

fact that the farmers began to import sheep and raise more wool and flax. We discussed the reasons for the early development of shipbuilding in New York, the children concluding that the Dutch would encourage this, as it would not interfere with any like industry at home.

We took up the work of Governor Kieft and Peter Stuyvesant—the first because of the harm he did the colony by foolishly antagonizing the Indians, and the second because of the improvement of conditions under his rule and the consequent growth of the colony.

There was a heated discussion over the remark of Governor Stuyvesant that he would be a father to the people, several of the children seeing no reason why the colonists should object if he was a good one. After some time they were forced to see that no system of government could be a good one if it depended on the will of one man.

We read of the surrender of New Amsterdam to the British, the change of names, the change of government to a royal province and the establishment of an assembly. We went somewhat into the trouble between governors representing the king and the people.

There was a division of opinion as to the formation of parties in the colony, certain of the children claiming that of course the common people would side with the king to put down the patroons as in Europe they had done with the Barons and it took some questioning to make them see the difference in the conditions and that in this case patroons would side with the king.

OK.

Miss Bacon.

Amey

We took up the heating and lighting of the home and the children made a tour of the building to see the different ways in which the school is heated: the stove in the shop, the lamp in room 8 and the furnace in the basement. We moulded candles and *from* paraffine. These turned out very satisfactorily. Group IV. came in while we were making them and wanted to stay until after they were finished. Groups III. and IV. have been doing all the hardest work on the playhouses, making such things as the Kindergarden children could not do well. They hemmed the curtains and painted the chimney.

We took up the subject of the apartment houses where more than one family live and made these out of blocks. The children made them large enough to get into and then they tried outlining rooms with chairs while they were playing by themselves. Group III. a comes in once a week in our handwork period, and this week we worked on the songbooks they are illustrating. We decided to stop work on the playhouse until the other children came back in the spring, so that they might have a chance to do some work on it. The older children have finished their rugs and taken them home.

We cooked cream and wheat one day and apple sauce another day. The work in our training with bells is getting more interesting. At first the children did not like it, but now they can hardly wait their turns.

Miss Scates.

JK


Social Occupations.

We have continued the lumbering and have taken the work at a later stage after the logs have come down to the mill. The children had two mills, one at a higher point on the river than the other, and difficulty arose in distinguishing which logs should go to the one mill and which to the other. It was finally decided that some mark would be necessary and they were told that the lumbermen chopped a mark for a certain mill on every log they cut. When the logs came down near the first mill they were looked over and all for a certain mill were put into a boom made of logs chained together. The rest were allowed to go freely down the river. One day they had a log jam and found it would be necessary to follow the logs down the river in order to prevent a jam. The children recognized the danger that would come from this state. The inside of a sawmill was described to the children with pictures and the methods of sawing wood. While they were playing this, to explain the method of making a boom, I drew the picture of a river on the board for a bird's eye view. The children had great difficulty in understanding it, so I drew it on the floor at their feet. Then they wanted to put in it the loghouses of the lumbermen and the mill and the other things necessary for the picture. In doing this they had difficulty in making a bird's-eye view of a house. They wanted to make a side-view and it took some time looking at many things to realize that there would be only the top visible. After that they worked it out in the sandbox. Besides the mere lumbering we brought out the physical features necessary to make a large river and the conditions it would have at its source and mouth. With Miss

Dolling they have been studying the different kinds of wood and testing them for hard and soft wood. They now can distinguish pine and oak. They were shown pictures of the common trees that are used for lumber and cross-sections and longitudinal sections of the woods themselves.

In number they have continued the same games, which they do not seem to tire of, but have taken up the combinations of counting by 3's and have also been given numbers to find how many 10's and 5's there are in each.

A half hour was spent in illustrating "Black Beauty" and a half hour in telling their own stories when both groups were together. Some of the children not knowing a story but not wishing to be passed over, gave a Mother Goose rhyme. This was entirely their own idea. They have dictated a report for the school paper and spent one hour in reading.

Miss Andrews. 

Art Work.

They have been making illustrations in colored chalk in connection with the processes of making maple sugar. They did not get the trees very well, so I had them draw a forest on another day. Someone suggested the animals that lived in the forest and so they looked at the cast of a wolf and then attempted to draw it from memory. Then some of the children wanted to draw the wolves' homes and others wanted to put in different animals.

Miss Sexton.

History and Science (a).

A little more than one hour was spent in connection with the game we have been playing of life in the agricultural village trying to see if the children would give mythical stories easily in connection with the various natural phenomena, such as the changes of the moon, sunrise and sunset, rain and the seasons. The thing was an absolute failure so far as their being able or desirous (beyond their ordinary wish to take part in the discussion) to tell or even act out such stories. I am not quite sure to what the failure was due and shall try again later in a different way. They began by playing that one of the class was much older than the rest and they were asking where the sun went and what happened to the moon, etc. The one thing that the grandfather did was to contribute more questions, such as, What is the sun doing when it is night? instead of attempting to account for those that were asked him. Thinking that perhaps it was a little too remote the next time I tried to find out what stories they would have about fire, where it first came from. They began with Old Mok's story to Ab about the Fire Country. The only thing given was that the old man said that they would strike stones together to see whether they would make fire and they got it. The rest of the class did not accept this but said, How could they strike stones together to make fire when they did not know they would make fire? They used the same methods with the clouds. One child who had evidently been told the story began to tell of the sun's taking a drop out of the stream and dropping it again on the land. The children were not interested in it and asked how the old man would know that

the sun had taken up a drop and similar questions.

