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AN EXPERIMENTAL RURAL SCHOOL
AT WINTHROP COLLEGE
ROCK HILL, S. C.

BY

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,

Washington, June 21, 1913.

SIR: The need of a better adaptation of the organization, spirit, and work of the rural school to the needs of rural life is generally admitted. Like all important changes in established systems and practices, this adaptation must come gradually, through many experiments more or less successful. The record of any such experiment, therefore, has much interest and value. A noteworthy experiment of this kind has been carried on for something more than two years in the Experimental Rural School of Winthrop College, Rock Hill, S. C., by Mrs. Hetty S. Browne, under direction of the State supervision of rural schools, in cooperation with the president of the college. The accompanying manuscript contains some account of this school, its methods and work. The style is simple, and many details interesting to the practical teacher are given. I recommend that the manuscript be published as a bulletin of the Bureau of Education.

Respectfully,

P. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

PREFACE.

About 79 per cent of the rural schools in the Southern States have only one teacher. It is evident, therefore, that a plan must be worked out which will enable this single teacher to make her school a factor in the development of the life around it. On November 2, 1910, the Peabody Board appropriated \$600 to work out such a plan. It was finally decided to attempt this through an experimental rural school in connection with Winthrop College, Rock Hill, S. C., under the direction of Mr. W. K. Tate, State supervisor of rural schools, and in cooperation with Pres. D. B. Johnson and members of the faculty of Winthrop College. Mrs. Hetty S. Browne, a teacher in the city schools of Spartanburg, agreed to undertake the experiment, which was started March 21, 1911.

At the outset the effort was to see clearly: First, what the farm wife must do all her life; second, what the farmer must do all his life. Then, regardless of tradition, the resolve was to make a school that will train the farm children for their future work in the home, on the farm, and in the social life around them.

It was recognized that activity has given the race its power. Man began by making crude weapons and tools out of wood, bone, stone, etc., and throughout the history of the race education has been in activity, not in books about it. Hence we began frankly with the activities of the farm, both in the home and in the fields. The children from the outset, felt a joy in the work. This stirred an interest in all their tools: plows, hoes, books, pencils, paper, everything used in furthering their work. Thus they became their own teachers and teachers of all those in contact with them. They mastered reading, writing, drawing, out of their own zeal which was born of the interest that grew out of their progress.

Simultaneous activities are made possible by this interest. A visitor will see a group working in the garden, another group on the veranda sewing, another in the kitchen at a cooking task, another in the workshop, and still another at their numbers or reading with the teacher in her room.

With these activities are related such essential technics as drawing, reading, writing, numbering, and modeling; so that the children master these largely without the irksome effort that is characteristic of the old schools. How this is done will be seen especially from Mrs. Browne's account of the corn cycle.

It will be noted that the exercises are ordered so as to develop the body along with the organs of sense and the mental power. The content of the words the children learn along with their activities is both concrete and vivid. From the outset they are led to put facts together and draw conclusions.

The purpose was to get at a practical working plan. For this reason the school was called "experimental" to distinguish it from the so-called model schools. The aim was not a cut-and-dried plan, but rather a working idea to enable the teacher to create a growing agency for the development of farm life.

Through Pres. D. B. Johnson the college provided house and grounds. The college likewise put in the simple equipment, which is within reach of any country community. The results warranted the college in taking over all the expenses after the first session. This success is due primarily to Mrs. Browne, who has developed the experiment which she graphically describes in this bulletin.

A. P. BOURLAND.

WASHINGTON, D. C., July 2, 1913.

AN EXPERIMENTAL RURAL SCHOOL.

THE PLANT.

The so-called good country schools are generally only poor copies of the city schools near them. They are likely to have all the formality and dry bookishness of the city, simply because the city is looked upon by country people as the source of everything good, schools included.

In establishing our experimental school, we endeavored to begin as far as possible without preconceived notions. It was to be essentially an "experimental" school, where we hoped to discover things. We tried to rid ourselves of the traditional schoolroom idea. We planned for no desks, for instance; in short, we sought to make a new start in school plant and equipment. Dr. Bourland had suggested a house and furniture suitable for a well-to-do farmer. Near the college campus we found a house which seemed to answer our purpose. It was a more or less typical farm dwelling, with a large veranda. Roses and vines clustered about it, and flowers grew in profusion everywhere on the grounds. There were plenty of trees to give shade; fruit trees, a mulberry tree, and two Carolina poplars. The house had an attractive, homelike appearance, inside and out, and with a little work by the college carpenter it was easily made ready for our occupancy.

We determined to fit up three of the rooms. The first we furnished somewhat like a sitting room. The center of attraction here was a long table with a burlap cover, on which the following books were temptingly displayed:

Mother Goose Nursery Tales.
Pinafore Palace.
Lang's Fairy Tales.
Arabian Nights.
Robinson Crusoe.
Nursery Tales and Fables.
Lang: Stories of the Vikings.

Mother Goose Nursery Rhymes.
Grimm's Fairy Tales.
Scudder: The Children's Own Book.
Pilgrim's Progress.
Pinocchio.
Esop's Fables.
Popular Tales from the Norse.

There were several copies of some of these books. Artistic curtains of ecru scrim were so hung as to soften the outlines of the windows without obstructing the light. Pots of plants were placed on a

broad shelf before the windows, and added considerably to the cheerful appearance of the room. Plain shelves were arranged for writing materials, drawing materials, scissors, and clay for modeling, as well as for the sewing materials—thimbles, needles, thread, tape, etc. A few chairs completed the furnishings of this room.

The next room we furnished as a carpenter's shop. The equipment was very simple, consisting of two benches (one bought, the other made by the college carpenter), saws, hammers, chisel, square, and a brace and bit.

The third room we set aside as the kitchen. We equipped it with a big coal range, two kitchen tables, a quantity of cooking utensils, and dishes.

On the veranda near the pump we hung our drinking cups, one for each child.

The veranda made an ideal outdoor schoolroom, and there were few times during the winter that we could not spend several hours daily there with comfort.

There was enough ground attached to the house for a large garden, as well as for a generous playground for the children. As part of the garden outfit we had a toolroom in which to keep the garden implements—wheel hoes ("plows," as the children proudly called them), rakes, hoes, trowels, etc.

From the very beginning the garden was made the center of activity, and has never failed to be a source of enjoyment and instruction for both teacher and pupils.

THE EXPERIMENTAL BEGINNING.

The school was opened in March. As no country children were immediately available, we got our children from a near-by cotton-mill village. A few came from the college campus.

The first thing the teacher did when the children came was to show them the house. She next led the way to the garden. The children were delighted when told that each was to have a garden patch of his own, and they wished to begin work immediately.

A 3-foot walk was made, extending down the middle of the garden, and the individual plats were to be laid off on each side of this. By measuring, it was found to be 40 feet each way from the walk to the fence, and it was agreed to let this determine the length of the garden. The width was the next question. In their zeal the children proposed very large gardens, but the teacher limited the width to 7 feet. A walk 1 foot wide separated the divisions.

We found trouble in getting the sides of our garden straight. One boy suggested that his father used a garden line to make his rows straight. He told us how the line was made, and under his direction we each made one, using two sharpened stakes and a piece

of twine. After much measuring the gardens were laid off, and each farmer began proudly to dig and rake his soil preparatory to putting in the seed.

The next morning some of the children had forgotten which garden had been assigned them. The teacher had to get the plan that she had made the day before to settle the difficulty. How to prevent this occurring every day was the problem. After talking the matter over, we decided to make wooden stakes and print the owner's name on each. Each child was encouraged to go to the blackboard and with a ruler make a drawing of the way he thought the stake should look. After this the teacher and pupils considered the plans, and each child was allowed to tell why he had made his stake in a certain way. All agreed that it should be in the form of a cross, with the upright piece long enough to be driven firmly into the ground and the crosspiece long enough to contain the owner's name. The width of each piece was considered, and it was decided that the upright piece should be 2 by 18 inches and the crosspiece 3 by 12 inches. An old dry-goods box furnished the lumber. It was broken into pieces, and the work of measuring, sawing, and nailing began.

