

## THE HARRISONBURG WATER SUPPLY SYSTEM.

A PROJECT IN GENERAL SCIENCE

### Introduction

In order to illustrate the method of working on a project some of the students<sup>1</sup> in the course on Organization of General Science, at the Harrisonburg State Teachers College, Fall Quarter 1929, worked on a project which involved a study of the Harrisonburg water supply system.<sup>2</sup> These students were divided into groups and each group took responsibility for a certain phase of the study. When the work was finished, the parts were assembled and arranged for teaching in the eighth and ninth grades for seven consecutive periods. The work includes reading, interviews, discussion, laboratory experiments, etc., and calls for facts and principles from several sciences. The procedure as a whole involves a complete unit of work.

### FIRST DAY

Study the sources from which water may be obtained for home and commercial uses.

*References:* General Science texts of Caldwell and Eikenberry; Webb and Didcoct; Wood and Carpenter; Clement, Collister, and Thurston; Pieper and Beauchamp.

### Class Discussion:

1. Name as many water supply sources as you can.
2. Make a list of the uses of water in Harrisonburg.
3. Give the advantages and disadvantages of securing water from rivers, lakes, wells, oceans, springs, and storage reservoirs.
4. From which of the sources mentioned does the city of Harrisonburg get its water?

<sup>1</sup>Mrs. Christine Rodes, Mary Louise Blakenbaker, Ruby Stewart and others.

<sup>2</sup>This project was suggested by the series of projects on water systems of various cities in the United States, by Earl R. Glenn and others, published in the *General Science Quarterly*, 1921-22-23. The series was also reprinted in pamphlet form by the Lincoln School of Teachers College, Columbia University, New York City.

### Group Assignments:

Group I: Locate the water source of Harrisonburg. What to do: Make a map of Rockingham County secured from Wayland's *History of Rockingham County*, enlarged five times the original size.

Group II. History of the Harrisonburg water system. What to do: Get data from the office of the Superintendent of Public Works, and from Chamber of Commerce.

Group III: Relation of population to amount of water used. What to do: Secure from Chamber of Commerce figures representing population, and from water office figures representing amounts of water used daily.

Group IV: Ownership and cost of water system. What to do: Who owns water system? Name advantages and disadvantages or municipally owned water system. What is the rate for water? How much water is used in your home? What does it cost? Who owns the meters? What is the total cost of the city water system?

### SECOND DAY

Study the facts concerning the source of water of Harrisonburg, history of the system, amount used and cost.

*References:* Wayland's *History of Rockingham County*, Wood and Carpenter, Webb and Didcoct, Caldwell and Eikenberry, Pamphlets from Chamber of Commerce.

### Class Discussion:

1. Report from Group I—Map hung in room and source marked plainly. How far is Harrisonburg from water bed in Dry River Valley?
2. Report from Group II—Available pictures displayed. Where was the water secured before getting it from Dry River? Why were these sources abandoned? When was the present system adopted?
3. Report from Group III—What is the population of the city and the

average amount of water used by each person?

*Assignment:* Report from Group IV.

#### THIRD DAY

Study of the ownership and cost of the water system.

*References:* Wayland's *History of Rockingham County*, Woods and Carpenter, Webb and Didcoct, Pamphlets from Chamber of Commerce.

*Class Discussion:*

1. Report from Group IV.
2. What is the rate for water used?
3. How does rate in Harrisonburg compare with other cities?
4. Is it better and more economical for each family to be responsible for its water supply or for the community to do this for all? Why?
5. Give advantages and disadvantages.

*Assignment:*

Group 1: Information about source (Dry River). Arrange, if possible, for an excursion there by this group. Prepare a report.

Group II: Secure permission for a visit to the reservoir, and make the trip carrying kodaks for taking pictures.

Group III: Prepare completion tests to be filled in from data secured on the trip. Example: 1. The city reservoir is.....miles from Harrisonburg center. 2. It covers.....acres of land. 3. Its depth is.....feet, length is....., capacity is....., cost is.... 4. The elevation above the city is.....feet, and supplies a pressure of.....lbs. per square inch. 5. Etc.