They then went back to ~~counting out~~ their game and I found that coming down to this agricultural village from the occupations of the plain they were not able to reproduce the village life as a whole. The only things suggested were things like threshing or gathering the wheat and the ordinary everyday occupations, preparing the wheat for use, etc., grinding and cooking and such things as caring for the sheep (which though mentioned they left uncared for), building fires, fishing and hunting and caring for the children seemed to have passed out of their minds as part of the village life. I think this was partly due to their feeling of the importance of the wheat as the one thing these people had which the other village did not and by further work with it and completely working that out from the threshing, winnowing, grinding and cooking the other activities will come to them as things they would like to carry out. The experiment side of the work has been the invention of the flail and its advantages in threshing, how they would winnow the wheat having it where they took advantage of the wind, grinding and especially the advantage of these in cooking. They seemed to make no connection between the work they had done in the kitchen with the different forms of cooking and what they had to do with the wheat they had threshed and ground. It was not until they were asked how much water they would put with their wheat in the kitchen that they had any idea of using the same proportion to the wheat they had just ground. When left to themselves to cook this ground wheat in water they invariably added a lot of water, about ten times the proportion they had been accustomed to. Only one

child used without suggestion the fact that wheat cooks more easily by stirring it first with a little cold water before adding boiling water. The difference in utensils, in burners and the small amount of wheat would seem to account for this isolation of ideas. After the kitchen was mentioned they all wanted to rush down and get sauce-pans and measuring-cups, but soon got the idea that their beakers could measure just as well as the tin cup.

They were so civilized that they hesitated about eating the porridge they had cooked because in cooking a gelatinous scum formed over the top and wrinkled and looked as they said, "very bad". The two boys were much worse than the girls in this respect

Miss Camp.

History (b).

They have been weighing the weights they moulded and filing them off when necessary. They have also remolded some of the poorer weights. This had brought in some number-work in adding up the weights needed to balance one whose weight they were determining and in subtracting when it was necessary to put a weight on the same side with their leaden one to see how much it lacked of a certain weight.

We have looked at some pictures of mountains and valleys and the children have pointed out where the miners would live. In telling the story they said that when the miners brought the metal down to the people on the plains, the latter would smelt it for them and do the work for which they could keep part of the metal. It took them some time to get at the idea that they could trade it for wheat or cattle.

Miss Hill.

Cooking (a. & b).

They made white sauce and reviewed the cooking of the potato.

Mrs. Feuling.

Art Work (a).

They are making illustrations for their story. This week they showed Ab and Old Mok going for the stone to make the kettle and drew the interior of the cave with Old Mok chipping out the kettle. It was their first attempt at drawing an interior. It was difficult for some of them to realize that they could not see the outside at the same time that they were showing the inside. They finally realized their relation to the inside of the cave and one drew an excellent picture. All showed the fire and tried to show it lighting up Old Mok as he worked at the stone. This class seem to have a realization of the whole story and although they do not know how to express themselves they are interested and worked together as a class.

Miss Cushman.

Art Work (b).

The history teacher had requested me to help them get more of an idea of landscape--mountains and plains. I tried to interest them in this. As soon as I suggested the connection with their history, one of the children said: "Oh, let's not talk about that," and the class feeling seemed to go all to pieces. There is no central interest from their work that they wanted to do, yet they showed that they did not have an interest in landscape as separated from a story. Children do not care for these things except as they enter into life. So I asked the children to tell stories themselves about landscapes and plains.

Francis told a story which his father had told him about the plains and how horses are caught. Another child wanted to illustrate the same story as Francis had told him and one of the girls wanted to represent a forest. So they did this.

Miss Cushman

History (a).

They have finished the first voyage of Columbus. One day they got completely mixed up about the parallels of latitude from looking at a map of the hemispheres on which the lines of latitude dipped towards the equator at the center. The next day they began talking about the countries in a certain latitude being further south than others in the same latitude. Although they had used a globe more than maps, I found it necessary to have them draw the lines on the black globe and find out for themselves. They made a map in sand of Cuba and Hayti. I read to them Columbus' letter about the first voyage as given in Higginson's "American Pioneers".

Miss Hill.

History (b).