The children had to do considerable thinking for themselves; for example, in finding the center of the crosspiece, in order to nail it properly to the upright. The younger children were shown how to take a piece of paper the exact length of the piece which they wished to divide and to fold it over end to end. Of course there were some who were curious to know how long each piece of paper really was; they measured it for themselves, and found that each half was 6 inches.

Some drill in printing was necessary before the children could attempt printing the name on the stake. Oblongs the exact size of the crosspiece were drawn on the blackboard and the children practiced printing their names in these, using the teacher's copy as a model. When a child had gained sufficient skill in printing his name on the blackboard he printed it in pencil on his stake, and then went over the pencil marks with black paint.

That night a heavy rain came. Our stakes stood the test bravely, but our paths were all obliterated. Where did each garden begin and end? It was evident that we must have three more stakes and mark all four of the corners. Each child went to work and soon had the additional markers completed and in place. This time only straight stakes were made. Each was 2 by 18 inches.

In all of this work the teacher was pleased to see how eager the older children were to help the younger. With a few suggestions from the teacher, they learned to render real help, instead of doing the work for them.

While all of this was going on in the garden the more formal studies had by no means been neglected. The children had been learning to read and to write and to do various other things. For their first reading and writing lessons they had: "I have a garden. Carrie has a garden," etc.

From the garden the children learned the words soil, rock, clod, loose, hard, etc. Then the names of the tools: Hoe, rake, plow, trowel, line, etc. When they returned to the house they built these words with cut-out letters. Gradually new words were added, such as:

seed	tiny	cover
drill	block	plant
long	garden	

In making the stakes they learned these:

board	cross	nail
piece	long	cut
inches	name	hammer
stake	square	hatchet
oblong	measure	ruler
upright	saw	

In sewing they also learned a number of words:

thread	needle	tape
scissors	thimble	measure
cloth	cut	stitch
baste	hem	
fold	pin	

The teacher always put the nouns in one column, the adjectives in another, and the verbs in still another. She said nothing, however, about grammar or the parts of speech. She left this for the child to grow accustomed to.

The older children were encouraged to select books and to read either to themselves or to groups of others. Every day there was a social period on the veranda. The children all brought their chairs and placed them in a circle. The older ones would tell what they had read. The younger children were also expected to take part. Each child told a story, repeated a rhyme, gave a riddle, or did something for the entertainment of all.

The children were encouraged in attempts at dramatizing stories they liked. They had good times playing "Chicken Little," "The Three Bears," "Billy Goat's Gruff," etc. The Mother Goose Rhymes were a source of great pleasure at this time, too. The teacher read the rhymes, the children repeating with her those they knew.

The household duties also formed part of the regular program of the day. On reaching school the children ran to the blackboard



A. ALL HANDS AT WORK.



B. READY FOR LUNCH ON THE VERANDA.



A. THE READING HOUR.



B. ROBINSON CRUSOE'S CAVE, BUILT BY THE CHILDREN.

in the kitchen to see what duties had been assigned them. The teacher had written on the blackboard something like this:

Wash and hang up cups.....	Nell and Aggie.
Bring water.....	Jessie and Melver.
Fill kettles.....	Lawrence and Carrie.
Cut flowers.....	Estelle.
Arrange flowers.....	Wilma and Bonnie.
Dust.....	Mamie.
Tend fire.....	John.
Arrange books.....	Nellie May.
Open and arrange carpenter shop.....	Conlie.
Tidy up kitchen.....	Maggie.
Dust erasers.....	Charlie and Willie.

When these tasks were done, the children took up various activities. Some got books and read. Some of the boys went to work in the carpenter shop or garden, while a number of the girls went to work at their sewing. This activity was essentially spontaneous and natural; there was no restraint. Children were allowed to talk in an ordinary tone of voice when it did not disturb some one else. Bruce wanted to know if he might whistle when he sawed. He was told that he might. The question of discipline took care of itself. All were busy and happy. The teacher's part was to help the children and not to dictate to them.

In all of our work we tried to make only those things of which we felt the need. The garden lines and stakes were made when it was necessary to have them. We soon found that we must have towels. After working in the garden our hands were soiled. We could wash them at the pump, but we needed something on which to dry them. Suppose each one hemmed a towel? The towel was accordingly planned and worked out in response to a definite need. The amount of material and the cost were ascertained, and then the sewing began. After the towels were completed, the owner's initials were worked on them in red. The word "initial" was a new one to the children, and as they worked each one gave the initials of a member of his family. They were taught that a person's initials must be written in capital letters with a period placed after each one.

The making of the towels furnished sewing for two months. After the individual towels were hemmed, others were hemmed for use in the kitchen.

Some of the words learned in making the towels were: Towel, side, end, hem, selvage, center, feet, inches, corners, square, oblong, width, length, long, small, wide, even, straight, measure, fold, under, turn, stitch, haste, ravel.

"When are we going to cook?" was the question asked daily for the first few days. "Before we cook we must understand our range," was the reply. The children knew the names of most of the

parts of the range and their uses, but they did not understand the drafts. A fire was lighted in the school range; then the drafts were closed, and the fire went out. The fire was built again. The drafts were turned on. The fire roared up the chimney. The top of the range was hot, but the oven was still cold. How could we send heat to the oven? Evidently we must send the flame against it. The teacher then showed the children how to regulate the dampers for heating the oven and the water tank and how to boil water. Hot water or kettle tea was made and served for luncheon.

At the simple luncheon which followed this first cooking lesson the teacher secured a glimpse of the amount of true education that can be gained through the proper serving and eating of a meal.

Arithmetic was carefully related to the different activities. A great deal of number work can be obtained from the garden, the carpenter shop, the kitchen, and in sewing. The children measured the gardens, the length and the width. They measured the walks, the distance between the rows, the distance that the seeds were planted apart, etc. They counted the number of seed planted, and then learned to estimate the number of seed and not to count each one.

In cooking they learned to measure the materials they had to cook and to tell time by the clock in order that the food might cook the proper length of time.

In sewing they learned to measure by the yard, foot, and inch. In making towels the following number work was studied:

Length of towel in feet. Length of towel in inches. Width of towel in feet. Width of towel in inches. How many inches in one side of towel? How many inches in two sides of towel? How many inches in one end of towel? How many inches in two ends of towel? How many inches in one side and one end of towel? How many inches in one side and two ends of towel? How many inches all around the towel? What is meant by "perimeter"? How long is the tape for your loop? Fold it in half. How many inches in each half? What is one-half of 5 inches? Find the half of the end of your towel. Measure how many inches in one-half of it. What is one-half of 18 inches?

The care of the towels gave rise to another activity—that of washing. We had a tub and washboard, and as the children washed they sang:

This is the way we wash our towels,
Wash our towels,
Wash our towels.
This is the way we wash our towels,
Etc.

After this they were hung smoothly on the line and fastened by clothespins. When dry they were ironed. In all of this work the element of play entered; at the same time the children were shown how to do the work neatly and accurately.

The children were encouraged to talk as they worked, to describe the work, or to tell of something they had seen in the garden. If mistakes in English were made, they were so kindly corrected that the child was not embarrassed. In this natural social atmosphere the children rapidly gained facility in using the mother tongue.

We believed that we had rid ourselves of all preconceived notions of school, but one or two still persisted unconsciously. There was the traditional recess, for instance. At 10.30 sharp every day, no matter how interested the children were in the work they were doing, a recess was taken. The teacher played games with the children. They were natural children and liked games, but they liked better that pleasant game they had been playing, which some people erroneously call work. One by one the children gradually slipped back to their work. After the teacher had attempted to do things in her way for a while, she decided she was making a mistake, and thereafter she let the children order it in their own natural way.

A part of every day was spent in the garden. It was getting late in the spring, and very little time could be given to study of the soil or of the germination of the seeds. We planted onions, turnips, potatoes, radishes, lettuce, peas, beets, corn, beans, Swiss chard, okra, and tomatoes. Later peanuts and pop corn were planted. These were harvested in the fall, when the children returned to school.

School began in March and ended in July. During the summer vacation the children who lived nearest took charge of the garden and used the vegetables.

IN THE FALL.

Although gratified with the progress made during our first session, we realized that we must have real country children for our undertaking. A rural school within 4 miles of the college agreed to invest the amount they had been paying a teacher for a few months in the salary of a driver for nine months, so that the children could be hauled in each day. The college furnished the wagon.

