrowed had their origin and development in the country and the home. The primitive meanings of most of the most familiar and useful words of the vocabulary of the child can be traced back to the primitive home and to the field and forest. Only by making these primitive and fundamental associations for itself can the child gain such real mastery of the primary and objective meanings of words as will enable it easily to trace and understand secondary and derived meanings.

I recommend the publication of this manuscript as a bulletin of the Bureau of Education, because of the help it will give to teachers in the elementary and grammar grades, and especially to those in rural schools.

Respectfully submitted.

P. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

TEACHING LANGUAGE THROUGH AGRICULTURE AND DOMESTIC SCIENCE

[NOTE.—The following paper is not presented as a complete course in literature, and it is not concerned with the study of the structure of language in the form of English grammar. It is intended as a practical aid to rural teachers along a definite line which is clearly described in the text. Its import is positive—not negative. If any study or topic is omitted, it is not to be considered on that account that the Bureau of Education recommends the elimination of that study or topic from the course of study.—EDITOR.]

THE RURAL-SCHOOL PROBLEM

The city schools of our land have done much to prepare the children whom they serve for the life they are to live. The many-sided life of the city man or woman is in general well provided for by the various phases of industrial work that find a place in the curricula of many city and town schools. The rural school should serve the needs of the country child equally as well, and should endeavor, as far as means and opportunity are afforded, to introduce instruction along those lines that will instill in the child a love and appreciation of rural life, and should assist other agencies in giving him a fundamental knowledge of the great realm of nature about him and the leading facts necessary to a successful conduct of the farm. If education is, as it has been often defined, "a preparation for life," the foregoing statement can not be controverted, and doubtless no one would desire to contest it.

The chief office, then, of the rural school, in addition to giving the child the fundamental instruction in reading, arithmetic, geography, etc., is to develop a deep and reverent appreciation of nature, and to give a fundamental knowledge of that body of facts by which man may make nature yield the greatest possible amount of food and clothing for sustenance and comfort.

The teacher in the rural school undertakes a difficult task when he attempts to lift his school to the standard outlined. The consolidated school may attack the problem with reasonable hope of solution, but for the teacher in the one-room rural school, confronted with the necessary schedule of from 20 to 30 classes each day, the situation

is far more serious. For him the solution must be found largely in correlating the necessary instruction in the practical fields of nature study, agriculture, and domestic science, with the work in the subjects already in the course, and in a reorganization and redirection of the subject matter taught in those subjects. The new instruction does not demand new classes; it is to be given, for the most part, in the classes already provided in the present curriculum. As Bailey says, "It is a point of view asserting itself. It is an *attitude* toward life and expresses itself in a *way* of teaching. Its spirit will eventually pervade and vitalize all school work."

This standard can not, of course, be reached unless the rural teacher is imbued thoroughly with the idea of directing the instruction in the rural schools along more practical lines and is capable of giving the instruction necessary. Public opinion is fast crystallizing to this end. Laws are making this attitude on the part of the rural teachers more necessary than ever before, and are demanding that they be prepared to impart in their instruction the fundamentals at least of these practical subjects. Normal schools generally are placing in their courses required training in these subjects, and the time seems not far distant when all States will demand such training of all teachers that give instruction in rural schools.

GENERAL PRINCIPLE OF REORGANIZATION AND CORRELATION

The work of adjusting or readjusting the instruction in the rural school to the needs of rural children will have to be largely through a reorganization of the subject matter in the old subjects, through a correlation of necessary instruction in nature study, agriculture, and domestic science with that in all the old subjects, and in approaching all subjects in the rural school from a new and different viewpoint. A few illustrations will serve to make the idea clear.

Many of the principles found in the ordinary textbooks in arithmetic should be omitted and practically all of the problems should be restated. The ideal text for the rural school should emphasize such principles as are needed from time to time in the daily life on the farm and in the farmer's business affairs with the outside world; the problems set for solution should be very practical in nature.

In physiology and hygiene the rural-school teacher should teach, among other things, the sanitation of the home in regard to pure water supply, cleanliness in dairy, outhouses, back yards, the protection of food from flies, fumigation and disinfection in case of contagious diseases, etc. Instruction should also be given in the causes and method of prevention of tuberculosis, typhoid fever, and other preventable diseases.

No subject in the public-school curriculum lends itself so easily and effectively to the scheme of correlating with the regular work these

practical nature and farm-life subjects as does language work. Every child in the rural school has his language lesson every day throughout the eight years of his public-school life. Subjects for these language lessons must be chosen by the teacher, and they must be closely related to the child's life and interests if the work is to be interesting and effective.

No better or more attractive source from which these subjects may be chosen can be found than the realms of nature study, agriculture, and domestic science. From these sources most of the subjects for both oral and written language, or composition work, should be drawn. Subjects chosen from these fields are interesting because they are real and vital in the child's life. In talking and writing about the attributes, relations, and activities of objects in the world about him, such as birds, insects, plants, etc., the child, in addition to gaining valuable information, is adding to his language equipment words that are not meaningless, but words that are really "signs of ideas." This can not be the case when subjects foreign to the life and interests of the child are used in language work. Subjects like "Virtue has its rewards" and "Honesty is the best policy" are likely to be fatal to interest in composition work.

Many of the new activities introduced into rural life in connection with agricultural and domestic science offer a great abundance of material for correlation work. Boys' corn clubs and girls' canning clubs afford many desirable subjects, as will be shown later, for narration, description, and exposition. School gardens and experimental plots, as well as experiments in baking bread, cooking meat, etc., also furnish valuable material for language lessons. The choice of poems to be memorized should be largely those touching nature, while subjects for argument in the language recitation and for debate in the literary society should be taken from nature and rural life. The school library should contain as many of the Farmers' Bulletins issued by the United States Department of Agriculture on practical farm-life subjects as may be of use from time to time in assisting both teacher and pupils in doing investigation work. It should also contain a good work on agriculture, one on nature study, and one on domestic science. For list of such bulletins and books see pages 15-30.

The following paragraphs give some practical suggestions as to the choice of subject matter for oral and written composition work in the rural school:

LANGUAGE EXERCISES IN RURAL SCHOOLS

1. *Conversation exercises.*—The first language exercise attempted in the first grade, and one used in the first three grades as a regular exercise, is free conversation. In this the teacher elicits statements from the children in answer to simple and skillful questions about matters

closely related to the interests of their everyday life. Rural life affords abundant material for subjects in which the children will readily become interested. Pictures of animals and farm scenes may be used here as a basis for these exercises. A list arranged by grades may be found under "Description," page 11.