We finished this week the story of Columbus. The gradually accumulated interest of the children was very marked. His life as a whole seemed to come to their minds as it had never done before and this without suggestion on my part. Afterwards, seeing that they did take this view of it, we recalled and mentioned his aims at the beginning, what he had accomplished and his failure. The children showed by the expression on their faces and by their questions that they were getting a grasp of the whole story. They heaved pathetic little sighs as the statement was made that the commissioner sent to investigate the reports of his cruelties and lack of management at San Domingo, arrested him and sent him back to Spain in chains. They were told that the captain of the ship offered to remove the chains but that Columbus refused on the ground that the king and queen had authorized the commiss-

ioner to do what he thought best and Columbus was not willing to be relieved of the chains except by their orders. (p.204, "Columbus" by C. K. Adams). I read to them the speech of the queen stating the complaints against Columbus (p. 207 ib.) Then I told them of Columbus' last voyage, where he discovered South America as given in the chapter on his last voyage in the same book. I finally told them, because they asked for it, about his death and the removal of his body later to San Domingo. As an experiment I told them also of the fact that later the French owned part of the island which contained Columbus' body and that the Spanish resolved to remove it to Havana, where a monument is now erected to his memory, but later it seems to have been discovered that the wrong casket was taken and by the best authorities now known the remains of Columbus are still in the old cathedral at San Domingo.

We attempted to trace the results of Columbus' life by finding again on the map all the lands he discovered, the increased navigation that resulted and the new places, trees, animals, products, etc.

I told them of the coming to the eastern coast of North America of the Cabots and of the reaching of India by the Portuguese and of the desire on the part of many explorers to go to the new lands. We found that the islands in the West Indies where colonization had begun were in a warm climate, and the children mentioned sugar-cane as a possible product. When asked what beside sugar could be made from it someone suggested molasses, greatly to the surprise of two others who had no idea molasses could come from sugar cane.

Number Work.

They have nearly all finished the calculation of the amount of milk required in cocoa for from 1 to 10 people and have taken up the diagram of the multiplication table as given to group VI. All of the children wanted to continue their work in the second period, which was put down for reading, so I permitted them to do so, and Cordelia, who got very much interested in her diagram, asked to go on with it in her free period which followed. She was allowed to do so and finished it having worked voluntarily nearly 1 1/2 hours.

Miss Runyon.

Science (b).

They measured the column of mercury and calculated the height of water if mercury were fourteen times as heavy as water. They have talked a great deal about the push of the air and the amount of that push dependent on the weight of the air as weight depends upon the temperature. They have spent this time on detail work with the barometer and thermometer as the easiest and most available representation of that force. In an unsuccessful attempt made to fill a U-shaped tube a little air was left above the mercury, so that the mercury was noticeably shorter than in the open tube. After the children found out why it was of no use, we broke the end and let in the full pressure of the air and the children watched with much pleasure the mercury forced out in a stream at the lower end.

Miss Camp.

Science (b).

Spent their whole time in writing records and getting together, reading and correcting the records of the term.

Miss Andrews.

Cooking (a).

Meat (continued).

A general review was taken of the cuts of meat and the method of cooking each, the children being able to reason from the position of the cut, whether it would be tough or tender and hence what means would be employed in its cooking. Soup was prepared for luncheon according to the method which the children had found by experiment to be the best for extracting juices from meat.

Farina and cocoa were also prepared.

Number Work:

The following recipe for farina being sufficient for 6 people, find what will be necessary for 1: 6 tablespoonfuls farina, 12 saltspoons salt, 3 cups water.

Miss Tough.

Cooking (b).

They separated the starch and gluten from the flour and examined the nature of the gluten and also to find out the general composition of flour. The process was similar to the potato experiment. This was a preparation for their work on gluten wafers which they made the following week. They made a very stiff dough and chopped it for 10 minutes. They stretched the gluten and realized that they were getting the gluten to a similar condition as the white of egg when beaten in the air. A small portion of the dough, large enough for one wafer, was moulded

into a ball and then rolled out to paper-width thinness. The children worked with ^{interest} ~~intense~~ care and dispatch.

Miss Harmer.

Textiles (b).

They worked out a plan for a loom on which to weave the yarn they had carded and spun. They examined a piece of cloth to find out how many sets of thread would be needed and which threads should be put on the loom first. They decided that the stronger and heavier one should be put on first and that they would need two sticks. They then found that they would require two more sticks to hold the first two apart. Each child worked out his own plan and the simpler one was voted on by the whole class. They worked one period finishing their baskets.

Miss Harmer.

Art Work (a).

They spent one day on bead work with Mrs. Brown and the other day represented the ships of Columbus in the storm. They had no idea what the ocean looked like, so I made a sketch showing them how the ocean looked and they watched. Then next week they did this from memory. The ships were represented in the distance.

Miss Cushman.

Art Work (b).

We illustrated scenes from Robinson Crusoe. Each child chose a particular part of the story: the storm, the shipwreck, the making of the tent, the watching of the savages on the shore, and the finding of the footprints on the sand--these were the things that seemed to impress them the most in the story. One period was spent on beadwork with Mrs. Brown. Miss Cushman.

Gymnasium.

All the children above Group III. have been individually examined. Of the forty-three girls a slight spinal curvature was discovered in twenty; three cases seem serious. Seven seem to be in poor physical condition, irrespective of spinal curvatures. Fifty boys were examined and thirteen were found to have spinal curvatures; five cases were serious. Twelve of the whole number were in poor physical condition. The examination was a rigid one and all the slight deviations of the spine were noted, which accounts for the large percentage of curvatures. The cases were reported to the parents, and when necessary, special work was advised.