When the country children came in September, practically a new start was made. Our pupils were not entirely new, however. We already had in our school some pupils who, though they came from the mill, were children of parents from the country and had many of the instincts of country children. We decided to keep these. One of our boys from the campus, McIver Coker, also stayed with us. These children were of great service in helping to give the spirit of the school to the newcomers. Most of the new pupils had been to school, but they had learned only the restrictions—the "thou shalt nots." It required much skill on the part of the teacher to help them to see that school was a place for work, pleasure, fun, and even frolic.

Among the newcomers were two sisters, aged 14 and 16, respectively. They had been to 10 different teachers. They had learned to hold a book properly, to turn the pages, and laboriously to spell out a few words. They knew no Mother Goose Rhymes, none of the old Fairy Stories, and no Bible stories. Their training in arithmetic had taught them to repeat what they called the second line of the multiplication table, thus: $2 \times 1 = 2$, $2 \times 2 = 4$, $2 \times 3 = 6$, $2 \times 4 = 8$, etc.

To these girls our school was a revelation. It was particularly hard for them to understand that there might be fun in anything connected with school. Thus they disapproved of the running and racing by the children that took place when the school driver let down his charges a block from the school. They scolded the other children for it, later explaining to the teacher that they had done so because it "wasn't proper to run in town; city folks would laugh at them." To this the teacher laughing replied that she liked to run, too, and straightway proposed a race, in which all took part except Maggie and Mary, who were not yet ready to accept the new conditions.

The many games also astounded Mary and Maggie. The teacher was a believer in games for the country school, and she led in them. Not only were there games at school, but every month there was a party, to which the home folks were invited. The first one was at Halloween. We decorated our rooms with autumn leaves. We made jack-o'-lanterns from pumpkins brought by the boys. These and a roaring fire in the fireplace gave all the light we needed. When the guests arrived we popped corn over the coals, bobbed for apples, tried to bite an apple suspended from the ceiling by a string, and played other Halloween games. The refreshments consisted of popcorn and roasted peanuts from our own gardens and apples bought with the money we had earned from the sale of a peck of potatoes from our garden. A few circle games, learned during the month, gave a finishing touch to our Halloween party.

In November we celebrated Thanksgiving Day. Again we decorated with autumn leaves. The home folks brought picnic baskets. The children made hot coffee for their elders and kettle tea for themselves and their younger guests. The table was laden with three big bowls of fruits and nuts. We had enough popcorn and peanuts from our garden for this celebration also. After dinner we put the tables out of the way, and made a cozy circle all around the room, two deep in some places. Parts of Longfellow's *Hiawatha's Childhood* had been memorized by the children in their regular school work. The children recited this naturally, one taking it up where another left off. The Thanksgiving Story was read by one of the children, and other poems and songs followed. All of the children took part just



A. THE VERANDA.



B. SEWING LESSON ON THE VERANDA.



A. AT WORK ON THE VERANDA.



B. A TABLE IN THE TEACHER'S ROOM.

as they did at their social period every day. Games brought the celebration to a close.

These two parties were typical. Christmas, Lee's Birthday, Valentine's Day, Washington's Birthday, and Easter were appropriately celebrated. In May we held a picnic.

THE GARDEN.

The garden was, indeed, the center of the school activity. All the children were farmers, girls as well as boys. Eventually they studied the soil as to formation, varieties of soil—gravel, sand, clay, humus—the moisture in the soil, the amount of moisture, and the action of water gravitation and capillarity. They studied the weather, and learned the effect that wind, rain, snow, and frost have on a farm. In an elementary way they learned something of fertilizers. They learned why a cover crop is used on the uncultivated portions of a farm and of the necessity for a rotation of crops.

They learned how far apart rows must be and how far apart the seed in the row. They estimated the amount of seed necessary for their garden, and were encouraged to consult seed catalogues, Government bulletins, and various books on agriculture.

They germinated some of the various kinds of seed, and discovered the conditions necessary for germination. They compared the different seeds, as to their manner of germination. They learned the names of the parts of the seed, e. g., of the bean: Seed coats, hilum, microphyle, cotyledons, radicle, plumule, etc. They studied the methods of cultivation. They watched the unfolding of each plant and learned the names of all the parts—root, stem, leaf, bud, blossom, fruit, seed. They learned the kinds of roots, the kinds of stems, and the kinds of leaves. They learned the parts of the blossom and that there were two essential parts. They learned that these two parts are often borne on different parts of the plant and even on separate plants.

They learned something of the plant families. It was easy to see that the potato and horse nettle belonged to the same family by the similarity of the leaf and bloom and by the Colorado potato beetle infesting both plants. It was harder to find that the tomato belonged to this family also.

They studied the weeds and grasses in the garden, first, to know how they injured the plants and, second, to find the best way in which to get rid of them.

Animals, birds, insects, toads, and worms were studied in their relation to the garden. The animals found in the garden were the mole and the rabbit. The birds that visited it were the English sparrow and some of the other sparrows, the mockingbird, bluebird.

brown thrush, woodpecker, flicker, cardinal, orchard oriole, and blue jay. The children called the English sparrow "town bird." They found him altogether unlovely. The others we decided were our friends. Of insects there were a host, and of all these only one, the little ladybird beetle, was a friend. Some of the foes were aphides, potato beetles, cutworms, corn worms, larva of cabbage butterfly, and squash bug. The children found that the homely toad and the earth worm were friends. Each child kept a record of the observations made in a book which he called "A Book of Bugs."

The following was written in one of these books about the cabbage butterfly:

CABBAGE BUTTERFLY.

Melver caught a cabbage butterfly. It is greenish, yellowish, whitish. The wings have dark markings on them. It has four wings. It has six legs. It has two antennae. They have knobs on them.

THE LARVA.

Estelle found a larva of the cabbage butterfly on a cabbage leaf. It looks like a green worm.

THE EGGS.

Jessie found some eggs of the cabbage butterfly on a cabbage leaf. The eggs are small. They are just the color of the cabbage leaf.

May 28. We have not found a chrysalis. [A chrysalis was found later.]

Each child kept a Garden Book in which he recorded the various things of interest about his plants from the time they were planted until they were harvested. Below is a copy of what was written in a garden book about peas.

PEAS.

Variety—Lightning Excelsior.

Planted—March 19.

Up—March 25.

In bloom—April 11.

Saw first pods—April 30.

Gathered peas to eat—May 14.

May 14—Picked one peck of peas.

May 16—Picked one peck of peas.

May 17—Picked one peck of peas.

May 21—Picked one peck of peas.

As the vegetables were ready for the table the children studied the various ways of cooking and serving them. They learned too, in an elementary way, something of their composition and food value. Besides the vegetables used at school, some were taken home; others were sold and the money used for the benefit of the entire school. A record was kept of the sale of the vegetables and of the expenditure of the money.

A STUDY OF CORN.

The extent to which the work in reading, number, and writing is combined with other activities in our school has already been noted. To indicate the development of this plan it is desirable to take one plant from our garden and show in detail how we combined nature study and the more formal subjects. Corn is the plant taken for this illustration.

Our study of corn began in the winter with a study of soil. We asked ourselves what soil was. The children brought some soil in where we could all examine it. The children felt the soil. Since it was moist, it must contain water. How much water? How could we find out? After some time one child thought of weighing the soil, drying it out, and weighing it again. We took three pounds (a little over a quart) weighed it, let it dry in the sun and weighed it again. The loss in weight was only about one-eighth of a pound. We then dried it out in the oven of the stove and weighed it again. The loss this time was a little less than one-eighth of a pound, making the total loss one-eighth pound plus one-eighth pound, or one-fourth pound. What became of the water? The teacher then taught the word "evaporated" for dried out.

The teacher said that she knew how to get rid of something else that was in the soil. She weighed the soil that had had all the water evaporated from it and recorded the weight. She put the soil in an iron vessel on the stove and allowed it to get red hot. When it was cold again it was weighed and the result was a slight loss in weight. What was it that burned in the soil? The teacher showed the children the humus. She let them see the tiny pieces of leaves, sticks, etc., and asked them to guess now what was burned out of the soil. The teacher explained the expression "organic matter" and showed that "organic matter" was in the garden soil, although it could not be seen. In this way we discovered two things in our soil—water and organic matter.

