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Spring Study of Trees

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How to buy, clean, press, mend, repair, pack and hang up suits.

How to act when sister or mother entertains, or when invited out to a dinner or social affair (everyday manners, writing and answering social notes and invitations, table etiquette, duties of host at dinner, carving and table service, duties of a guest).

How to cook, when it is necessary (materials, equipment and home cookery of staple foods).

What should be included in a well balanced diet.

How to select meals at various types of eating places.

Health habits which should be formed in order to keep one at his best.

Sanitary practices that should be followed in order to make the home and community a better place in which to live.

What should be done in case of accident.

Home care of the sick and common scientific home remedies.

Proper attitude toward those in the home.

Standards of conduct between boys and girls.

How to spend leisure time.

Relation of work to health and success.

Jobs open to high school boys.

Life vocations.

Since the men of the household usually share in the responsibilities of the care and welfare of the family, it would seem wise to give the boys of today, who will be heads of homes tomorrow, some practical, scientific knowledge upon which to base their judgments. Even now the boys must make decisions with respect to themselves and others.

Is it not possible to include boys in these health and home welfare courses without entirely wrecking the traditional course of study? Evidently so, for not long ago the federal Bureau of Education made a survey to determine if such courses were offered, and from the report of the findings of that survey the following information is offered:

"The returns from a questionnaire recently sent by the Bureau of Education to high schools of the United States show that Home Economics is offered to boys in some schools of a number of cities of thirty-one different states. It also shows that twenty-four of these states report a number of cities having some schools that offer to boys a course in Personal Hygiene and Health. Also, that thirty-three of the states report a number of cities in which some schools offer to boys specific courses in Home Economics, such as Foods, Landscape Gardening, Nutrition, Household Management, Home Building and Furnishing, Clothing Design, Household Budgets, Camp Cookery, Family Relationships, Art and Design, Applied Economics and Child Care.

"Wherever Home Economics has been offered to boys, it has been received by them with acclaim."

Thus we learn from this report that some schools are offering courses usually given only to girls, and furthermore, that the boys like what they get.

Cannot more of our schools offer such courses? They should certainly give the boys as much consideration as is offered to the girls in educating for life and its responsibilities.

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SPRING STUDY OF TREES

Botany

In the January number of Science Bulletin there were offered some suggestions concerning the study of trees in winter. During the spring there are many opportunities to pursue further interesting and profitable studies.

One of the most familiar signs of active growth in trees is the bursting of buds from which the new growth of leaves occurs. In this connection the contents of buds should be studied. A longisection of a large bud, such as the Shagbark Hickory, will reveal the "stem tip" or "growing point" to which are attached the closely packed "foliage leaves." These parts are protected by the modified leaves or "bud scales." Such a bud is spoken of as a "leaf" or "branch" bud. In the Cottonwood the large buds at the end of the twig when sectioned will show distinctly at this time of year the catkins of flowers. These are known as "flower" or "fruit" buds. Buds, such as those of the apple, which contain

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both leaves and flowers are known as "mixed" buds. A point to be emphasized, and verified by observation, is the fact that the production of leaves and flowers depends entirely upon the opening of buds.

The new growth of stem produced from the terminal buds will be green at first, which indicates that woody stems develop from the herbaceous condition. The length of time necessary for the leaves to reach their mature size can be observed, as well as the time of appearance of the new buds in the leaf axils. The rate at which the new stem elongates can be observed, and when growth is completed the amount can be compared with that of previous seasons. By careful dissection of a large bud which is swelling, the number of nodes and leaves can be determined with considerable accuracy. After the new growth has been produced the number of nodes and of leaves can be compared with the number in the buds. This will bring out the fact that the opening of buds involves mostly the enlargement of structures already formed. A study of the "fruit spurs" in the Apple or Pear will illustrate a type of growth decidedly different from the ordinary and its relation to pruning practice can be pointed out. Such comparisons will help to show the effect of environmental conditions upon growth. The point should be emphasized, however, that conditions during the preceding summer when the buds were forming are just as important as the conditions at the time when the buds are opening. The relative value in fruit production of summer and winter pruning should be made clear.

Some twigs, such as those of the Lilac, Willow and Cottonwood, will grow readily indoors in water and can be used to follow the changes which occur during the opening of buds. One lot of twigs can be treated with warm water for a time and another lot can be placed in a closed chamber containing ether and chloroform for a period of twenty-four hours. The length of time necessary for such treated buds to open can be compared with that for untreated buds, kept as a check. Results should not be expected now as striking as would be obtained earlier in the spring or in late winter. Practical application of such methods is to be found in the "forcing" of seed potatoes and flower bulbs. Observation will reveal the fact that not all the buds on a twig make an active growth at one time. Some of them, for some reason, remain in the dormant condition. The presence of these dormant buds makes possible the production of a second growth of leaves in a season when the first leaves are killed by frost. The fact that some woody stems, like the willow, will form adventitious roots readily when placed in water, while others will not, suggests the necessity for grafting as a means of propagation and the various types of grafting should be studied and if possible demonstrated.