It is a disputed point among scientific people at what age children should begin to be examined for physical defects. Some scientists assert that it is impracticable for any child under eight or ten years, as the percentage of children younger than that who have slight deviations is so great. However, the weight of authority seems to be that curvature is not a normal condition wherever found, and that while the child is likely to outgrow the difficulty if proper care is taken both as to physical training and nutrition, still it is hardly advisable to risk letting it go.

For the first five months the work in the gymnasium consisted mostly of gymnastic drill. This was to get rid of the influence of the school-room and also to act as a corrective to the various poor positions which the children assume. Since February 1st the work has tended more toward games and plays, in order to prepare the children for outdoor work as soon as the

weather permits.

It was a question with the teacher how soon regular gymnastic work should begin with the younger children. He is of the opinion now that they should have very little work other than games and plays up to eight or nine years of age. The educational value of gymnastics as compared with systematic games is questioned. The opinion of a great many people is in favor of the games, and they have much on their side; if the games are conducted in a systematic manner, from the simpler to the more complex, there is no doubt that this is a great factor in the development of the child's sense of coordination and control, which, after all, is the main object in physical training.

Mr. Peterson.

History.

For the sake of some of the children who had been away the expansion of the Virginia colony under Dale was given by the other children: the part played by the new charter brought in 1619, the permanency established by the coming of wives and slaves. Then I told them briefly of the removal of the charter by James I. and of the death of Charles II., which left the colony to run itself for some years. The next event I wanted to take up was Bacon's Rebellion. I decided to do this by finding how much the children could get from hearing the account read, as I want them as soon as possible to get their history facts for themselves. I read to them from Magill's "Stories of Virginia", which is in the school. After reading a paragraph I asked a child to tell me what was in it, and then another. Some of them remembered the last thing first; some of them remembered

only two out of three or four facts and others were able to grasp the idea in a paragraph of from twelve to fifteen lines and present them clearly.

In Number Work they have continued their diagrams of the multiplication table. They have enjoyed the work and two or three of the children have said that they are going to make the same thing at home. I suggested to them that they could make a game out of it by putting down one number in a square themselves and then having the person with whom they are playing put down the next number in the next square, etc. I have left the children to work by themselves as much as possible, once or twice leaving them alone, because most of them need to be thrown on their own resources.

Miss Runyon.

Science.

Spent half their time in correcting records and the rest in reviewing their work in alloys, taking up the value of alloys, the effect on certain metals and the alloys in coins. I asked them for a test for an alloy in copper, since they have had more work with this than any other, and they gave me two. If the metal were put in the flame, green color would indicate copper and if put in an acid, blue would indicate copper.

Miss Andrews.

Cooking.

Same as Va.

Textiles.

They have continued making baskets from reeds.

Miss Harmer.

Art Work.

The children who have been out on account of sickness are finishing their slabs. The others worked with Mrs. Brown on their designs or helped me cast their slabs. There was not much work they could do the first time, but they watched me and waited on me to see the process.

Miss Cushman.

German (b).

They are learning the story of the "House that Jack Built", as reported last week, and a German song. Incidentally I bring in as much vocabulary as possible, giving the directions to them in German. They are doing much more satisfactory work than at first.

Miss Schibsby.

Cooking (a).

They prepared Vb's luncheon as well as their own and continued their work on meats. They prepared steamed fish. In examining the structure they found that instead of its being of a fibrous nature, the fish when cooked flaked apart. The connective tissue was much finer and more delicate and hence greater care should be taken to keep the temperature low, so that the fish would not break apart. They also prepared boiled potatoes and egg sauce for the fish and made cocoa.

Miss Harmer.

Cooking (b).

Review of Albuminous Foods.

Eggs (continued). In talking of the composition of the parts of the egg the shell was first examined. One of the class remembered that it had lime in it, but the others were not positive on this point, so it was decided to make some tests to discover if this was true. From work done in another class the children remembered that when acid had been applied to limestone a gas had been given off which was called carbon dioxide. They also knew that this gas would extinguish a lighted match, and would cause a clear lime-water to become cloudy. Through these facts they

were able to arrange the apparatus and materials to test for lime in the egg-shell and were interested in seeing that considerable gas could be collected from one egg-shell. Next week the residue of the shell from which the lime has been removed will be examined. The white of the egg was talked about and found to be mostly albumen with some water and mineral matter. The yolk was known to have albumen, water and salts also, but the children thought from its appearance that it must have something more. Fat was suggested and seemed satisfactory, but a test for it was deemed advisable. This was worked out with some help and the experiment begun, but owing to an accident it was not possible to finish it.

For luncheon boiled rice, poached eggs and cocoa were prepared.

Number Work: Rice requires eight times its bulk of water in cooking. Calculate the amount of rice and water necessary for the class luncheon, allowing each person $1/8$ cup of rice. Make enough cocoa for the class from the following recipe which is sufficient for one: 2 teaspoons sugar, 2 of cocoa, 2 table-spoons water, $3/4$ cup milk.