The children examined the soil again and discovered a third element—sand. The teacher called the children's attention to the resemblance of the sand grains to little rocks, and said, "How do you think these little rocks were made? Suppose we rub two stones together over this piece of white paper." The children did this and saw the tiny particles of rock. "Do you think this could have happened naturally? What would rub stones together? Cultivating soil rubs them together. Stones rolling down a hill rub together. Don't you think the wind might help? Water sometimes carries stones along and rubs them together." The teacher took a wide-mouthed pickle bottle and put stones into it. Then clear water was poured in. "Look at the water and stones. The water is almost

clear. Shake it vigorously for a long time. Let it settle. What do you see at the bottom of the bottle? Do you think the streams of water wear away rocks? What do they do with the particles of rock that they wear away? Where did these particles fall in our bottle? Where would they fall in the stream? Which would fall first, the large or small particles?" Next we took a fruit jar and placed in it common soil, sand, and gravel, and poured some water in. After shaking it vigorously until it was thoroughly mixed, we set it aside to settle. "Where are the gravel, sand, and silt? Let us go to a stream the next time it rains and see if this is really true." We did so, and found silt at the mouth of the stream, then sand, then gravel, and last of all the stones.

We found some disintegrating granite. One boy found some other rock that was disintegrating. "Why is it going to pieces? What made our jar break when we left water in it that cold night? Do you think something of the kind could have happened here? Tell me how. Tiny particles of water in the rock freeze; this causes the rock to break into pieces." The teacher then told in a simple way of the chemical action of air and water in the weathering of rocks.

We made a collection of stones from the neighborhood. When we went to the field for the minerals the children noticed the different kinds of soils and gathered specimens of each kind. We collected gravel, sand, clay, and humus. The teacher wished to show the children the difference in water gravitation and capillarity of the four kinds of soil collected. To do this we had to have a soil tester. We made a small wooden bench with long legs, and bored auger holes in the top large enough to allow a small round lamp chimney to be run through it up to the enlarged part that fits over the burner. Four lamp chimneys were used. They were placed in an inverted position. Netting was then tied over the lower end of the chimneys.

To show the difference in water gravitation of the various soils, an equal amount of each kind of soil was placed in each chimney and an equal quantity of water poured over the soil. The pupils observed: (1) Which was wet through first; (2) into which the water sank most rapidly; (3) through which the water began to pass first; (4) the appearance of the water as it came through; (5) through which soil most water passed; (6) the difference between clay and humus.

The soil was then allowed to dry in tubes. The children now noticed: (1) Which soil dried first; (2) appearance of the different soils when dry. The children were asked: "Do you think gravel good for our garden? Why not?" We next tested the capillarity of the four kinds of soils. Clean tubes were taken, and an equal amount of soil was placed in each tube as before. Instead of pour-

ing the water into the tubes, however, we now put the tube into water and observed how the water rose in the soils. Equal quantities of water were put into four glass cups and one was placed under each tube. The pupils watched to see in which tube the water rose most evenly. They were asked: "Which soil do you think is best for our garden? Why?" We allowed the soil to dry in the tubes. We then took out the soil and put in thoroughly pulverized soil to test for gravitation and capillarity. "Through which soil does water soak most readily? What kind of soil do you think it is best for us to have in our garden, soil that is packed and hard, or loose, pulverized soil? How deep do you think soil should be loose? Why?" The teacher then told of the benefit of deep plowing and of the necessity for having a thoroughly pulverized seed bed. She then asked these questions: "What kind of a road does clay make? How could you help a muddy-clay road? What kind of a road does sand make? How could you help a sandy road?"

Having completed our study of the soil, we next had to find what our plants needed to make them grow. We made four experiments, as follows:

I. Place grains of corn between sheets of damp blotting paper. Leave some in warm schoolroom and take other into a cold room.

II. Put some corn into damp sawdust and keep it damp. Put some in dry sawdust and keep it dry. Place side by side in sunny window. (The children took this as a huge joke. They knew that seed must have water if it is to come up.)

III. Put some corn into a tin can of soil that has a hole in the bottom and is supplied with drainage. Put some corn into can of soil with no hole in the bottom. Place both in sunny window side by side and water at stated periods with equal quantities of water.

IV. Put some corn on damp blotting paper and allow it to get air. Put some corn on damp blotting paper and close box tightly, thus excluding the air.

From experiment I they learned that seed must have warmth to germinate. From experiment II they learned that seed must have moisture to germinate. From experiment III they learned that there can be too much water and also that the seed will rot if allowed to lie in water. From experiment IV they learned that seed must have air to germinate.

"Are all seed equally good?" was the next question. "Suppose we test some seed." Ears of corn were brought from home, and a few were selected for testing. They were numbered 1, 2, 3, 4, 5, 6. We made a shallow box and filled it with garden soil. We divided this with tape into 6 sections, and numbered the sections from 1 to 6. Five grains from each ear of corn were then planted in the section with the corresponding number. They were watered thoroughly and placed in a sunny window. The same treatment was given to each section of the box.

The teacher brought out that the ear with the largest number of grains of corn to germinate was the best ear for seed. As the corn was shelled, the children noticed the position of the grains in the row. "Notice the size and shape of different grains. In which ear do you think there is most corn? Why? Notice the scar left on the cob. Which do you think is better, a large cob or a small one? Why?"

We next made a study of a grain of corn. We took some dry corn and some corn that had been soaked in warm water over night. The children looked at the grain of dry corn and noticed the part that was joined to the cob. "Notice the dent in one side," said the teacher. "Take a grain of soaked corn. What is the first part of the corn that you see? Take off the seed coat and note the germ. Remove it with a sharp pointed knife." They then took the corn that had been between damp sheets of blotting paper, and found germination further advanced. The teacher had them take the germ from the corn and see if it would grow without the rest of the grain of corn. After a few days: "Did it grow? What part of the corn then is the essential part?" They observed it for a few more days: "What has happened to our corn? Why do you suppose it died? What do you think was in the part we removed? How did the bean carry its food?" The children learned that corn has two supplies of food—cotyledon and endosperm. They noticed the radicle as it emerged, then the plumule. "Which came out first? Note the grains of corn planted in damp sawdust. Note the position of the plumule, of the radicle. Where is the grain of corn? Where was the germ when it germinated?"

We thought it interesting to see how our plant grew. We took the corn that had been planted between pieces of damp blotting paper. The plumule and radicle had both emerged from the grain of corn. With pen and ink we made horizontal marks around the root and the stalk of the corn one-sixteenth of an inch apart. We had to be careful to put a mark on the very tip of the root and of the stalk. In the morning there was a surprise for us. We marked again; to be sure we were observing correctly. We saw that we put a mark on the very tip of the root. We examined the plant again next morning. "Were we right? How does the root grow? How does the stalk grow?" The term "growing tip" was then taught. We examined the growing tip and found it very tender. In considering what kind of soil is needed for the little root to push its way through, we found one more good reason why the seed bed should be thoroughly pulverized. We made drawings of corn: First the dry grain, then the soaked grain, then grain with the root peeping out, grain with the root and plumule both out well, and after an interval of a few days a grain with the growth of both plumule and radicle well started.

The next step was to consider how close we should plant our corn. The children examined a picture of corn, with its immense root system. "What do plants have to have? Air, heat, light, moisture. With what must we provide our corn in the field? What will happen if we plant our corn too close together?" The boys measured the rows of corn at home and found how far apart they were, as well as how far apart the stalks of corn were in the row. "Why do you suppose your father made his rows so far apart? So the plants would get sunshine and air. But there is another good reason. How does your father cultivate his corn? What would happen to his corn if he got it too close? How are we going to cultivate our corn? Do you think that for this reason we could plant ours a little closer? Suppose we plant our corn in rows 2 feet apart and in hills $1\frac{1}{2}$ feet apart. Now, how many grains shall we put in a hill? What must we think of? Which would be easier, to pull up a stalk or two of corn or to have to plant over again?" We decided to put five grains of corn in a hill. With yardstick and chalk we marked off rows 2 feet apart on the floor of the veranda and indicated the position of the hills. "How many hills will there be in each row? How many grains of corn needed for one row? For two rows?"