2. *Observation reports.*—This work should be done in all of the grades, increasing in intensity and in detail from grade to grade. A subject connected with nature or farm-life activities should be assigned for observation, and two or three days later an oral or written report should be required from each pupil in the class. This is a very fine language exercise, because it develops the power of seeing things, leads to the acquisition of valuable knowledge of practical rural subjects, and increases the vocabulary at a rapid rate. For children in the rural schools the field of subjects for observation is inexhaustible. For suggested lists of topics to be used in this work the reader is referred to the Correlation Subject-Lists on pages 20-30.

3. *Narration.*—After the repetition of stories has developed in the children the narrative instinct, they should be given an opportunity to relate to the class actual experiences, either of themselves or of others. This work will be, for the most part, oral, but some written work may be done in the higher grades. In the rural school these experiences will naturally be closely associated with life on the farm and in the woods. It may be a fishing or hunting trip, an observation trip in the woods to watch a mother bird feed her young or build a nest, a successful experience in bread making, or gardening, or raising chickens. The boys' corn clubs and girls' canning clubs, and experiences in conducting experimental garden plats will afford many interesting subjects for narration. The life on the farm will be found rich in material for this work and the ingenious teacher will be quick to take advantage of it.

4. *Essay.*—The essay, which is a type of composition for both oral and written work, may be used in all of the grades, beginning with the second. It gives information and discusses the salient points of the subject before the class. In the rural school the subjects for this work will, of course, be drawn largely from the life of the farm. For example, if the subject is "corn," the discussion will, among other things, likely touch upon the uses of corn as food, where grown, how cultivated and harvested, relative value as a farm crop, choice of seed corn, etc. The detail and intensity will, of course, increase with the grade in which the work is being done. Detailed help may be had from the Correlation Subject-Lists on pages 20-30.

5. *Description.*—Work in description should be done in both oral and written work from the second grade up. The oral work will, of course, predominate in the lower grades. Below the fourth grade the object described should, for the most part, be before the eyes of

the children. Rural life affords a splendid array of interesting subjects for this work.

Pictures illustrating scenes in rural life may be effectively used in this work. The following, which may be purchased at very reasonable rates from any school-supply house, are suggested for use:

Grades one, two, and three: Feeding her birds, Millet; The cat family, Adam; Plowing, Bonheur; Flock of sheep, Bonheur; The horse fair, Bonheur; The churning, Millett; The melon-eaters, Murillo; At the watering-trough, Dagnan-Bouvert; Shoeing the bay mare, Landseer; Shepherdess knitting, Millet; Family cares, Bonheur; The gleaners, Millet; The haymakers, Dupré; The escaped cow, Dupré; Greedy calves, Weber; Blessing the fields, Breton; The highland shepherd's home, Landseer.

Grades four, five, and six: The village blacksmith, Taylor; Sheep shearing, Millet; Highland cattle, Watson; A pair of nutcrackers, Landseer; The song of the lark, Breton; Road through the woods, Corot; A heavy load, Morgan.

Grades seven and eight: Oxen going to work, Troyon; Oxen plowing, Bonheur; Windmill, Ruysdael; Angelus, Millet; Labor, Millet; The sheepfold, Jaque; The brookside, Hart; Miraculous draught of fishes, Raphael.

6. *Exposition.*—Exposition in its widest application includes any kind of explanation or elaboration of a proposition or subject. This would include the Essay and Observation Reports outlined above. As used here it is the arrangement in logical sequence of the different steps in a process. It is difficult because it demands logical reasoning and accurate memory, and for this reason should be employed only from the fifth grade up. It may be used in both oral and written work with such themes as The preparation of the soil; How a bird builds a nest; How to clean a room, etc.

7. *Memorizing poems and gems.*—Memorizing poems and literary gems should be carried on in all of the grades. The selections should be recited orally for the most part, but occasionally they may be written from memory. In the lower grades the memorizing should be done by hearing the poem read or repeated by the teacher; in the higher grades it may be done from the printed page. In the rural school, choice of selections should be given largely to poems touching rural life activities. The following is a graded list of poems suggested for use in the rural school:

Grade one: The cow, R. L. Stevenson; The little plant, Kate Brown; November, Alice Cary; Come, little leaves, George Cooper; Little birdie, Tennyson; The busy bee, Isaac Watts; Mother Goose rhymes: Blow wind, blow, Little robin redbreast, Little cock sparrow.

Grade two: The bee and the flower, Tennyson; Daisies, Frank D. Sherman; The hayloft, R. L. Stevenson; How the leaves come down, Susan Coolidge; Robin redbreast, William Allingham; Milking time, Christina Rossetti; Winter time, R. L. Stevenson.

Grade three: To a butterfly, Wordsworth; The snowdrop, Tennyson; The oak tree, Mary Howett; The kitten and the falling leaves, Wordsworth; The flight of the birds, E. C. Stedman; The voice of the grass, Sara Boyle; September, Helen Hunt Jackson.

Grade four: The frost spirit, Whittier; The first snow-fall, Lowell; The gladness of nature, Bryant; The owl, Tennyson; The song of the brook, Tennyson; The village blacksmith, Longfellow; The pet lamb, Wordsworth; Evening at the farm, J. T. Trowbridge.

Grade five: The brook song, James Whitcomb Riley; The corn song, Whittier; The planting of the apple tree, Bryant; Woodman, spare that tree, G. P. Norris; Hunting song, Coleridge; The ivy green, Charles Dickens; Going a-nutting, E. C. Stedman; Sweet peas, Keats.

Grade six: The daffodils, Wordsworth; The huskers, Whittier; October, Bryant; To autumn, Keats; God's presence in nature, Thomas Moore; Song of the river, Charles Kingsley; The humble-bee, Emerson.

Grades seven and eight: The snowstorm, Emerson; Reaper and flowers, Longfellow; The chambered nautilus, Holmes; Snow-bound, Whittier; A forest hymn, Bryant; The last leaf, Holmes; To a mountain daisy, Burns; To the skylark, Shelley.

In the same way from 10 to 15 literary gems should be taught the children in each grade every year. The following, touching upon rural life, are simply suggestive:

In contemplation of created things
By steps we may ascend to God.—Milton.

Nature makes her happy home with man
Where many a gorgeous flower is duly fed,
With its-own rill, on its own spangled bed.—Coleridge.

The green earth sends its incense up
From every mountain shrine—
From every flower and dewy cup
That greeteth the sunshine.—Whittier.

How blest the farmer's simple life!
How pure the joy it yields!
Far from the world's tempestuous strife,
Free 'mid the scented fields.—Everest.

O happy if ye knew your happy state,
Ye rangers of the fields! whom nature's boon
Cheers with her smiles, and ev'ry element
Conspires to bless.—Somerville.