Miss Tough.

Science (a).

They have spent all their time on number work. They have had great difficulty on the technical side and so I have had them formulate the multiplication tables. They enjoy the work and don't wish to have any connections or applications pointed out.

(b). Same as VIIa. Beginning to tire of it, possibly because they had some of the same sort of thing last year.

Miss Hill.

Art Work (a).

They drew Miles' Standish's house from a building of blocks. I did not give them any rules for perspective, but simply allowed them to see the proportion between the ends and the sides of the houses following the eye rather than the conscious feeling of perspective.

Miss Cushman.

(b).

They are working in water colors, paying special attention to the handling of materials in still life, using the colors in a large way.

Miss Cushman.

Latin.

They have been doing some sight work and are working at the declensions and a little on the conjugations. I am letting them use the cases as much as possible, calling their attention to them in the sight stories. They have turned some English into Latin and have analyzed simple sentences.

Miss Schibsbby.

Art Work.

They are doing the same work practically as VIIb.

Miss Cushman.

Latin.

They are analyzing more difficult sentences, getting hold of modifiers and trying to distinguish the differences. They are also working on the charts of the conjugations and going on with the Argonautic Expedition.

Miss Schibsby.

Art Work.

They spent one day in working on designs for their Indian looms and one day in giving a color chart, working out the three primary colors and taking from them the last of the complementary colors. I showed them a point star with the red, yellow and blue on alternate points and the binary colors, green, purple and orange, in the intermediate spaces.

Miss Cushman.

They are learning a song and have analyzed it. It has some idiomatic constructions which I wanted them to get. This has been made the basis for grammar work in declensions and conjugations. They now recognize complex sentences and can tell whether the dependent sentence has adverbial or adjective modifiers.

Miss Schibsby.

Sanitation.

From their work on soils they planned an ideal cellar. The points brought out in the previous work were: the water in the soil and the circulation of pure and impure air, both influencing the condition of the cellar unless precautions were taken to exclude them. Walls of more or less impervious material and a cemented floor would keep out dampness. The impure air should be replaced by free ventilation by means of windows on all sides of the house, so as to catch any wind that was blowing, also the windows must be directly opposite to secure a draught. In order to get the fresh air the cellar or basement must be one-half or one-third above ground. The point was brought out that hot air rises; hence when the house is heated it is fed from the cellar, and hence the importance of keeping the air pure. The capillary attraction of water was explained showing the necessity for a damp-proof course in the cellar wall. To show this they were asked to recall what happened to a lump of sugar when the end of it was placed in water and saw that the water quickly traveled through the lump. They selected limestone for the walls, because it would be cheaper than any other on account of its being a native rock.

After they had planned their cellars we went out into

the yard to select a place for the building of the house. The following week they formed a club and one child acted as temporary chairman. A president, secretary and treasurer were elected. They then formed committees to be made responsible for the different lines of work. They elected an architectural committee, a building committee, a sanitary committee, a ways and means committee and a committee on interior decoration. Heads of committees were selected, not from personal preference, but for efficiency, as they would have to have some experience in directing the children under their care.

Miss Harmer.

Art Work.

This week was given to the work on the houses. They drew a perspective view of a house with the angle toward them and drew it to a scale. This was from the ground plan.

Miss Cushman.

Science. This week we have come definitely to the theory of the spectroscope. It seems somewhat abstract for the group and requires going slowly and with considerable repetition, but I believe they are getting a fair hold on it.

I began by reviewing a little, asking what a molecule is and whether there are more of them in a cubic centimeter of water or ice provoked considerable discussion. Some one suggested--perhaps it was Frances, I am not quite sure-- that ice floats on water and that in freezing water may break whatever it is in, i.e. water expands on freezing, and therefore there are more molecules in one cubic centimeter of water than in the same volume of ice. Ralph, however, was not convinced.

Then remembering that the molecules of a gas are much farther apart than those of a solid or liquid, we saw that the molecules of a gas would have a very good chance to vibrate in their natural periods, that an incandescent gas would therefore excite ether waves nearly all of the same wave-length, and that the spectrum of an incandescent gas would, therefore, be a line similar to the sodium line that we looked at. We saw also that another gas would be likely to have another line of vibration, therefore a different wave-length, and therefore a different position in the spectrum.

I then gave a brief description of the spectroscope and asked why we should use a slit. The reason, I am afraid, was not very clearly seen. I also spoke of spectrum analysis and of the new elements that have been discovered with the spectroscope. I left with the class for the next day this question:

If we have our spectroscope pointed at a hot solid or liquid, and have between this hot solid or liquid and our spectroscope a less hot vapor, e.g. sodium vapor, what will the spectrum look like?

No one succeeded before the next day in seeing what the spectrum would be like, and the next day we spent a good part of our hour in discussing this case. I had again spoken of the room that we considered last week, supposing it filled with wires tuned to c' and having c' and c'' approaching it, the class began to see what the spectrum would be. Ruth and Dorothy, I believe, were the first to see it. I then stated what the solar spectrum is and asked for an explanation of it. I think the class saw that the solar spectrum gives us some idea of the constitution and temperature of the sun.

