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MEASURING THE END-PRODUCT

By JEAN DAWSON, Normal Training School, Cleveland, Ohio

Can you tell a cherry tree from an apple tree when it is not in fruit? Do you know wheat from oats, peas from beans, a cabbage from a turnip, a rose from a blackberry bush, an oak from a maple, a burdock from a dandelion?

Ninety-seven graduates from ten high schools in one of our large cities were asked to identify these and other common plants and trees growing within a few rods of the Normal Training School which they had just entered to prepare themselves for the teaching profession. The test was conducted in the laboratory. Each specimen bore its own number and each student examined it at her leisure. In every case the specimens were typical. Branches, eighteen inches or more in length were cut from the trees and berry bushes; entire plants, potted or pulled up by the roots were used. No scientific names were required; if a student called a *quercus alba* an oak, she was given credit for a correct answer.

High school graduates fail to recognize the most common things in their environment

The result of the test was a surprise. It is clear that children passing through the public schools acquire very little knowledge of the common things of nature. It was thought that, being city-bred, the girls would know more about city things. Accordingly they were asked to locate accurately ten buildings of the city. The buildings chosen are in the central district and are important from a civic or a commercial standpoint. No answer was counted unless the girl had been born in the city or had lived there at least five years. Although ninety-five of the girls were born in the city and had spent their lives there, twenty-nine per cent could not locate a single one of the ten buildings, and twenty-four per cent could locate but one.

Thinking that the class might be exceptional, a similar test was given to one hundred girls entering the same school the following fall—1913. The results of the tests were tabulated and are given together for comparison:

	Percentage that did not know	
	1912	1913
¹ Vegetables:		
Squash vine	52	72
Cucumber.	61	48
Corn plant	7	7
Carrot.	91	18
Parsnips.	35	67
Red beet	4	5
Kahl-rabi.	75	78
Curled-kale.	92	92
Egg-plant.	96	91
Celery.	8	21
Tomato.	22	16
Lettuce.	15	6
Wax-bean.	20	28
Cabbage.	12	7
Radish.	67	3
Potato.	44	30
Lettuce in seed.....	75	30
Corn in blossom.....	2	31
Fruit Twigs:		
Apple twig	45	52
Plum twig	73	93
Pear twig	25	91
Peach twig	11	44
Cherry twig	35	97
Wild Apple twig	72	91
Mountain Ash twig.....	90	99
American Elm twig.....	97	76
Locust twig	63	67
White Oak twig.....	18	42
Sugar Maple twig.....	6	13
Wild Rose twig.....	40	89
Blackberry twig	62	86
Raspberry twig	73	77
Plants:		
Chrysanthemum.	53	72
Begonia.	71	41
Cactus.	20	23
Fern.	2	3
Geranium.	3	6
Ivy (English)	35	57
Grains in head:		
Wheat.	79	68
Oats.	15	30
Rye.	84	79
Barley.	79	82

¹ The class of 1912 was given the test two and a half weeks after it entered the Normal School and had its attention called to these plants, while the class of 1913 took the entering week. The advantage of this time probably accounts for the difference in the standing of the two classes. About one-third of each class had had botany in the high school.

Grains Threshed:

Oats.	18	41
Corn.	0	15
Wheat.	43	56
Beans.	4	13

Weeds:

Dandelion.	10	12
Plantain.	69	57
Dog's-fennel.	85	98
Wild aster	85	94
Burdock.	79	95
Lamb's quarters	69	100
Wild lettuce	58	99
Sand bur	68	96
Sweet clover	53	97
Worm-seed.	100	100
Curled dock	93	94
Ragweed.	92	91
Red clover	4	10

Percentage failed

	1912	1913
Buildings:		
City Hall	86	83
W. Building	64	78
Chamber of Commerce.	79	84
Principal Savings Bank	88	88
Old Court House.	70	73
Old Post-office	89	94
New Post-office	65	83
Principal Hotel	87	83
New Court House.	85	75
R. Building	84	95

Looking with unseeing eyes

To adjudge these girls dull would be libelous to the system of grading students in our schools, for be it understood that to enter the normal school, an examination must be passed after graduation from a four-year high school course, or the student must have attained an average standing of eighty-five per cent in all high school subjects.

To attempt to excuse these young women's lack of knowledge on the ground that the objects in question were not familiar to them, would be unfounded. To be sure, in the large city in question, there are congested sections where trees are scarce and gardens few: and unfortunately there are schools located in such districts. Actual facts show, however, that only about two per cent of the students examined came from such districts, the city being noted for its school and home gardens, beautiful boulevards and natural forest parks. The aforesaid buildings too are familiar sights, as all street cars run to the center of the city, and these buildings are constantly referred to in the newspapers.