8. *Letter writing.*—Beginning with the simplest letter form in the second grade, the writing of letters should be kept up consistently as a language exercise through all the remaining grades. Not only should social, business, and various other kinds of letters be written, but it is the form in which narration, essay, description, and exposition should be written at least half of the time below the sixth grade. Actual correspondence with relatives and friends should be encouraged among the children and directed carefully by the teacher. A cooperative class letter should be written occasionally by the upper grades to the corresponding grades in a neighboring school. These letters will naturally have to do with rural life and its activities, and the suggested subjects for the foregoing types of language work will serve to assist the teacher to direct the work along the lines adapted to the needs of the rural child.

9. *Argument or debate.*—Beginning in the fourth grade and continuing through the remaining grades a very effective language exercise, used in both oral and written work, is the simple argument, or debate. In the beginning two or three statements will be the extent of the remarks, perhaps, but in the seventh and eighth grades short, logically connected talks or written papers may be expected. This work leads directly to the literary and debating society, which every school should maintain. The subjects chosen for this work should for the most part touch rural life and its activities. The following subjects will be suggestive:

- Life in the country is to be preferred to that of the city.
- Corn is a more profitable crop than cotton (or wheat, etc.).
- Birds are more injurious to farm crops than insects.
- The house fly is more injurious to the human race than smallpox.
- Strawberries are more profitable than the orchard.
- It is more difficult to cultivate corn than tobacco.
- The elm is a prettier tree than the oak.

10. *Verse writing.*—Beginning perhaps in the fifth or sixth grade the child should be given an opportunity to express in words the music and poetry in his soul. Reading and memorizing poetry in the lower grades will serve to develop the natural instinct for rhythm and euphony in language, and there will be much unconscious borrowing of beautiful phraseology. This acquisition should become a fixed language possession. Rural life affords a splendid array of subjects for this work. The falling of the leaves, the singing of the birds, the cows grazing in the pasture by the brook, the trees swaying in the wind, the snowstorm, etc., are suggestive subjects. The teacher will be surprised at the results of this work. The following verse was written by a child in the primary grades of the Chicago schools:

DAFFODILS

Pretty, yellow daffodils,
 Growing thick upon the hills;
 Above your head the birds do fly,
 Looking up against the sky;
 And voices far and near
 Birds and children sing with cheer,
 For the yellow daffodils,
 Growing on the green-clad hills
 Mean Spring, Spring, Spring.

11. *Talks from outlines.*—In the last three grades the pupils in the language classes should be encouraged to make short talks before the class from outlines on matters of general interest touching rural-life activities. Occasionally the pupils in the eighth grade should make these talks to the whole school. In the rural school such subjects as the following may be chosen for this purpose: The value of birds to a community; How plants absorb moisture and food from the soil; The Babcock milk test; Testing cows for tuberculosis; Boys' corn clubs and what they have accomplished; The death toll of preventable diseases.

12. *Diary.*—Good language training in expressing thought in concise phraseology may be given by having the children keep in a small blank book a record of events and observations about matters in which they are interested. These records, in the case of children in the rural school, will cover such subjects as observations of weather conditions, growth of plants in school or home experimental garden plats, various experiences connected with corn and canning clubs, records of expense and profits in raising poultry, vegetables, etc. These little books should be inspected by the teacher every two or three weeks, and careful directions should be given as to the best method of keeping them.

RURAL-SCHOOL LIBRARIES

In every rural school library there should be a collection of books of reference, supplementary readers, and bulletins issued by the State Agricultural College and by the United States Department of Agriculture that may be of assistance to both teacher and pupils in doing investigation work along the practical lines suggested in this pamphlet. Three or four reference books on agriculture, nature study, and domestic science will be sufficient for practical work. The following lists of books, bulletins, and supplementary readers are given that rural school-teachers and school authorities may select from them such material as may be deemed best suited to their needs. They may be ordered through any book jobber or from the publishers. A considerable discount from the publishers' list prices is given when purchases are for school library purposes.

I. BOOKS OF REFERENCE

AGRICULTURE

Agriculture for beginners. Burkett, Stevens, and Hill.
 First principles of agriculture. Goff and Mayne.
 Agriculture for common schools. Fisher and Cotton.
 Principles of agriculture. Bailey.
 Practical agriculture. Wilkinson.
 Corn plants: Their use and ways of life. Sargeant. Discusses wheat, oats,
 rye, barley, rice, and corn.
 Plant breeding. Bailey.
 The soil. King.
 Chemistry of soils and fertilizers. Snyder.
 How to make school gardens. Hemenway.
 Types and breeds of farm animals. Plumb.

NATURE STUDY

Nature study and life. Hodge.
 Practical nature study. Coulter-Patterson.
 Nature study for grammar schools. Jackman.
 Nature study in the elementary school. Wilson.
 Nature studies on the farm. Keefer.
 Nature study. Cummings. Three books: Primary grades, lower grammar
 grades, and higher grammar grades.
 Introduction to botany. Spalding.
 Familiar animals. Monteth.
 Birds in their relation to man. Weed and Dearborn.
 Birds through the year. Gilmore.
 Bird world. Stickney.
 Tenants of the trees. Hawkes.
 Half hours with fishes, reptiles, and birds. Holder.
 Stories of insect life. Weed.
 Ants, bees, and wasps. Lubbock.
 Ways of the six-footed. Botsford.
 A primer of forestry, Parts I and II. Gifford Pinchot. (Sent free by
 United States Department of Agriculture.)
 Common minerals and rocks. Crosby.

DOMESTIC SCIENCE

Domestic science in elementary schools. Williams.
 Handbook of domestic science and household arts, for use in the elemen-
 tary schools. Wilson.
 The healthful farmhouse. Dodd.
 Home problems from a new standpoint. Hunt.
 Household management. Terrill.
 Household hygiene. Elliott.
 Sanitation in daily life. Richards.
 Food and dietetics. Norton.
 Home care of the sick. Pope.
 Drinking water and ice supplies. Pruden.
 Cleaning and renovating the home. Osman.
 Chemistry of food and nutrition. Shernian.
 Till the doctor comes. Hope.
 Dust and its dangers. Pruden.
 Textiles and clothing. Watson.

II. FARMERS' BULLETINS

The following bulletins, issued by the United States Department of Agriculture, will be sent free on request. Letters should be addressed to the Secretary of Agriculture, Washington, D. C.

CORN

- Bulletin No. 199. Corn growing.
 229. The production of good seed corn.
 253. Germination of seed corn.
 272. A successful seed corn and hog farm.
 298. Food value of corn and corn products.
 303. Corn harvesting machinery.
 313. Harvesting and storing corn.
 409. School lessons on corn. (Very fine; contains a full bibliography of books and bulletins on subjects connected with corn.)