I then told of Wollaston in 1802 observing the dark lines in the solar spectrum, and of Fraunhofer later studying them and naming some of the lines. I also told of the D line being two lines, each of which Prof. Michelson has shown is itself a double line¹, of the discovery by Lockyer and Frankland of the D₂ helium line in the solar spectrum, and the discovery in 1895 by Ramsay of the helium on the earth.

I then started to develop Döpler's principle. I went at this by considering again sound waves. I imagined sound with a wave-length of one foot moving with a velocity of ten feet and asked what the number of waves reaching a person in one second would be (a) if he were standing still, (b) if he were moving with various velocities in a direction opposite to that of the sound, (c) if he were moving with various velocities in the same direction as the sound. This was pretty well understood and next time we shall amplify it and apply it to light. This will take part of our ^{first} hour next week. The rest of that hour and the whole of the other will be devoted to writing about the spectroscope.

¹I know of no reference to this, although it is doubtless published in some place. The double nature of each of the two D lines is shown by the visibility curve obtained with the interferometer, and I believe the doubling can be directly observed with Professor Michelson's new "Echelon" Spectroscope.

Sub-Primary (Groups I. & II.) March 23, 1900.

This week the children finished all the furnishings for their playhouses and will take them home as soon as they finish weaving their rugs. Some, of course, do the weaving faster than others.

Some of the children were absent last week when we made the paraffine candles, so we repeated the making this week and the children who had seen it done told the different steps to be taken. -- They made tin candleholders and use the candles to light their playhouses. One mother said her boy went to bed by candlelight as long as his candle lasted.

The older children made clothes-bars as part of the laundry equipment, by sawing four strips of wood by measurements given them, then bored holes in these strips and fastened them together by rods, so they would open and close.

The younger children have been dramatizing songs and stories and this group work helps them to play with more understanding and enjoyment with the older children in a larger group. It would have been wiser to have started them in the fall in this way instead of all together, for I think they would have become acquainted faster and adapted themselves to their surroundings more rapidly.

We cooked apricots and molded flaked wheat.

This week Group IIIa. came in for a half hour for the third time to illustrate through cutting one of our songs for our book. They began to work as if they knew what they wanted to do and this time accomplished more work.

Miss Scates.

OK

Social Occupations (a & b).

They have finished talking about the lumber camp and spent an hour making a résumé for the school paper. Special time has been spent on the number work in going over the work that they have done before especially playing ring toss with 3's and making changes in playing *store* with numbers that were not 10's.

The children measured uncut lumber in the shop to see how many feet there were. This was done by simply measuring the lengths of the boards with the ruler. They also measured their own heights. The children are not able to measure accurately with the foot ruler, usually missing a quarter of an inch at each change. I found when they used the 15-inch ruler they did not realize that it was longer than a foot, as they thought every ruler was a foot ruler. This was straightened out by measuring a 15-inch ruler with the 12-inch ruler and seeing that 12 inches made a foot. One of the children when she was given a board to measure which was 6 ft. long came out with the answer "72 inches". I did not realize that she could count up so many 12's, as she is the youngest child in the class, not being quite six, and she had done it in the same time that the others had taken to count six lengths of their foot ruler.

They have ~~had~~ ^{been} read to them from the "Jungle Book" the story of the "Miracle of Purum Bhaghat". This had to be paraphrased for them a good deal and part of it told in a shorter form, but "Rikki Tikki Tavi" was simple enough for them.

Miss Andrews. *OK*

Cooking(a & b).

Cornmeal Mush-- Cornmeal was shown to the children and recognized by many. What is it made of? How is it made fine? By grinding Cornmeal compared by weight with flaked corn. Difference in structure cause of difference in weight of same bulk. Cornmeal packs more closely because it is fine. Pupils found one cup of cornmeal balanced five cups of flaked corn. From this amount of water was determined. 1 cup of corn^{meal} requires 5 cups of water. This ratio was applied to other measures, such as a tablespoon of cornmeal requires 5 Tb of H₂O. If we took a bowl of cornmeal it would require 5 bowls of water, etc. Practical Cooking--1/4 cup cornmeal 5/4 cups water or 1 1/4, 3 s. salt.

Wheatena: Method similar to above.

Number Work: Ratio 1 to 5 applied to different measures.

Practical Cooking: Use of tablespoon in measuring to bring out number side of lesson more prominently.

Farina: Wheatena and farina compared; otherwise method similar to above. Danger of lumping brought out and method of avoiding.

Fig Pudding: The teacher, in answer to eager questions of children stated that they were to cook fig pudding. What materials would be needed? (Some kind of wheat, figs, milk, and sugar.) Instead of wheat they were told to use corn-starch. Corn starch examined--like flour, very fine, white, etc. Comparison with cornmeal and whole corn. Proportions given. Method of cooking discussed. What happens when we put starch in boiling water or milk? (It gets lumpy.) What ways do you know to prevent lumping? (Stirring, separating starch grains by sugar and by

use of cold water.)