In the identification of trees during the growing season, leaf characters are the principal ones used but the value of other characters should be recognized. Bark and twig characters are always useful and flower characters are helpful in some cases. Fruit characters can seldom be used until fall. Some convenient groupings are as follows: (1) Trees readily recognized by their bark, viz. Birches, Aspens, Sycamore, Ironwood, Black Cherry, Red Oak; (2) Trees with conspicuous flowers or fruits, viz. Catalpa, Black Locust, Tulip, Prairie Crab, Cherries, Walnuts; (3) Trees with thorns, viz. Honey Locust, Osage Orange, Hawthorns, Prickly Ash. The leaf characters most useful in identification are: (1) whether the blade is simple or compound; (2) whether the arrangement of leaves on the stem is simple or compound; (3) form or shape of the leaf blade; (4) type of margin; (5) type of veining. For accurate identification, use should be made of a reliable leaf key rather than the "popular" and none-too-accurate matching of specimen with picture. Reliable keys are found in such manuals as "Michigan Trees" by Otis or "Guide to the Trees" by Curtis, both published by Greenberg. One of the best and most helpful reference books is Hough's "Handbook of Trees" pub-

lished by Romeyn B. Hough Company, Lowville, N. Y. It is beautifully illustrated, shows the distribution of each species, and has complete descriptions. "A Handbook of the Native Trees of Iowa" is a useful reference and can be secured from the Extension Service, Iowa State College, Ames, for five cents per copy.

Interesting class discussions can be developed around such topics as (1) Economic Value of Forests; (2) Forest Regions of the United States; (3) Protection of Our Forests. Other topics will suggest themselves. Much helpful material can be secured in the "Forestry Primer" published by the American Tree Association and obtainable from the Forestry Department, Iowa State College, Ames.

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STATIC ELECTRICITY

General Science

There is ample evidence that many electrical phenomena were observed in early times. Thales, of Greece, about 600 B.C., observed that amber when vigorously rubbed would attract light bodies such as scraps of thin paper. When a piece of magnetic iron found in Asia Minor was seen to attract bits of iron it was suggested that the two phenomena might be identical, but early in the seventeenth century Dr. William Gilbert pointed out the difference and brought the words "magnetism" and "electricity" into use.

Over in Magdeburg, Otto von Guericke, who had made an air pump and experimented with atmospheric pressure, constructed an electrical device. He took a ball of sulphur and as it turned in his hands, electric charges were developed to a remarkable degree. Still later Benjamin Franklin, the versatile American statesman and scientist, demonstrated that the lightning which was superstitiously believed to be "fire sent down from heaven," was identical with the electric spark produced by von Guericke in the laboratory. About the same time Volta, in Italy, made an electrophorus or induction device—the fore-runner of the modern static machine.

When the air in the school room is warm and dry, the teacher of general science may easily demonstrate the presence of an electric charge. Suspend from any convenient point a silk thread to which a small ball of pith, from a corn stalk, has been tied. Now rub a warm dry glass tumbler or flask with a dry piece of silk cloth and hold the glass near to the pith ball. If the glass has been electrified, the pith ball will be attracted to it. The glass is then said to have an electrostatic charge upon it or to be "charged." If the pith ball ceases to be attracted and flies away from the glass by repulsion, we say that the pith ball has acquired the same kind of charge and that like charges repel each other. Now if a fountain pen or a piece of sealing wax is rubbed with dry warm woolen cloth or fur and has thus become electrified, it will attract the charged pith ball which was repelled by the glass. This is because the charge upon the pen is opposite to that upon the glass and unlike charges attract each other. If next the pith ball is touched by the finger it will lose its charge and become neutral and in that condition will be attracted by either the pen or the glass since it no longer holds a charge.

It has become customary to call the charge upon the glass a positive charge and that upon the pen or wax a negative charge. The entire experiment may be reversed if desired, that is, one can begin with the fountain pen and demonstrate the same laws, charging the pith ball positively or negatively as desired. Since the pith ball loses its charge every time the hand touches it, we decide that the hand is a conductor of electric charges (or of electricity) and the charges are "grounded,"—conducted to the ground. Since the silk, touching the pith ball, does not cause it to lose its charge, we say that silk is a non-conductor or insulator.

A device formed of one or more suspended pith balls constitutes a pith ball electroscope, an instrument to demonstrate the kind of charge possessed by a body. If the pith ball is repelled we know that it has the same charge, both bodies being either negative or positive.

These simple tests will enable the teacher to show that rubber, silk, wax, wool, fur, paraffin and glass