DAIRYING AND THE DAIRY HERD

- Bulletin No. 32. Silos and silage.
 42. Facts about milk.
 55. The dairy herd.
 63. Care of milk on the farm.
 106. Breeds of dairy cattle.
 114. Skim milk in bread making.
 241. Butter making on the farm.
 166. Cheese making on the farm.
 348. Bacteria in milk.
 363. The use of milk as food.
 413. The care of milk and its use in the home.

POULTRY

- Bulletin No. 41. Poultry, care and feeding.
 51. Standard varieties of chickens.
 64. Ducks and geese.
 141. Poultry raising on the farm.
 182. Poultry as food.
 200. Turkeys, varieties and management.
 287. Poultry management.

FARM ANIMALS

- Bulletin No. 55. The dairy herd.
 90. Raising sheep for mutton.
 100. Breeds of dairy cattle.
 150. Shear-in sheep.
 170. Principles of horse feeding.
 179. Horseshoeing.
 206. Pig management.
 Circular No. 23. Agricultural Experiment Station, Madison, Wis., A catechism on bovine tuberculosis.

POTATOES

- Bulletin No. 35. Potato culture.
56 and 316. Potato scab.
91. Potato diseases.
251 and 320. Potato spraying.
205. Potatoes as food.

INSECTS ON THE FARM

- U. S. Department of Agriculture, Bureau of Entomology:
Circular No. 16. The larger corn stalk borer.
67. The clover root borer.
73. The plum curculio.
84. The grasshopper problem.
87. The Colorado beetle (potato bug).
92. Mites and lice on poultry.
98. The apple tree tent caterpillar.
Bulletin No. 99. Three insect enemies of shade trees.
132. Insect enemies of growing wheat.
196. The usefulness of the American toad.
275. The gypsy moth.
284. Insect enemies of the grape.

HORTICULTURE

- Bulletin No. 87. Orchards, cover crops, and cultivation.
113. The apple and how to grow it.
154. The home fruit garden.
181. Pruning.
198. Strawberries.
213. Raspberries.
283. Spraying for apple diseases.
203. Use of fruit as food.

WEEDS.

- Bulletin No. 28. Weeds, and how to kill them.
80. Thirty poisonous plants.
Wisconsin Agricultural Experiment Station, Madison:
Bulletin No. 179. The eradication of farm weeds with iron sulphate.
Circular No. 19. The control of quack grass.

SCHOOL AND HOME GARDENS

- Bulletin No. 154. The home fruit garden.
218. School gardens.
255. The home and vegetable garden.

GENERAL

- Bulletin No. 44. Commercial fertilizers.
85. Fish as food.
120. Practical suggestions for farm buildings.

- Bulletin No. 134. Tree planting on rural school grounds.
 256. Preparation of vegetables for the table.
 270. Modern conveniences for the farm home.
 342. Cooking beans and other vegetables—a model kitchen.
 343. Cultivation of tobacco in Kentucky and Tennessee.
 317. The farm home.
 345. Some common disinfectants.
 332. Nuts and their uses as food.
 389. Bread and bread making.
 375. Care of food in the home.
 459. House flies.
 468. Forestry in nature study.

III. SUPPLEMENTARY READERS

FIRST GRADE

- Little nature studies for little people. Burt. 25 cts.
 Pathways in nature and literature, First reader. Christy and Shaw. 25 cts.
 Nature's byways. Ford. 36 cts.
 Pets and companions. Stickney. 30 cts.
 Hours with nature, Book One. Amy Kahn. 20 cts.
 Seaside and wayside, Book One. Wright. 25 cts.
 The earth and sky, No. I. Stickney. 30 cts.
 The sunshine primer. Noyes and Guild. 40 cts.

SECOND GRADE

- Animal fables. Stafford. 30 cts.
 First year nature primer. Beebe and Kingsley. 35 cts.
 A boy on a farm. Abbott. 45 cts.
 Seaside and wayside, Book Two. Wright. 35 cts.
 Second science reader. Nelson-Verden. 30 cts.
 Plant life. Bass. 5 cts.
 From September to June with nature. Warren. 35 cts.
 Hours with nature, Book Two. Kahn. 25 cts.
 Pathways in nature and literature, Second reader. Christy and Shaw.
 30 cts.
 Friends and helper. Eddy. 60 cts.
 Bird world. Stickney and Hoffman.

THIRD GRADE

- Stories of country life. Bradish. 40 cts.
 Animal life. Bass. 35 cts.
 Leaves and flowers. Spear. 25 cts.
 Merry animal tales. Bingham. 50 cts.
 Our birds and their nestlings. Walker. 60 cts.
 Some useful animals. Monteth. 50 cts.
 Stories of humble friends. Pyle. 50 cts.
 The world at work in field and pasture. Dutton. 35 cts.
 The earth and sky, No. II. Stickney. 30 cts.
 Nature myths of many lands. Farmer. 45 cts.
 Fables in feathers. Bourke. \$1.

FOURTH GRADE

Outdoor secrets. Boyle. 35 cts.
The first book on birds. Walker. 60 cts.
Plants and their children. Dana. 65 cts.
Chapters on animals. Hamerton. 20 cts.
Animals at home. Bartlett. 45 cts.
Friends in feathers and fur. Johonnot. 45 cts.
Ten common trees. Stokes. 40 cts.
Short stories of our shy neighbors. Kelly. 50 cts.
Geographical nature studies. Payne. 25 cts.
Senside and wayside. Book Three. Wright. 45 cts.
Through the year. Clyde and Wallace. Book I: September to January.
36 cts.; Book II: February to June, 33 cts.

FIFTH GRADE

Three little lovers of nature. Ware. 30 cts.
True tales of birds and beasts. Jordan. 40 cts.
My Saturday bird class. Miller. 25 cts.
The trail of the woods. Hawkes. 40 cts.
Seed travelers. Weed. 25 cts.
Neighbors with wings and fins. Johonnot. 40 cts.
Stories of animal life. Holder. 60 cts.
The earth and sky, No. 111. Stickney. 35 cts.
Half hours with fishes, reptiles, and birds. Holder. 60 cts.

SIXTH GRADE

Some curious flyers, creepers, and swimmers. Johonnot. 40 cts.
Neighbors with claws and hoofs. Johonnot. 54 cts.
Birds through the year. Gilmore. 50 cts.
The little water folks. Hawkes. 75 cts.
Outdoor studies. Needham. 40 cts.
Reading in nature's book. Cathcart. 65 cts.
Popular science reader. Monteth. 75 cts.
The bird book. Eckstorm. 60 cts.
Travels of a waterdrop, and others. Morris. 35 cts.