Number Work: Halves reviewed--how many fourths in a half? in a whole? Division of $7 \frac{1}{2}$ figs among 6 children. Each child would get one whole and one and one half figs would have to be divided into 6 parts.) How shall I divide the one? (First cut it into two equal parts. Then someone suggested cutting each half into 2 parts. When asked how many pieces they would have they found they would not have enough to go around. One child then said that 1 piece might be cut from the $\frac{1}{2}$ and the larger piece be cut into 2 parts; this would give 6 in all.) The ~~children~~ teacher then gave the term "sixth". Have we had any other parts? (Yes, halves, threes, fourth and one child said "sevenths and eighths, although as far as the teacher knew this boy had never had those terms given him but seems to have gotten them by analogy). Recipe was written on the board and children tried to read it: 2 T cornstarch, 2 T sugar, 2 T cold milk, 1 S salt, $\frac{1}{2}$ cup milk--boil 5 minutes. Time was brought in by showing that the long hand passes over a certain distance in 5 minutes.

Mrs. Baxter.

Shop Work.

They have been working on small looms and have encountered some difficulties as explained in Group IV.

Mr. Ball.

History (a).

They have spent all of their time in acting out the occupations in the wheat village where the people have combined for the raising of sheep and cattle and for the cultivation of wheat. In order to act this out dramatically they found they needed names for the people who were to take part and although they went back to the way in which the first people they knew had attained their names and said that these people would get their names from what they did and very easily gave the name "miner" to the whole village in the mountains and "wheat people" to those living in the plains, when they came to the point of getting the names from the occupations of the individuals, they could not do it without suggestion. They finally gave the name "metal-worker" to Helen, who had come down from the mountains (the miners' village) to show the wheat people how to work in copper. The only name volunteered for the people in the wheat village was "bull-catcher", "wheat cutter". After a while "bull-catcher" was changed to "bull-tamer" as representing a more permanent occupation.

The children differ very much in their desire for real things to work with in playing this game. P.G. is embarrassed by having the real things and acts freely in pantomime his part as a miner refusing to take any ore to be actually crushed, while H.H. requires the actual copper to play her part as a metal worker to her own satisfaction.

In carrying out the cooking of the wheat they had threshed and ground, they baked their little cakes of half boiled porridge on asbestos mats and apparently enjoyed eating them so much that they did not suggest any improvement in the milling process.

tion

They have spent one period in working out the size of the dolls they are to make with Miss Cushman after vacation. The propor-

tion was one-half the height from the ground to the meeting of the poles. They then worked out with the help of the ruler what the height of the figure would be for huts of 6, 8, 10 and 12 inches; then of 7, 9 and 11.

Miss Camp.

Shop Work (a).

They finished the Indian ox-cart. It has been patterned after the Mexican carts where the wheels are cut from a solid log, a tree as round as possible having been selected and then a piece cut off straight across the end and a hole burned through for the axle. The children easily got the idea that this was an early form of cart, but instead of using the rude lumber, they used wood cleaned and smoothed. They made some failures in attempting to bore holes straight and to saw straight to form the outside end of the axle perfectly round so that it would fit the opening in the wheel. Luther, who has been thought quite dull in some of his other classes, has developed a good deal of mechanical skill. There is quite a difference in the boy in the shop and in the other classes. Another interesting thing in regard to this child is the change in his attitude from the time he first appeared in the shop. Then he had to be separated from the rest, because of his embarrassment and panic at being in a strange place. He soon waked to the work and has gone right ahead of the other children.

Mr. Ball.

Shop Work (b).

They have finished their marble game. This is a board 8" square. It requires sawing and planing and the children have had some difficulty in finishing it across the grain. Where they are not always able to saw straight, we have allowed them to use a file to make the ends straight. On the smoothed side of the board they laid out, starting from the center, a series of squares 1 inch apart. At the ~~intersection~~ intersection of the lines they bored a hole $1/4$ deep and then enlarged the hole at the top by using the counter-sink, which is a new tool to them. In some cases I think this has been too hard for this group. They have made very slow work with the tool and frequently ~~asked~~ two children work together, one pressing down on the top of the press and the other turning the handle. Most of the group have finished these games and have also finished the small loom for weaving rag carpet. The side pieces of the loom were 18" long, 1" wide and $5/8$ " thick. An inch from each end of each piece a $1/2$ inch hole was bored. The principal difficulty the children have encountered has been in boring the holes straight, so that when the dowel rod has been put in, frequently the two holes would not line up perfectly true.

Even in this younger group the circular saw has been recognized as a real help. The children furnish the motive power and the teacher guides the wood, as it is too dangerous for them to do. They ask to have the work done with the circular saw rather than with the hand-saw.

Mr. Ball.

Reading (b).