When the soil was in readiness we laid off rows 2 feet apart with the help of the garden line. We dropped seed 18 inches apart in drill, as we had decided. As the seed were dropped, the barefoot children pressed them down firmly into the soil. They did this because they were told that soil fitting closely around a seed will keep it moist, and a seed requires moisture to germinate. They covered over with soil, pressing the earth firmly against the corn. The top soil was left soft and loose.

The children watched the first tiny leaf come out. They noticed where the seed was and compared it with the bean, which they had previously studied. They noted the growth of corn, how one leaf unfolds, showing another one curled and ready to unfold, and so on.

The children were instructed that they could not begin to cultivate corn too soon. "We must keep our top soil soft and loose," the teacher told them. "Why? Suppose we try this experiment." Into a shallow box we put some moist soil. Over part of it we put a layer of dry dust from the road. We then set it in the sun for a day or two, and finally removed the dry dust to look at the soil. "Which shows more moisture, that covered by the dust or that left bare? Why did the water in the bare soil evaporate more quickly? Can you give a good reason now for keeping a layer of pulverized soil on top of our garden?" Thus the expression "dust mulch" was taught. We looked at earth under planks, boards, and stones, and the children learned that it was moist because the stone and board act exactly as a dust mulch.

From our experiments we learned that water rises in soil. Questions that we investigated were: "In what kind of soil does it rise more readily—firmly packed or loose, lumpy or well pulverized? Which of these soils dries out more readily? In what condition should we keep the soil around our corn? Into what kind of soil did water sink more readily? Would it be wise to have our soil in a suitable condition for the water to sink into?" We considered again the immense root system of the corn and noted the fine mat of roots near the surface of the ground. The children were cautioned against cultivating the corn too closely after it had grown large enough to have these roots.

The children kept a record of all the experiments performed and of the planting and cultivation of the corn. They also made a record of all the animals and insects that molested the corn.

One morning we found traces of a mole. We dug into a burrow, but could not find the mole. Later one of the children brought a mole caught at home. We then made a complete study of the mole, and afterwards of the corn worm, which is really not a worm at all, but a larva.

The children noticed smut on the corn and read that it was best to burn the stalk infested with this disease to keep it from spreading all over a field.

We found other enemies of the corn: Weeds and grass had made their appearance. We learned that they hurt our corn by taking from the soil the food and moisture that it might have; they kept light, air, and sunshine from corn.

We learned the names and habits of the weeds and grasses found in the garden and studied how to get rid of them. We decided that to get rid of them we must first know how they made new plants. Some had only seed. Some had seed and sent down a tap root that lives all winter. The quack grass had seed, but would grow from cuttings and keep alive all winter. We made drawings and blue prints of the following weeds and grasses: Pig weed, lamb's quarter, joint grass, purslane, ragweed, dog fennel, plantain (3 varieties), pepper grass, shepherd's purse, jimson weed.

"How did these weeds come to be in our garden? From seed. We did not plant them. Who did plant them? Some sowed themselves. The wind, birds, animals helped others. Suppose we try to find out how many seed are in one plant." The teacher pulled up a plant of shepherd's purse and gave a branch of it to each child. We counted the number of seed pods on each branch. We put the number down with a sharp stick on the ground and added. Then we counted the number of seed in one pod. "How many pods? How many seed in one pod? How shall we find out how many seed altogether? Multiply." We did so, and found that there were practically 4,000 seed on the one plant of shepherd's purse. "How many seed



A. A LESSON ON COTTON.



B. ON HIS OWN FARM.

made this plant? Only one. How many plants could come from this one? Four thousand. Don't you think we shall have to destroy every weed, if we wish to get rid of them entirely? If we destroy all of them this year, do you think it will help us next year? How?"

The teacher told the children that weeds and grass are sometimes friends after all. They make lazy farmers work their crop to get rid of them when they would not work it to keep a dust mulch.

The following reasons for cultivating corn were developed: (1) To form a dust mulch (a) in order that corn may get moisture and (b) that the soil will not lose the moisture; (2) to make soil loose and fine, that roots may get food and water; (3) to kill weeds and grass.

When the corn was about a foot high we fertilized with nitrate of soda. Care was taken not to get any on the plant.

We made a note of the time when the corn tasseled and examined the tassel carefully. In the same way we noted the time of silking and examined the silk closely. Having studied other flowers, the children knew that the two essential parts of the flower are the stamens and pistil. They had noticed pollen on the stamen of other flowers. "Where is the pollen on the corn? Can you guess what this part is? What are the two parts of a flower? Which part have you found? Now, who can find the other part? On what does pollen fall?" It took the children some time to discover that the silk is the pistil. "Now, can you give me a good reason for being careful to have a good stand of corn? Why should it all be of the same age?" We then cut silk from one ear of corn; on another we made the silk into a ball and then waited for results.

One dry day the children noticed that the leaves of the corn were curled up and, of course, thought the corn was dying. They were much relieved to find the leaves straight the next morning, but they curled again in the heat of the day. In answer to the children's questioning the teacher wet two cloths and hung one out smooth. The other she made into a roll. The children then watched to see which dried out first. They thus learned that the corn leaves lose their moisture too rapidly when spread out smoothly. The leaves protect themselves by curling up in the same way that the cloth did.

When the silks were dead on our corn, we pulled the husk down and found the corn ready to eat. "How long has it been since the corn tasseled? Since it silked? Since it was planted?" The children learned that at this stage corn is called "roasting ears." We gathered roasting ears to cook. We learned to tell when the corn was ready by noticing the silk and feeling it through the husk instead of pulling the husk down, because if corn is left unprotected the ants come and destroy it.

We pulled the two ears on which we had experimented with the silk. Neither was filled out. "What did we do to the first? Cut

the silk from it. What did we do to the second? Made the silk into a ball. Do you think, then, that the silk is an essential part of the corn?"

We now husked the corn that we had gathered. We followed the silk on one of the ears until we found the end attached to a grain of corn which was plump and round. The children knew that the pollen falling on the silk had something to do with it. They were told that a pollen grain must fall on each silk; that each silk is attached to one grain of corn, and that the pollen causes the grain of corn to develop.

We husked the corn and discussed the value of the husks or "shucks," as the children called them. They saw that the husks cover and protect the ear of corn. They learned that husks are used as food for animals; that they can be made into doormats, etc.

A stalk of corn was taken up carefully, roots and all. The soil was washed out at the pump. We noticed the large root system, with tiny roots, reaching far into the ground. After discussing the kind of soil and the reason for shallow cultivation, we examined the parts closely, as follows:

PARTS OF PLANT.

1. Roots: (a) Kinds—fibrous, brace.
2. Stalk: Jointed; joints closer together near the roots. Why?
3. Leaves: Grow from joint, attached to lower joint, encircle stalk until it reaches next joint where it spreads out. Arranged for conducting water to the root of the plant. Shape is grasslike. Parallel veined. Margin of leaf fuller than rest of blade. Why? Do you think the parallel veining helps? Rough, covered with small hairs.
4. Tassel: Part of flower.
5. Silk: Other part of flower.
6. Fruit: Ear of corn. Covering, husk. Grains of corn borne on cob.

Later the process of cooking the corn was carefully gone through with by the teacher and children. After the corn had been cleaned of its husk and silk, the pupils pinched a grain of corn here and there with the finger nail until the milk came. Then they used iodine to test the corn for starch.

The corn was put in boiling water, and the children were told that the cooking time for corn was 20 minutes. The teacher had one of the children bring a clock, while another was instructed to watch the time and report when the time was up.

While the corn was cooking, the children discussed interesting points about corn—various uses of corn apart from eating; fodder; history of corn from Indian and Pilgrim times; Indian legend as to how the Indians first got corn ("Hiawatha's Fasting," by Longfellow); methods of grinding the corn, old and new, etc.

At Halloween we had the corn popped as part of the celebration, and we sang the Popcorn Song. From the corn shucks we made mats and baskets.

APPENDIX A.

DIARY OF THE FIRST TWO WEEKS OF SCHOOL.

September 19 to October 14, 1911.

Tuesday, September 19.

Children present representing the first three grades of school.