Group IV: Prepare a report of the visits to the reservoir.

#### FOURTH DAY

Discussion of Class Excursions.

*Reference:* Wayland's *History of Rockingham County*, Webb and Didcoct,

Wood and Carpenter, Pamphlets, etc. from Chamber of Commerce.

*Class Discussion:*

Check completion tests—reports from groups 1 and 4.

*Assignment:*

Group 1: Construct a diagram of the Harrisonburg water system. Use text to find some methods for the purification of water.

Group II: From water office get a copy of the bacteriological report from State Board of Health on city water. Also get a record of the analysis of the mineral content of water. Prepare a report.

Group III: Prepare a demonstration to test hardness of water. Prepare to test for total solids by evaporation.

Group IV: Prepare to test for vegetable material with potassium permanganate. Prepare a test to show how distillation purifies.

#### FIFTH DAY

Study of the composition of water and methods of purification.

*Reference:* Wood and Carpenter, Webb and Didcoct, Clement, Collister, and Thurston, Pieper and Beauchamp.

*Class Discussion:*

Group I: Report on methods of purification of water, and display chart.

Group II: Report. After seeing water in the reservoir are you sure it is pure enough to drink? How can you find out that it is safe to drink? What does the bacteriologist mean by B. Coli? Was there chlorine present in the analysis? Why is the chlorine put in water? Does Harrisonburg have any other method than chlorination for purification?

#### SIXTH DAY

Study the composition of water and methods of purification (cont'd).

*References:* Same.

*Class Discussion and Demonstrations:*

1. Test for hardness of water.
2. Test for mineral content.
3. Test for vegetable material.
4. Distillation.

*Assignment:* Test on Water Pressure.

#### SEVENTH DAY

Study of water pressure and principles involved.

*References:* Wood and Carpenter, Webb and Didcoct, Clement, Collister and Thurston.

*Class Discussion:*

1. Why does water rise so high from a fire hose?
2. Why does water sometimes rush through the faucet strong enough to knock a cup from the hand?
3. How high is the reservoir above the city?
4. How much pressure is exerted?
5. If the reservoir were not above the city, how could water be gotten into the homes?
6. What is the name of the system by which water flows without mechanical aid?
7. What size pipes are used to bring the water from the source?
8. What is the course of the chief water mains, and their capacity?
9. How can you show that water seeks its own level?
10. How can you account for the water pressure in Harrisonburg being 70 lbs. per sq. in.?

FRED C. MABEE AND OTHERS

Teacher (to boy sitting idly in school during writing time): "Henry, why are you not writing?"

Henry: "I ain't got no pen."

Teacher: "Where's your grammar?"

Henry: "She's dead."

## KEEPING UP WITH SCIENCE TEXT BOOKS

WHILE there is a dearth of textbooks for college general science courses, the general science books for senior and junior high schools are legion. Not only are the latter abundant in number, but they contain a great amount of subject matter that cannot be covered in the time generally allotted to this subject. The problem of subject matter is therefore one of elimination; the field is so extensive that utilization of all the material is impossible.

In selecting a general science textbook, the book itself should be tested by the following inquiries:

1. Is the book within the intellectual grasp of the pupil?
2. Can the book be easily adapted to local conditions?
3. Is the mechanical appearance of the book pleasing? (Type clear? Pictures interesting? Print large enough?)
4. Will the content of the book fall within the scope of the required course of study?
5. Are there teacher's helps? (Questions? Summaries? Experiments? References?)
6. Who wrote the book? (Some college professor who has had no actual teaching experience in the public schools?)
7. Is the book scientifically accurate?
8. When was the book written? (Within the last five, ten or fifteen years?)

Following are short discussions of general science textbooks that have been published within the last five years. Three of these were printed in 1928.

ELEMENTS OF GENERAL SCIENCE WITH EXPERIMENTS. By O. W. Caldwell and W. L. Eikenberry. New York: Ginn and Co. 1926. Pp. 600. \$1.68.

There exists a wealth of material in this text. The content is divided into six general divisions, namely: the air; water and