SEVENTH AND EIGHTH GRADES

Nature studies on the farm. Keefer. 40 cts.
Senside and wayside. Book Four. Wright. 50 cts.
The story of the birds. Baskett. 65 cts.
Home studies in nature. Trent. 90 cts.
Half hours with fishes, reptiles, and birds. Holder. 60 cts.
Trees in prose and poetry. Stone and Fickett. 45 cts.
Half hours with lower animals. Holder. 60 cts.
How the world is fed. Carpenter. 60 cts.
How the world is clothed. Carpenter. 60 cts.
Chapters on plant life. Herrick. 60 cts.
Door-yard folks. Harris. \$1.

CORRELATION SUBJECT LISTS

The following outlines are presented, grade by grade, that the rural teacher may have, in the correlation of practical rural-life subjects with language work, a source from which he may draw or to which he may add such topics as may appeal to his pupils and suit local conditions. They are arranged by grades to avoid unnecessary repetition and confusion. The writer does not intend that any teacher shall follow this outline slavishly. Below the seventh grade, any of the subjects suggested may be used in any of the grades, provided the intensity, extent, and details be gauged to suit the advancement of the class.

GRADE ONE

I. AGRICULTURE

1. Farm crops.
 - a. Corn—planting, gathering.
 - b. Cotton—planting, picking.
2. Garden and orchard.
 - a. Apple—uses as food, storing for winter, gathering.
 - b. Beans—planting, uses, canning.
3. Domestic animals.
 - a. Cow—feeding, watering, housing, uses, value.
 - b. Horse—uses, feeding, value.
4. Miscellaneous.
 - a. Farm implements: Hoe, rake, plow, as to uses, appearance, etc.
 - b. Weeds: The most common good and bad ones in relation to farm activities.

II. NATURE STUDY

1. Animals.
 - a. Dogs—traits, uses, care, kinds.
 - b. Birds: Robin, bluebird, chickadee, chipping sparrow, English sparrow, crow; as to appearance, habits, song, good or bad for community.
 - c. Frogs and salamanders: Tree frog, toad, red and green newts; as to food, habits, appearance, habitat.
 - d. Fishes: Sunfish, goldfish, shiners; as to food, appearance, where found, relative value as food.
 - e. Miscellaneous: Snakes, turtles; as to kinds, appearance, habits, place of living.
2. Plants.
 - a. Wild flowers: Arbutus, anemone, goldenrod, dandelion, aster, blueets, burdock, buttercup, milkweed, poison ivy, oxeye daisy; as to appearance, uses, good or bad.
 - b. Garden: Radishes, onions, rhubarb; studied simply as plants as suggested above.
 - c. Fruit: Peach, plum; studied as a tree and fruit and not as a farm product.
 - d. Trees: Soft maple, chestnut; as to appearance, shape of leaves, kind of bark, character of wood.
 - e. Flowerless plants: Ferns, few kinds discussed as to appearance, etc.
3. General.
 - a. Frost—how formed, effect on plant-life, what plants resist its blighting power.

III. DOMESTIC SCIENCE

1. The home—Its purpose; what does father do; mother; brothers; sisters? How do you help?
2. Interior of the home—Uses, furnishings; methods of cleaning with brooms, dusters, carpet sweepers, vacuum cleaners, damp cloth; care of clothing.
3. Heating of home—Kinds of fuel; source and supply of wood, coal, and kindling; stoves, grates, and fireplaces, and their points of advantage and disadvantage.
4. Sources of food—Garden, orchard, farm, store; how food is secured from these and in what condition.

GRADE TWO

I. AGRICULTURE

1. Farm crops
 - a. Corn—Uses as food for man and beast.
 - b. Cotton—Hoing, plowing, cultivation.
 - c. Wheat—Harvesting, thrashing.
2. Garden and orchard.
 - a. Peach—Varieties, uses as food, canning, drying.
 - b. Tomatoes—Planting, cultivation, care of plants, uses as food, canning, hotbeds for raising plants.
3. Domestic animals.
 - a. Cow—Milk and its various uses.
 - b. Horse—Uses, shoeing, girths.
4. Miscellaneous.
 - a. Farm implements—Harrow, wagon.
 - b. Fences—Kinds, methods of building, advantages of each.
 - c. Rocks—Value in fences, road building, foundations of houses, filling gulleys.

II. NATURE STUDY

1. Animals.
 - a. Domestic—Cat.
 - b. Birds—Goldfinch, blue jay, scarlet tanager, Baltimore oriole, song sparrow, snow bunting, downy woodpecker.
 - c. Frogs—Bullfrog.
 - d. Fishes—Pout, dace.
 - e. Insects—Grasshoppers, crickets, June beetles, potato beetle, elm-leaf beetle, lumpy lice, flies, polyphemus.
 - f. Miscellaneous—Rats, mice.
2. Plants.
 - a. Wild flowers—Cone flower, trillium, wild geranium, blood root, iris, tansy, poison sumac, robin's plantain, mallow, yarrow.
 - b. Garden—Lettuce, carrot, potato.
 - c. Fruit—Grapes.
 - d. Trees—Elm, oak.
 - e. Flowerless plants—Mosses.
3. General.

Snow—How formed, shape of crystals, effect on land and vegetation.
Likewise, sleet and hail.

III. DOMESTIC SCIENCE

1. The kitchen—Cleanliness in and care of; proper keeping of food in; care of stove, dampers, draft, how to make a fire, uses and purposes of oven; location of kitchen in house and why.
2. Winter food supply—What, source, methods of cooking, as boiling, baking, frying, roasting, etc.; preservation of food for winter.
3. Clothing—Kinds, texture, purposes, change and care of; summer and winter materials and source of each; primitive clothing.
4. House plants—Needs in soil and moisture, sunlight and air, favorable temperature, window boxes, identification of a few.
5. Hygiene and personal habits—Proper habits in eating and drinking, simple hygiene of nutrition, care of teeth, table manners, mastication, regularity in eating, temperance in eating and drinking.

GRADE THREE

I. AGRICULTURE

1. Farm crops.
 - a. Corn—Fodder, uses of stalks and shucks, fertilizing.
 - b. Cotton—Ginning, uses of seeds.
 - c. Wheat—Protection from pests, i. e., rust, army worm, etc.
2. Garden and orchard.
 - a. Grapes—Varieties, uses, pruning, arbors.
 - b. Turnips—Preparation of soil, sowing, uses of leaves and root as food, storing for winter.
3. Domestic animals.
 - a. Cow—Breeds, difference in appearance and milk-producing power.
 - b. Horse—Breaking and training for work.
 - c. Hogs—Feeding and care.
4. Miscellaneous.
 - a. Farm implements—Cultivator, wheat and corn drills.
 - b. Roads—Methods of building, materials used, value of good roads to the farm.