Visit the garden. Find peas sown in July for a cover crop rank and completely covering the ground. Find peanpts still green. Popcorn is mature and ready to harvest. Jessie and Carrie have had charge of the garden during the summer. They return the key to the teacher. Children who were in school last year take pride in showing the new children through the house and telling about the different rooms. After this all gather around the teacher on the veranda, and the children from last spring tell the new ones of the work they have done at school, of what was raised in the garden, of what was made in the carpenter shop, and of the good times in cooking and sewing. The new pupils are told that each of them is to have a garden. They are to work in the carpenter shop and are to cook and sew.

The children have been attracted by a crayon sketch of "The Three Bears" on the blackboard. The teacher tells them the story. Scissors are brought out, and the younger children set to work cutting the chairs, table, bowls, and beds for the bears. The older ones try to read to the teacher in the book brought from home. The teacher soon finds that this is impossible. A new beginning must be made. She decides to let the third grade pupils read in second reader. The older children and the teacher return to the children who are cutting the story of "The Three Bears". All notice the shape of the piece used to cut the chair, bed, table, etc. Teach them square and oblong. Find other squares and oblongs in the room. Get some idea of their ability to estimate length in inches. Mount cutting that children have done. They are very proud of their work.

Recess. Play "Hide and Seek" and "Drop the Handkerchief." Children eat their lunches. Return to veranda. Older children make a list of vegetables in the garden. Teacher gives reading lesson to beginners and those who must begin all over again. Teacher shows picture of baby. The children are all glad to tell of the baby at home and also of the mother there with the baby. They tell of tending the baby and how they love the baby. Develop sentences: Who loves baby most? Whom does baby love most? Mama loves baby. Baby loves mama.

Write these sentences on the blackboard many times. Beginners read easily. Children who have been attempting to use the book hesitate and try to read the sentences word by word. Teacher lets them look at sentence, then look at her and tell her what they saw. Look at sentence; erase quickly. What did you see? Chalk given to children. Children hold chalk and write in the air with teacher as she writes the sentence: "Mama loves baby." Repeat several times, then erase, and let children write sentence on blackboard.

The beginners follow directions more carefully than those who have been trying to write and succeed better. All are encouraged to try again, and the

sentence is again written on blackboard just as before, children-writing in the air as the teacher writes on the blackboard. The sentence is erased and the children again attempt to write it. Finally, the two sentences presented are written carefully on the board by the teacher and allowed to remain. Correct work that advanced pupils have been doing and spell it as an oral spelling lesson.

Second day, September 20.

Teacher explains that there are household duties to be performed daily. These will be found written on blackboard in kitchen. Just now older ones may read for younger. Writes on blackboard:

Cut flowers.....	Jessie.
Arrange flowers.....	Mamie.
Dust.....	Amie May.
Arrange books.....	Johnny and Carrie.
Bring water.....	Lawrence and Charlie.
Wash and hang out cups.....	Melver and Nell.

Teacher shows pupils the drinking cups and explains that they are to be scalded, dried, and hung on numbered nails near the pump every morning. Duties done, all gather on the veranda. Teacher reads twenty-third Psalm, and the children begin to memorize it.

What shall we plant in our garden? Various things suggested. All who remember the beautiful sweet peas at the college are unanimous in their choice of them. Some suggest turnips. It is too late for turnips now. How about onions? Teacher shows onion sets. What are these? All the children know. What did we plant to get our tomatoes, turnips, etc., last spring? Seed. To get onions we plant sets. Jessie says her mother plants onion seed. Yes; teacher has some seed. Shows it to the children. When did Jessie's mother plant seed? In the spring. If we want our onions now we must plant sets. How do you suppose we got these sets? Bought them. Yes; but how did the seed man get them? What do they look like? Tiny onions. They really are. Seed planted close together in poor soil made these tiny onions which we call sets. Each child is allowed to examine a set. From which end will leaves come? From which end roots, etc.? Given clay and allowed to model onion. Feel your onion. Now feel your model. See that your model is just like your onion. Develop these words as children model: Onion, round, set, smooth, cone, leaves, flat, roots, pointed, grew, sprout, skin, white, rings, green, germ, thin, thick. Let older children learn these as a spelling lesson. Younger continue modeling while older ones spell.

How many onions do you think there are in this bag? What do we use to measure onions? Find dry measures. Measure and find that we have two quarts of onions. Sometimes onions are sold by weight. Estimate weight; then weigh, and write weight on blackboard. Write number of quarts on blackboard. How shall we plant our onions? In rows. How far apart must the rows be, and how far apart must the onions be in the row? What will tell us how far apart? Size of plant. Think of size of different plants; compare with onion. Can put them closer together than any of these. How close? Finally decide that rows may be 1 foot apart and that sets may be 6 inches apart in the row. How wide is your garden? How long will your row be? Seven feet long. Find number of sets needed for one row in your garden. First find number of sets needed for 1 foot; then for 7 feet. After children have discovered this, teacher places these problems on the board for advanced children: If sets are put 4 inches apart, find number of sets in 1 foot; in 2 feet; in 3 feet; in 4 feet; in 5 feet; in 6 feet; in 7 feet.

If sets are put 3 inches apart, find number of sets in 1 foot; in 2 feet; in 3 feet; in 4 feet; in 5 feet; in 6 feet; in 7 feet.

Beginners read somewhat as they did the first day. They read the two sentences learned the day before and add to them:

Nell loves Baby
Nell loves Mamma
Mamma loves Nell
Baby loves Nell

Use in this way the names of several members of the class. Write without copy, just as was done yesterday, "Mamma loves Baby."

Correct number work of advanced children.

Recess. Try to play ball. Not enough large children. Play farmer. Eat lunches. Return to veranda.

Have children attempt to tell story of "Three Bears." Younger children want to cut story again. Teacher shows them how to cut "Big Bear," "Middle-sized Bear," and "Little Tiny Wee Bear," to put with furniture cut the day before. Advanced pupils read in third reader "The Hill Pasture."

Mount work done in cutting. Teacher tells story of Chick Tuppen.

Third day, September 21.

Children came to school laden with great bunches of goldenrod. They are put in our big brown jars. Duties found written on blackboard are done and school opened. All on the veranda. Teacher gives ~~verse~~ verse of Helen Hunt Jackson's September:

The goldenrod is yellow;
The corn is turning brown;
The trees in apple orchards
With fruit are bending down.

Writes it on blackboard that older children may read it and copy it at their leisure.

We want to cook to-morrow. All of our utensils in the kitchen are soiled. They must be clean. Must know, too, what we have. All go to kitchen. Everything in cupboard and on shelves is washed, shelves are wiped off, table scoured, and everything made tidy. The work assigned to each is again written on blackboard. After this is done, fresh paper must be put on the shelves. Paper must fit. What must be done first? We must measure the shelves and then cut paper to fit. Advanced children, with sheets of paper, rulers, and pencils, set to work to get paper to fit shelves. Beginners read. Teach idiom, "I see." Give them many sentences containing the idiom:

I see Mamma. I see Baby. I see Nell. I see Jessie, etc.

using names of children in the class. Then, by making simple drawings of a leaf, cup, ball, apple, etc., let them read:

I see a (leaf). I see a (cup). I see an (apple), etc.

Let each child whisper to teacher something he sees. Teacher writes "I see" on blackboard and draws the object. Child calls on another one to read what teacher has written.

For writing lesson write: "I see Mamma." Children tracing in air as teacher writes; then, after sentence is erased, writing on blackboard.

Older children have fitted the paper to the shelves and are ready for the teacher to look at it. She praises the neatest, most accurate ones. Then asks: How long is this shelf? How wide? How long is *this* shelf? How wide? If they have forgotten they measure again. Advanced children make inventory of cooking utensils and dishes used in serving. Look at inventories made by advanced children and correct the spelling. Tack correct ones on inside of cupboard door for reference.

Recess. Play games. Eat lunch.

Pick and shell peas ready to cook to-morrow. Count number of peas in pod as they are shelled.

Advanced children read in second reader. Review story of "The Three Bears." Repeat verse of September.

Fourth day, September 22.

Household duties done. School opened. Twenty-third Psalm and first verse of September repeated. Teacher writes on blackboard:

We are going to cook to-day.
 We are going to cook peas.
 The peas grew in our garden.
 We picked the peas yesterday.
 You may get the peas, McIver.