Feeble powers of discrimination

Upon every page of themes, written by these girls, the confession was made that they have been looking with unobserving eyes. Indeed their power of discrimination is so feeble that they find it difficult to distinguish a potato from a tomato vine, a willow leaf from a peach leaf, and an ash from a hickory. One girl confesses that she can tell the fruit trees only when the fruit is upon them. Twenty-nine per cent of the class of 1913 called a blackberry bush a rose bush. An entire class failed to recognize a mountain ash without its clusters of fruit after they had studied one with fruit for some time. Seeing the Waahoo or Burning Bush with its red fruit, they could not recognize a bush when the berries were green. Ninety-five and nine-tenths of the young women recognized the red beet, but only nineteen and six-tenths of them were sure that a beet was a beet when its color was white. One girl was very much distressed when told that she must familiarize herself with the common vegetables. She said that she had no garden at home and declared that she could not remember having seen one the entire summer. Had this young woman turned her head slightly, so as to have glanced out of the laboratory window, she could have seen, not over a rod away, a vegetable garden which she had passed five or six times daily for three weeks!

As poorly as they discriminate with their eyes, they make less use of their senses of taste, touch and smell. No member of the class was seen to taste or feel of a specimen and only about two per cent of the class made use of the sense of smell. Four out of six college graduates, who took the test, and twenty-one per cent of the high school graduates failed to recognize a fine celery plant, either by sight or by its characteristic odor. All of these young ladies, however, confessed to eating celery and had even bought it in the market.

Lack of knowledge due to lack of interest

In the themes which they wrote upon their study of trees, these young women again and again attribute their ignorance of their environment to a lack of interest. A few of them could remember being interested in trees and plants and losing their interest because of being rebuffed and ignored by their elders; most of them had never before had their interest aroused. Perhaps this is but natural, as few of us are interested in closed books. Let us listen to what some of the girls say on these points. Many of them speak of a growing interest and have given their themes such titles as "An Awakened Interest" and "An Awakening."

"I often used to ask about flowers and trees that I came across but as no one could tell me, I let the matter drop."

"I would often ask some older person the names of plants or flowers and the general answer would be, 'Don't bother,' or 'I don't know.' That would settle it, for if they did not know or care, what did it matter to me? Now for almost a month I have studied trees, weeds and vegetables, and I have had a great awakening."

"I have lived in the country the greater part of my life, but I have really paid but little attention to nature. People have asked me, and I have asked others the names of different plants, trees and vegetables, but that was as far as it went. Sometimes they knew and sometimes they didn't."

"It seems to me that a new world has suddenly opened before me. I have been asleep or rather I have gone through life with my eyes closed. I have become so enthusiastic in my tree study that my folks have begun to study them also."

"I used to look at trees, vegetables and other plants with unseeing eyes. Until September 1912, the only tree I knew was the maple. The fact is, I never thought about the different kind of trees: they were merely a part of nature that I encountered every day of my life."

The following is quoted from a student who comes to the Normal School with a record for scholarship, leaving the high school with an average of over ninety-one per cent and having spent one successful year in college.

"Three weeks of science has made me very inquisitive. I have spent many summers in the country. Often I have asked what the different things were in the woods and could not find out. If someone did tell me the name of a tree, the chances were that I would know it again by its location alone: the same kind of a tree, I would fail to recognize if met in another place. This is because I did not have its distinguishing characteristics in mind and could not compare it with other trees. Now that I am learning to observe every little thing, I can go out into the woods and feel at home with all of the trees, for I am acquainted with them and they are no longer strangers."

Although this young lady has spent many summers on a farm, where all the specimens upon which she was examined grew in abundance, her average was no higher in the test than that of the other members of the class. She did not know an elm, apple or plum tree. She did not recognize a raspberry or a blackberry bush, a melon or a cucumber vine; could not tell a carrot, a parsnip or a potato plant, although she says that she at one time picked up five bushels of potatoes in the field. She knew oats only in the head; could not recognize wheat, either in the head or after it was thrashed.

The class of 1913 were given an additional test on things usually of interest to girls. They were required to identify the names of the women editors of the woman's magazine page of the two evening papers of the city, and they were asked to locate the principal theaters and the shops dealing in women's apparel. Only two and a half per cent failed to

recognize the writers for the women's page in the daily papers and nearly all of them gave the impression that they could go to the shops and theaters; but, strange to say, only eight per cent of them located the shops and fourteen per cent the theaters, so that a stranger could find them without difficulty.

Fail in concise thinking and accuracy of expression

In locating buildings, truly the juggling of real-estate would have paralyzed the business world! Many of the buildings were given no definite location on streets that were miles in length; when the intersecting streets upon which a building faced were given, it was not assigned to one of the four possible corners. Careless, slipshod thinking was greatly in evidence and was even more distressing than their lack of discrimination and their failure to know beans, corn and cabbage. It sets one to wondering whether the fault lies in the home, the school or the child. In the case of these young women, what happened that the mathematics which they studied during their high school course did not teach them the concise thinking and accuracy of expression that has been claimed for it for centuries?

Conscious that there is something wrong with the school curriculum, why do we go on blindly experimenting when we might learn the cause of the trouble beyond the question of a doubt? Why not, as in the business world, apply the measuring rod to the end-product of our school (the high school graduate) and remodel our school course according to the results found?