II. NATURE STUDY

1. Animals.
 - a. Domestic—Rabbit.
 - b. Birds—Barn swallow, night hawk, whippoorwill, chimney swift, humming bird, cedar bird, phoebe, chebec, junco, meadow lark.
 - c. Frogs—Leopard frog.
 - d. Fishes—Pickerel, pike.
 - e. Insects—Mourning cloak, imperial moth, meal worm, rose beetle, asparagus beetle, clothes moth, water bugs, strawberry insects, damsel fly, dragon fly.
 - f. Miscellaneous—Squirrel, chipmunk.
2. Plants.
 - a. Wild flowers—Bur marigold, cinquefoil, Solomon's seal, hepatica, chickweed, lamb's ear, bellwort, bittersweet, wild carrot.
 - b. Garden—Beets, asparagus.
 - c. Fruit—Strawberry, raspberry, blackberry.
 - d. Trees—Hard maple, horse-chestnut, hickory.
 - e. Flowerless plants—Lichens, algae.
3. General.
 - a. Rain—Benefits, how precipitated, floods, overflows and causes.
 - b. Clouds, mist, fog—What, how formed, etc.

III. DOMESTIC SCIENCE

1. The living room—Pictures, curtains, furniture, floors and floor covering, wall decorations, wall paper, cleaning.
2. Food.
 - a. Corn—Uses as food, methods of preparation and cooking.
 - b. Wheat—Same as above.
 - c. Popcorn—Food value, methods of popping, why it pops.
3. First aid to the injured—What to do in case of cuts, scratches, burns, bruises, nosebleed, nails stuck in feet, frostbite.
4. Heating of house—Proper temperature, reading of thermometer on floor, near ceiling, near heat supply, near window; most healthful methods of heating.
5. Clothing: Cotton—Where grown, cultivation, preparation for market, manufacturing processes, kind of clothing made from, thread.

GRADE FOUR

I. AGRICULTURE

1. Farm crops.
 - a. Corn—Preparation of soil, plowing, enriching.
 - b. Cotton—Uses in cloth, thread, rope, etc., where grown.
 - c. Tobacco—Cutting, methods of curing, stripping, marketing.
 - d. Sorghum—Planting, cultivation, stripping and cutting.
2. Garden and orchard.
 - a. Cherry—Varieties, uses as food, canning, bird pests.
 - b. Cabbage—Sowing, hotbeds, transplanting, cultivation, storing for winter, uses as food.
3. Domestic animals.
 - a. Hogs—Killing, salting and curing of meat, rendering of lard.
 - b. Sheep—Care, feeding, watering, salting, housing.
4. Miscellaneous.
 - a. Farm implements—Binder, mower, hay rake.
 - b. Ditches—Draining of swamps and sloughs, on hillsides to prevent erosion, for draining around house and barn.
 - c. Painting and whitewashing—Trees, fences, buildings, and outhouses.

II. NATURE STUDY

1. Animals.
 - a. Domestic—Chicken, turkey, duck, goose.
 - b. Birds—Catbird, kingbird, cowbird, redstart, flicker, vesper sparrow, brown thrasher, white-breasted nuthatch, red-breasted nuthatch, quail, partridge, prairie chicken.
 - c. Frogs and salamanders—Green frog, spotted salamander.
 - d. Fishes—Suckers.
 - e. Insects—Codling moth, tent caterpillar, cankerworm, red admiral, apple-tree borer, fall webworm, apple-leaf crumpler, carpet beetle, white-marked tussock moth.
 - f. Miscellaneous—Spiders and harvestmen.
2. Plants.
 - a. Wild flowers—Meadow rue, purple aven, Indian pipe, sundew, shad bush, saxifrage, lady's slipper, blue-eyed grass, thoroughwort, jack-in-the-pulpit, corn cockle.
 - b. Garden—Parsnips, sage, horseradish.

2. Plants—Continued.

c. Fruit—Apple.

d. Trees—Butternut, mulberry.

c. Flowerless plants—Mushrooms, poisonous amanitas.

3. General.

Thunder, lightning—How caused, relation to rain.

III. DOMESTIC SCIENCE

1. The dining room—Light, location in house, proper furniture, curtains, decoration, plate rail. Table service—Kind of table, table linen, decorations, laying of silver, placing plates, napkins, glasses.
2. Food. Potatoes, sweet and Irish—Varieties, how to choose and keep, food value, preparation for food, reasons for cooking, economy in paring.
3. Clothing. Wool—Source of supply, preparation for market, manufacturing processes, kinds of wearing apparel made from, protection from moths, laundering, spinning, weaving.
4. Sanitation problems—How the family disposes of its waste, cellar, sewerage, garbage, vents for gases, disinfectants.
5. Water—Sources of supply, uses, hard and soft, softening of hard water, care of wells, filtering and boiling for purifying, use of individual drinking cups, windmills and private water systems.

GRADE FIVE

I. AGRICULTURE

1. Farm crops.
 - a. Corn—Plowing, harrowing, hoeing, varieties and where each grows best.
 - b. Wheat—Preparation of soil, sowing, cultivation.
 - c. Tobacco—Protection from pests, spraying, dusting, etc.
 - d. Sorghum—Manufacturing and marketing molasses.
2. Garden and orchard.
 - a. Plum—Varieties, uses as food, canning, planting of tree.
 - b. Onions—Planting from seeds and sets, uses as food, storing for winter, marketing.
3. Domestic animals.
 - a. Hogs—Breeds and advantages of each, pen building.
 - b. Sheep—Wool and its uses, shearing, preparation for market.
 - c. Beef cattle—Feeding, care, when to buy and when to sell.
4. The plant.
 - a. Food—Water, air, soil.
 - b. Growth—Conditions favorable, cultivation, sunlight, moisture.
5. Miscellaneous.
 - a. Farm implements—Thrasher, hay press.
 - b. Waste products—Saving manure, using straw for mulch.
 - c. Rainy days on the farm—How utilized.

II. NATURE STUDY

1. Animals.

a. Domestic—Horse.

b. Birds—Bobolink, kingfisher, chewink, ovenbird, purple finch, red-eyed vireo, indigo bunting, brown creeper, purple martin, sparrow hawk.

c. Frogs—Brown frog, red triton.