The materials for the reading lessons for this group have been taken chiefly from their history with occasional changes to other subjects; for example, shop work, or cooking, as their interest flagged. It has become evident of late that their power to give a definite account of their work and their interest in doing it are in direct ratio to the degree of activity involved in the original lesson. It has often been impossible to obtain a clear statement of their history even on the day in which it has been presented to them, and frequently different members of the group will give contradictory statements with regard to the most essential points. But when handwork is the subject of discussion they recall with comparative ease the desired details.

Their lessons have been presented for the most part on the blackboard with some typewritten leaflets. It has been found to be much easier to hold their attention to the blackboard work than to the other. Their interest in each other's work as that of the group as a whole is very slight, so that when each has the whole lesson in his own hands it is difficult for them to respect each other's claims upon the attention of the teacher and the group. With blackboard work the constant sense of expectation due to the frequent erasure of one set of sentences in order to make room for another helps to keep up their interest in something beside their individual opportunities for reading aloud. In order to insure alertness of attention, they are sometimes asked to watch while work is put upon the blackboard and then after it has been quickly erased, tell what it said. This is of service also in guarding against the danger of

mere word-calling into which their reading constantly tends to degenerate. For a similar reason there has been only a sparing use of phonics, new words being associated instead with as vivid an image as possible of the realities for which they are the symbols. The work of this group confirms the results of former experience--the conviction that the effort to make out words by sounding during the first months of reading is likely to result in a fatal division of attention. For instance, a few days ago one of the brightest children in the group, after being allowed to "sound" the new words in a sentence six words long, was unable to look away from his paper and tell what he had read until the fourth or fifth attempt.

Comparatively little writing has been done, the reasons being lack of blackboard room and of proper conditions for the use of paper and pencils and also the fact that the children tire very quickly. The general tendency seems to be towards very fine writing with a correspondingly cramped position of the fingers. An effort has been made to overcome these faults by encouraging them to write large letters that can be seen across the room and by showing them that the writing takes less muscular effort if the chalk is held lightly. One child was so delighted with this discovery that he insisted on erasing all his work and doing it over in the new way.

A notably successful lesson was the result of a talk about the making of their looms. Sentences were put on the blackboard by the teacher as the children gave them and read and reread by the class. A list was made of the new words, chiefly names of tools and a drill upon these was given by acting out

the uses of the various tools, individual children being chosen to direct the action by pointing to certain words or to find on the blackboard the name of the tool which the others were using. The children were delighted with the lesson. The next day they were eager to write the new words and spent the entire period at the blackboard without signs of fatigue. They called this writing "putting tools into their shop", and one boy insisted upon buying each tool from the teacher before he wrote its name,--gravely proffering imaginary money and insisting that the tool be wrapped up in paper and duly delivered.

Miss Hoblitt.

History (b).

Before taking up Magellan I asked the children how much of the new world Columbus had discovered and they pointed out on the map the new lands that had been made known through his discoveries. Then I told them of the other people who had begun to explore and showed them the part discovered by the Cabots, so that we had parts of the eastern coast of North and South America and I told them that a Spaniard had crossed the narrow place between North and South America and discovered the Pacific Ocean. We recalled the division of the New World by the Pope giving the eastern half to Portugal and the western half to Spain and then I asked if Spain should sail to the west until it came all the way round to the islands about the Indian Ocean, to whom they would belong. Some of the children thought that they would belong to Spain because they were found by sailing west, others thought that they would belong to Portugal because they were in the eastern half. When asked whether the Pope had any right to give away this world, they thought not and that it would belong to the people who discovered it. Then I told them that the Portuguese had persevered around Africa until they had crossed the Indian Ocean and found India and that they had begun to make settlements here. I told them that Magellan, a Portuguese, had gone on one of these trips and had found ^{off} ~~that~~ to the east of India some rich spice islands, but that he had disagreed with the commander of the expedition in India and had been dismissed from service. He then went back to Portugal and tried to get the king to give him ships to go to the spice islands by a western route, his idea being that he could find such a route through the new

lands that Columbus had discovered, but the king had refused his plea and that then he had turned to Spain. I told them that at this time Charles V. was king and that he was also king of Germany, so that we had added Germany to the lands in the Old World which they now know. I told them that Charles V. granted Magellan's request, giving him ships to make the voyage and then we went on to Magellan's trip across the Atlantic until he landed at South America near Brazil. I told them of the code of signals by lights which Magellan used and we spoke of the different terms used on shipboard for giving orders, such as "starboard" and "port" and simple terms of direction. Most of the story was told as usual by questioning the children and getting them to suggest what Magellan would do at each step. They showed much more interest in the beginning of Magellan's voyage than they did at the beginning of Columbus' and more at the beginning of Columbus' than they did of Henry of Portugal.

One period was spent in Number Work on the diagram of the multiplication tables, playing it as a game. The diagram was put on the blackboard and each child took his turn in filling one of the spaces. He could fill in any space he desired, provided he put down the correct number. Some of the children chose the hard ones and some the easy, but all were anxious to take their turn.

Miss Runyon.

Cooking (a).

Meat (continued).

The various points which had been taken up during the study of meat were briefly reviewed--the source, structure, composition, general methods of cooking, location and quality of cuts. The