Children who can do so read. Older children in beginner's class try to get the words and enjoy the effort. McIver brings the peas. How many peas do you think we have? Measure. We have 1 quart and 1 pint. How do you cook peas? Directions written on blackboard. Three children work together. Put 1 quart of boiling water in sauce pan. Put in 1 slice of bacon. Wash $\frac{1}{2}$ pint of peas. Put them into saucepan. Boil for 2 hours. Add 1 teaspoon of salt. After peas are all safely on the fire to cook, the clock is brought. When will the peas be done? What time is it now? 9.30. Two hours from 9.30 is 11.30. John's duty is to tend the fire and see that the saucepans are kept boiling.

Advanced children given these problems:

6 peas	4 peas	7 peas
7 "	9 "	8 "
+8 "	+5 "	+9 "

Beginners read. No new word is given, but a great many sentences are made with words already learned. A writing lesson is given as usual with the reading lesson. Correct number work of advanced pupils. Give older children in beginner's class some work in addition.

Get spray of peas—blossoms, leaves, pods. Let children draw and color with crayola. Develop these words: Vine, bloom, pod, hull, peas, leaves, stem, green, purple, brown, long, round, grows, runs.

Advanced children use these for spelling lesson. Continue ear training with beginners. Teach sound of m. Let children write it on blackboard, giving the sound audibly as they write.

It is 11.15. Peas will be done at 11.30. We must get our table ready for serving lunch. How many children? 11. Teacher makes 12. How shall we arrange our plates? You may all show me by drawing it on the blackboard. Decide to put five on each side and one at each end. How do you place the knives and forks? Knives on right. Forks on left. Which is your right hand? Which is your left? All show me your right hand. Show me your left, etc. Where shall we put the flowers?

Teacher then writes on blackboard:

Remove books and get table ready.....	Mamie.
Plates.....	Estelle.
Knives.....	McIver.
Forks.....	Charite.
Chairs.....	Lawrence, Aggie.
Out bread.....	Jessie.
Flowers.....	Nell.

Peas are served in bowls. When all is ready, lunch is announced by one child. He says: "Lunch is served." All take places at table. A simple grace is said. Children help each other to peas. Bread is passed. Some call this peas porridge. "The three bears" ate porridge. They left it to cool while they went for a walk. After the children have talked about the story of the three bears the teacher suggests that there is a rhyme about peas porridge. She begins to recite and children join in with her. Children are shown how to use fork properly, how to break their bread, and to eat slowly.

All enjoy the warm lunch. When all have finished, the teacher writes on blackboard.

Plates.....	Charlie.
Forks.....	Agnes.
Crumb table.....	McIver.
Wash dishes.....	Mamie.
Rhuse.....	Carrie.
Dry.....	Johnny, Jessie, and Nell.
Put away dishes.....	Rosa.
Wash tables.....	Charlie.
Wash towels.....	Annie, May, and Maggie.

Teacher resumes place at table. Gives signal for all to rise. All leave table in an orderly way. They go merrily to work and soon everything is in order again.

Teacher tells again the story of "The three bears" and an attempt is made to dramatize it.

Fifth day, September 25.

Find peculiar caterpillar on cotton. Put bunches of cotton with caterpillars clinging to them in terrarium. Find others on convenient limb of cotton and tie piece of mosquito netting securely around limb, thus caging caterpillars on the stalk.

Household duties are performed. School opened. Another verse of September memorized.

Teacher wishes to teach children some games. Bean bags offer a variety of instruction and easily learned games that prove interesting to the oldest as well as to the youngest. She therefore decides that they must have bean bags. The children can make them for themselves. Get scraps of gingham from friends. Children bring some. Explain to children what is to be made. Draw plan on blackboard. What figure is this? Oblong. Review oblong. What is size of this oblong? 5 inches by 10 inches. Show me two sides. Two ends. How many corners? Kinds of corners? Length of one side? Length of two sides? Length of one side and one end? Length of one side and two ends? Length of two sides and two ends? Length all around the oblong? We call this the perimeter. What is the perimeter of your oblong? Draw figure as it will look when folded. What shape is it now? Square. What is the difference between square and an oblong? Take some time to get correct expression. Size of square? Number of sides? Kind of sides? Number of corners? Kind of corners? Length of one side? Length of two sides? Length of three sides? Length of four sides? Perimeter of square? One-half of perimeter.

All cut bean bags by measure from gingham. Peas are to be put into bag. Bag is first basted, then sewed. A little place must be left open to put in the peas. Decide that 2 inches is long enough. Develop these words:

bag,	thread,	short,	thread,
oblong,	needle,	small,	cut,
square,	stout,	tiny,	sew,
gingham,	strong,	little,	baste.
cloth,	even,	closely,	
scissors,	straight,	evenly,	

All haste. Advanced pupils copy words and learn to spell them. Beginners read. "Kitty" is a new word. Old words combined in sentences with the new word kitty. Write, as usual, "I see kitty." Let advanced children spell orally words copied. Teacher takes a short walk with children. Notice signs of fall—goldenrod, aster, and other fall flowers. Notice the butterflies and grasshoppers. Sees a woodpecker and a mockingbird. Children eat lunch. Gather on veranda for social period. Teacher tells story of "Goldenrod and aster." Shows silhouette pictures in plan book. All recite "September," "Jack and Jill," "Polly put the kettle on," etc. Advanced children are assigned work in addition in Milne's Arithmetic No. 1. With beginners continue the ear training and teach the sound of *s*. Review sound of *m*. Write both on blackboard, sounding each softly, as written. Correct work of advanced pupils in arithmetic. Children wish to use their spelling book. They are allowed to study the first lesson.

Beginners try to cut the story of "Golden Rod and Aster" from picture in the plan book. Advanced pupils write spelling on blackboard. Words very simple. None misspelled. This class reads in second reader.

Sixth day, September 26.

Caterpillars playing havoc with cotton; they have eaten nearly every leaf. Caterpillars are growing and changing color. Our household duties are done. School opened. Children repeat in concert twenty-third Psalm. Repeat "September" in the same way.

Speak of things seen on excursion that we took Saturday. Birds are mentioned. How many have seen birds closely? What are some of the parts of a bird? What is general shape of body? Of the head? How is the head joined to body? Why is neck curved? Eyes—where placed? Nose and ears? We shall try to see whether a bird has any. Wings—correspond to which parts of your body? Legs—how placed? Toes—why are they so arranged? Which birds walk around and which hop? Covering of birds. Advantage of feathers—warm, light, can fit closely to body or spread into fan shape. Kinds of feathers—use of each kind. Use of tail? Does shape of body help bird to fly? In flying what does bird do with his feet? Can you tell now why they are placed as they are? Bones of bird—light, cavities filled with air. Do bones help bird to fly? Name everything that helps bird to fly. General shape of body, head so shaped and placed as to steer in flight, wings are to propel, tail is to direct the course of the bird, feathers soft, light, close-fitting, feet can be drawn up close to the body so as not to interfere with flight of birds, bones are light and contain cavities filled with air.

Food of birds. How many know how chickens eat? No teeth. Food passes into crop. Ground in gizzard by small stones that the chicken has swallowed. We shall watch all the birds we see and try to find out what they eat. We know a bird eats grain. One reason for his having a hard pointed bill instead of a soft mouth like ours. Words learned:

head	feet	long
body	toes	weak
bill	crop	spreading
eyes	stones	flies
ears	round	ents
nose	pointed	sings
neck	hard	hops
feathers	curved	walks
wings	light	grinds
tail	soft	spread
legs	two	

Beginners learn action word *hop*. Commands Hop, Nell; Hop, Agnes, etc., written on blackboard for children to read silently and then perform the action. Writing lesson given in connection with reading lesson as usual. Ear training continued. New sound *h*.

Older children drilled in rapid addition and subtraction. Beginners shown 1-inch, 2-inch, 3-inch, 4-inch, 5-inch sticks and work given them in number, using them as illustrations. For example: Show me the 1-inch stick. Show me the 2-inch stick. Compare them. Show me the 3-inch stick. Compare with 1-inch stick and 2-inch stick, and so on with each stick, comparing with the ones previously used. Review stories and poem. Older pupils read in second reader.