1. Animals—Continued.
 - d. Fishes—Perch.
 - e. Insects—Plant lice, lady beetles, mosquito, regal moth, curcullos, honey-bee, bumblebee, mud wasp, paper wasp.
 - f. Miscellaneous—Clam, snail, muskrat, slug.
2. Plants.
 - a. Wild flowers—Evening primrose, meadow lily, buttonbush, jewelweed, bishop's cap, snake's head, sarsaparilla, elecampane, columbine, blueberry, checkerberry, sparges.
 - b. Garden—Spinach, tomato, cucumber.
 - c. Fruit—Plum, apricot, nectarine.
 - d. Trees—Black walnut, cedar, juniper, willow, hackberry, larch.
 - e. Flowerless plants—Mould, yeast, foul brood, black knot mould.
3. General.
 - a. Sun—Producer of heat and light, its movements, causes of winter and summer, eclipses.
 - b. Moon—Phases, where it gets its light, eclipses.

III. DOMESTIC SCIENCE

1. The bedroom—light, shades, curtains, wall coverings, decorations, furniture, floor and floor coverings, care, ventilation, removal of curtains, decorations, etc., in case of contagious disease, disinfection.
2. Food. Milk—food value, qualities of good milk, cleanliness in milking and care of vessels, preparation for churning, Babcock test.
3. Clothing. Linen—source, manufacture, uses in articles of clothing, handkerchiefs, etc.
4. Ventilation—Importance of, how breathing makes air unfit for use, deep breathing, vent during sweeping periods and in sleeping rooms at night, value of fireplaces in ventilation.
5. The house fly—typhoid or filth fly, why objectionable and dangerous, how they carry disease, means of extermination, source of breeding.

GRADE SIX.

I. AGRICULTURE

1. Farm crops.
 - a. A B C's of corn culture: (1) Preparation of seed bed, fall breaking, 8 inches or more; (2) fertilizing seed bed, kind and how much; (3) selection of seed corn for vitality, quality, and high yield; (4) often and shallow cultivation from planting until corn is in full tassel.
 - b. Pick out some other crop that is important in your locality and treat it as with corn above. Consult some work on agriculture for detailed facts.
2. Garden and orchard.
 - a. Pear—varieties, uses as food, canning, storing for winter.
 - b. Radishes, beets, varieties, uses, marketing.
3. Domestic animals.
 - a. Sheep—value as meat, care and cooking of mutton.
 - b. Beef cattle—marketing, care of meat.
 - c. Poultry—feeding and care of young and old, gathering and care of eggs for hatching and marketing.
4. The Plant.
 - a. How plants are reproduced from seeds, cuttings, bulbs, etc.
 - b. Evil conditions, diseases, and pests.

5. Miscellaneous.

- a. Irrigation—reasons, methods, value, crops that need it.
- b. Cold frames—how made, plants to grow, value to farm.
- c. Weeds and grasses—varieties good and bad; in pastures and cultivated fields.

II. NATURE STUDY

1. Animals.

- a. Domestic: Pigeons.
- b. Birds: Hairy woodpecker, crossbills, wood pewee, red-breasted grosbeck, veery, house wren, warbling vireo, white-throated sparrow, fox sparrow.
- c. Frogs and salamanders: Wood frog, red-backed salamander.
- d. Fishes: Bass, rock, black, large and small mouth.
- e. Insects: Borers, cabbage worm, tiger beetle, squash bugs, botfly, apple maggot, house ants.
- f. Earthworms, moles, shrews.

2. Plants.

- a. Wild flowers: Fanny flower, early rue, dogbane, daisy fleabane, speckled alder, purple gerardia, celastroides, willow herb, clematis, butter and eggs, poison hemlocks.
- b. Garden: Cabbage, turnip, mustard.
- c. Fruit: Cherry, peach.
- d. Trees: Birch, pine, tulip, sycamore.
- e. Flowerless plants: Apple scab, rose mildew, peach-leaf curl, peach yellows.

3. General.

- Stars, comets, planets.

III. DOMESTIC SCIENCE

1. The pantry and cellar.

- a. Pantry—purposes and uses; proper place for dishes; storage of utensils not frequently used in kitchen.
- b. Cellar—ventilation, light, cleaning; storage of fruit, winter vegetables.

2. Food.

- a. Meat: Kinds—pork, beef, mutton, chicken; care of uncooked meat; characteristics of good meat; food value; preparation and cooking; method of cutting up carcasses.
- b. Eggs—food value; care and preservation; how to tell fresh eggs; methods of cooking; combinations with other foods.

3. Clothing. Silk—source; care of silkworm; where produced; manufacture; imitations; uses as wearing apparel.

4. The mosquito—how produced, places of production, life history, methods of extermination, as a producer of malaria.

5. Lighting systems—history through torch, candle, lamps, gas, electricity, acetylene lights, methods of improving present ways, care of lamps, home systems of acetylene lights.

GRADE SEVEN

I. AGRICULTURE

1. Farm crops.

- a. Corn—testing of seed corn, materials necessary for test, methods and demonstration of germination tests, why ears of medium size are best, varieties best suited to local land and why, how seed corn should be cared for, importance of improving crop.

1. Farm crops—Continued.
 - b. Cotton—the A B C's of cotton culture, as outlined for corn in preceding grade. Consult a reference work on agriculture for details.
 - c. Wheat—same as cotton above.
2. Garden and orchard.
 - a. Strawberries—varieties, choice of plants, cultivation, uses as fruit, marketing.
 - b. Watermelons, cantaloupes; varieties, preparation of soil, suitable soil, cultivation, marketing.
3. Domestic animals.
 - a. Cow—testing for tuberculosis.
 - b. Sheep—breeds and advantage of each, kinds of food and effect on wool-producing, value to farm.
 - c. Poultry—winter-egg production; prevention and cure of chicken diseases, poultry records and accounts.
 - d. Bees—hives, care, taking off honey and care of it, bee life.
4. The plant.
 - a. Parts—roots and root hairs in relation to absorption of food; stems, as to character (annual, biennial, perennial), uses and functions, structure; leaves, as to type, structure; seed, as to germination, dispersal.
 - b. Constituents—of plants and their characteristics; organic and inorganic.
5. The soil.
 - a. Importance as a natural resource.
 - b. Principles necessary to its proper understanding—geological, biological, chemical, physical.
 - c. Origin—forces in nature that have produced it—weathering, winds, water, heat, and cold, etc.
 - d. Constituents—inorganic, as rock particles, lime, nitrogen, potash, phosphoric acid; organic matter, life of soil, humus, plants, and animals in partial state of decay.
6. Girls' canning clubs.

Growth of the plant—Preparation of soil, planting and transplanting, cultivation, protection from disease and insects, grading and marketing surplus fresh product.
7. Miscellaneous.
 - a. Farm plans—Size and arrangement of fields, situation of barns and out-houses, fence building, drainage.
 - b. Hot beds and cold frames—How made, plants grown in, value.