Seventh day, September 27.

Household duties done as usual. School opened. Caterpillars examined. Study woodpecker. Have had preliminary study of birds the day before. Notice particularly coloring, bill, wings, tail, and formation of toes. Children pleased to learn how woodpecker can balance himself so well when he pecks. Why does he peck tree, telephone post, etc.? For food. To make a place for his nest. Learn from bird book how nest is made and number and appearance of eggs. Words developed are:

woodpecker	hole	four
head	worms	two
bill	insects	front
tongue	trees	back
neck	posts	harmful
body	poles	braces
wings	red	pecks
tail	black	flies
legs	white	calls
toes	sharp	eats
nails	long	covered
feathers	slender	
eggs	stiff	

Teacher reads "Myth of Woodpecker" from Cooke's Nature Myths and Stories. She shows picture of woodpecker.

Advanced children draw and color woodpecker from this picture. Beginners read action words *run* and *jump* are taught. As the sentences, Hop, Nell! Jump, Mary! are written on the blackboard, the children perform the actions. Many commands are written, the name of each child in the class being used several times. Then write on blackboard: Run, run, run! Jump, jump, jump! Hop, hop, hop! See Lawrence hop! See Annie May run! See Melver run and jump, etc. For writing, let children write commands on blackboard for classmates to perform. They write the command and then call the name of the one they wish to perform the action. Some of these attempt to draw the woodpeckers. Others sew on bean bags. Older children have a lesson in arithmetic. Reading lesson in second reader. Spelling lesson No. 2 in Progressive Speller, and words developed in lesson on woodpecker. Beginners given quick drill in recognizing various lengths, using 1-inch, 2-inch, 3-inch, 4-inch, and 5-inch sticks.

Teacher writes on blackboard: "We are going to cook to-morrow. We are going to cook some of our peanuts. Come with me to the garden. Pull up peanuts, sit in shade of tree, and pick them off."

Eighth day, September 28.

Who remembers what we are going to do to-day? Teacher writes, You may get the peanuts, Mamie. Suppose we measure them. What measure shall we use? Dry measure. After peanuts are measured, we decide how they are to be cooked. New peanuts are better boiled. Must be cooked thoroughly. Will cook them all together in one vessel, as it is hard to keep all parts of stove hot enough to keep a vessel boiling. Wash peanuts and put them to boil. Put in 2 tablespoons of salt. Why do we put it in at first? Has to go through hull of peanut.

Growing peanut vine brought into house. Examine bloom; examine peanut. Bloom above ground; peanut below ground. How does this happen? Find elongated pistil of peanut ready to pierce ground. Have made a great discovery. After flower is fertilized, the stem bearing little peanut becomes long, goes down into ground, and the peanut is formed under ground. In what kind of soil should the peanut be planted? Teacher then tells children where peanuts are raised and something of harvesting them and their preparation for market.

Advanced pupils have arithmetic from their book.

Beginners. *Can* is the new word. Teacher writes a command on blackboard, and after child has performed it writes for him to read: I can run, hop, or jump, to suit the command given. She then writes: Can baby run? Can baby see mama? See mama, baby. Baby can see mama. Baby loves mama, etc. Writing lesson, I can see. Mother Goose rhyme is taught:

Jack be nimble,
Jack be quick,
Jack jump over the candlestick.

It is written on blackboard. Teacher teaches them a tune for it. Act it as they sing. Cut the story with paper and scissors. Phonics, sound of *f*. Advanced children read in second reader and spell in Progressive Speller.

Social period. Review stories learned. Peanuts given them to take home, with instructions to ask mother before they eat them.

Ninth day, September 29.

Bean bags are finished. Put 1 pound of beans in each bag. Sew up the opening that was left in the bag. Draw concentric circles on floor of veranda with chalk. Number circles. Each child allowed three throws. Puts score made on blackboard. Adds number of points made. One gets largest number wins game. Another game. Divide school into sides. Each child throws once. Score kept on blackboard. Side making largest score wins the game. All enjoy game and do not know they have been having an arithmetic lesson. Advanced class do some work in Milne's Arithmetic.

Beginners read. General review of everything already learned. Four pages of chart made by teacher are learned.

Recess. Children play with bean bags.

Reading lesson:

Polly put the kettle on,
Polly put the kettle on,
Polly put the kettle on,
We'll all take tea.

Read it, sing it, cut picture suggested by it. "Jack-be-nimble" reviewed: Phonics—new sound, hard *o*.

Advanced pupils read in second reader and spell in Progressive Speller, No. 1. Social period: Each child gives a Mother Goose rhyme story or riddle. Teacher tells the story of "The Fox and the Bumblebee."

Tenth day, September 30.

Caterpillars everywhere, crawling in every direction on the porch and even in the rooms. Every leaf of the cotton has been eaten and even the squares and blooms have been devoured. Our household duties are done and school opened. Some of the caterpillars are placed on the table for study. Appearance—hairy, green, with black dots on a yellow line. How does the caterpillar crawl? Like a measuring worm. Notice and see if you can tell why this is. Has no legs in center. When did we first find the caterpillar? How did it look then? How does it look now? A few caterpillars are put in different receptacles to develop into cocoons.

Make a note of the cotton caterpillar in our "Book of Bugs." Date on which we first noticed the caterpillars? September 25. What is to-morrow? October 1. Write the names of the two months on blackboard. What season of the year is it? Fall. Name the third fall month: November. Say the three fall months with me. What kind of weather are we having? What part of the day makes you think of summer? What part of winter? Name all the seasons. How many are there? Name all the months of the year. Teacher writes names of seasons and months on blackboard and leaves it for spelling lesson for advanced pupils.

A game of bean bag is again played. The advanced ones keep the score. A drill in rapid addition is given them. Advanced pupils do work in arithmetic.

Reading for beginners. Two new words, *big*, *little*. Baby is little. Kitty is little. Mama is big. Mrs. Browne is big. Nell is little. Charlie is little. Agnes is little. I see a little kitty. I see a big (picture of ball in drawn). Phonics—review sounds previously taught and teach sound of *p*.

Recess. More bean-bag games. Eat lunches.

Social period. Memorize entire poem "September." Story of "The Fox and the Grapes." Older children write the story. They read in second reader. Do some work in Milne's Arithmetic, and have a spelling lesson in the Progressive Speller, No. 1.

APPENDIX B.

REPORT OF FIRST MONTH'S WORK.

September 19 to October 14.

First and advanced grades.

Arithmetic. Learned to count and write numbers from 1 to 10. Have had addition and subtraction of numbers from 1 to 10. Learned expressions horizontal and vertical; square and oblong. Learned to use foot rule, to find one-half and one-fourth of foot. Used liquid and dry measures.

Reading. First-grade children have learned about 20 words. First advanced grade has had about 75 words. Both classes read from a chart made at school and read Mother Goose Rhymes written on blackboard.

Phonics. Learned sounds of all the principal consonants. Have combined them with short vowel sounds.

Nature study and literature, etc., was the same for all.

Third grade.

Reading. Found third reader difficult, so have used the second reader.

Arithmetic. Milne's Arithmetic, No. 1, covered first 30 pages.

Language. Kept records in Garden Book and in Book of Bugs. Reproduction stories: "The Fox and the Grapes," "The Fox and the Crow," "The Hare and the Tortoise," "The Sleeping Apple," "Goldenrod and Aster."

Spelling. Progressive course in Spelling Book, No. 1. Have covered the first 15 pages.

Literature for all. Studied and dramatized "The Three Bears," "Chicken Little," and "The Goats in the Turnip Field." Have read and told other stories for recreation. Poems learned: H. H. Jackson's "September" and "October," "October's Party," part of Longfellow's "Hiawatha," and "Mother Goose Rhymes."

Nature study for all. Cotton caterpillar and the caterpillar found on violets and the one found on oak trees. Studied the downy and red-headed woodpeckers and the flicker. Learned the names and habits of some of the fall flowers, goldenrod, aster, and wild carrot. Made a complete study of the apple.

Agriculture for all. Harvested corn and peanuts.

Cooking. Rolled peanuts and cooked peas.

Sewing. Made bean bags.