II. NATURE STUDY

1. Animals.
 - a. Birds—Tree sparrow, grackles, wood thrush, yellow-throated vireo, black-billed cuckoo, yellow-billed cuckoo, ruby-crowned kinglet, golden-crowned kinglet, myrtle warbler.
 - b. Fishes—Trout, salmon.
 - c. Insects—Cutworms, lion beetle, army worm, corn worm, ichneumon fly, sphinx, bedbug, kissing bug, roach.
 - d. Miscellaneous—Wood chuck, centipede, willipede, mink, otter.
2. Plants.
 - a. Wild flowers—Ragwort, milkwort, chickory, baneberry, star grass, June grass, fescue grass, Jimson weed, St. John's wort, blue curls.
 - b. Trees—Ash, boxelder, poplar, chokecherry, red cherry, black cherry.
 - c. Flowerless plants—Molds, grain smuts, orange rust, grape mildew.

3. Study of birds.

- a. Harmful and helpful birds in the community, and why.
- b. Game birds and migratory birds.
- c. Habits—Nest and nest materials, incubation period, migration.
- d. Food—Proportion of animal and vegetable food of insects, and noxious weed seeds.
- e. Bird enemies and their control—Snakes, English sparrows, cats, hunters.
- f. Protection—Boxes, feeding, control of enemies, developing sentiment.

4. Study of shade and forest trees.

- a. Aesthetic and economic values.
- b. Planting and care.
- c. Trees in the community, value for shade, wood, etc.
- d. Problem of forest preservation and reforestation.

III. DOMESTIC SCIENCE

1. The front and back yard.

- a. Porches—Purpose and uses, furniture, decoration, protection with vines.
- b. Yards—Care of lawn, flowers, flower beds, etc.

2. Food.

- a. Vegetables—Food values, preservation and canning, methods of cooking and serving, best time to gather.
- b. Cereals—Food values, raw and cooked, methods of cooking.

3. Household pests.

- a. Kinds—Animals, as mouse, rat, fly, mosquito, cockroach, bedroach, clothes moth; plants, as molds, bacteria.
- b. How to eradicate, damage done by.

4. Preventable diseases—List of preventable diseases and the mortality from each; causes and eradication by better conditions in the home; germs and germ life.

GRADE EIGHT

I. AGRICULTURE

1. Farm crops.

The A B C of the culture of at least three crops common to the community as suggested for corn in the sixth grade. (A standard work on agriculture will furnish details for the work.)

2. The plant.

- a. Effects of climatic conditions on plant life.
- b. How plants can be improved by pollination, hybrids, crossbreeds.
- c. Selection of seed and strains.
- d. Plant diseases and methods of prevention and cure.

3. The soil.

- a. Kinds, as to components, physical properties, plant food, water-holding capacity, endurance, adaptation to different plants.
- b. Preparation for seed—(1) Plowing, as to reasons for, depth, time, subsoiling; (2) pulverizing in its relation to moisture, plant food, intertillage, depth, implements; (3) intertillage, as to purpose, effects of deep and shallow cultivation, dry farming, and dust mulch.
- c. Soil depletion and conservation—(1) Constituents that may be lost, amount of plant food that may be removed by various crops, how constituents are lost; (2) Importance of conservation, best means of preventing erosion and of replacing humus and mineral foods, rotation crops.

4. Live stock as a farm resource.
 - a. Value intrinsically and in maintaining fertility of soil through manure.
 - b. Pastures—Various grasses and other plants suited for grazing, methods of propagating these, value of pasture land as compared with that used for other purposes.
 - c. Feed stuff—Source, best suited to different kinds of cattle, amount of each given per day.
5. The orchard.
 - a. Location in relation to slope, drainage, and climatic conditions.
 - b. Preparation of soil as to plowing, subsoiling, pulverizing, and fertilizing; kinds of soil adapted to various fruits.
 - c. Planting fruit trees, pruning, spraying, protection from birds, insects, and fungus pests.
6. Boys' corn clubs.
 - a. How I cultivated my corn according to directions given by the various departments of agriculture.
 - b. How I measured my corn.
 - c. How I figured the expense per bushel of growing my corn.
 - d. How I select and preserve my seed corn.
 - e. How I produced pure-bred seed corn (the ear and row method).
7. Girls' canning clubs.
 - a. How I gathered my fruit.
 - b. How I manage my home canner.
 - c. Some secrets of good canning.
 - d. How I label and market my surplus product.
 - e. Some causes of failure in canning.

II. NATURE STUDY

1. Animals.
 - a. Birds—Water thrush, bank swallow, hermit thrush, marsh hawk, wild geese, wild ducks, red-headed woodpecker, sapsucker, loon, owl, eagles, gull, pine grosbeak.
 - b. Frogs—Cricket frog, mud puppy, Pickering's tree frog.
 - c. Insects—Aphids, rose slug, pear slug, painted beauty, currant worm, wood nymphs, swallowtails, scale insects.
 - d. Miscellaneous—Bat, weasel, porcupine.
2. Plants.
 - a. Wild flowers—Gentians, pale corydalis, cardinal flower, groundnut, viburnum, cassandra, cohosh, foxglove, nightshades, loosestrife.
 - b. Trees—Spruce, beech, tupelo, linden.
 - c. Flowerless plants—Bacteria, pear blight, foul brood.
3. The school garden.
 - a. Reasons for, practical application of knowledge learned, directed exercise and recreation, instilling in the child a love for the growing plant as directs its growth.
 - b. Location and plan of garden.
 - c. Preparation of soil and cultivation of plant.
4. Insect problem.
 - a. Economic benefit of knowing good and bad insects.
 - b. Insect pests—List of bad insects in community and their life histories; probable amount of damage done by them; best methods of eradication; kinds, such as gnawing, sucking, etc.

4. Insect problem—Continued.

- c. Beneficial insects—List of those in the community and their life histories; how they are beneficial and their value; how they may be propagated.
- d. Insects injurious to health: (1) Fly—life story, places of breeding, relation to typhoid fever, methods of exterminating; (2) mosquito—life story, breeding places, relation to malaria and yellow fever, methods of extermination.

III. DOMESTIC SCIENCE

1. Food.

- a. Fruit—Kinds, food values, uses, source of supply, preservation by canning, drying, storing, and cooling; preparation of raw and cooked fruit.
- b. Nuts—Kinds, food values, uses, sources of supply, where grown.

2. Canning.

- a. Purposes, kind of utensils necessary, methods of, in home and factory.
- b. Products canned—Fruits, as peaches, apples, berries; vegetables, as beans, tomatoes, pumpkins, corn, etc.

3. Bread-making—Fermentation, yeast, chemical reactions in use of baking powder, cream of tartar, soda.

4. Chemistry of cleaning.

- a. Agents, as soap, organic compounds, acids; kinds of each, process of making, uses.
- c. Disinfectants, antiseptics, deodorizers.