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Exhibits as an Aid in Teaching

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SCIENCE BULLETIN

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TEACHING THE HISTORY OF SCIENCE

We are living in a scientific age. Science has contributed more to our comfort, well being, and happiness than any other branch of knowledge. The other branches of knowledge are now taking the scientific method for the solving of their problems. Is it not important that science teachers should find some place in their teaching to teach some of the history of the development of science? An excellent method of doing this is through the study of the lives of our great scientists. It seems that the lives of politicians and soldiers are often emphasized much more than are the lives of such men as Pasteur, Darwin, Newton, or Faraday. Might not the study of the lives of our great scientists rather than that of our great soldiers contribute towards the abolishment of wars. Let us idealize the work of these great benefactors of mankind rather than that of the warriors of history. The lives of our great scientists are often dramatic and illustrate the highest type of devotion and sacrifice for the good of mankind. It takes more real courage for a Lazzar and a Noguchi to sacrifice their lives in the conquest of yellow fever than it does to lead an army into battle. Sir William Osler says of Pasteur,—“To no other man has it ever been given to accomplish work of such importance for the well being of humanity”. It has been said of Lister that he by the application of the principles of bacteriology to surgery is responsible for the saving of the lives of more men than have ever been killed in battle. Darwin by his work changed the thinking of a whole world and we came to realize that we are living in a dynamic and not in a static world. The lives of these great scientists are intensely interesting and the stories of the discoveries of

science will appeal to high school boys and girls. Why not teach more of the history of science?

WINTER BIRD STUDY

What birds are to be found in your vicinity during the winter months? We would like to have observers from different parts of Iowa report to us a list of the winter birds they find, giving us the date of observation and the locality. We will be glad to publish your reports. If we can get reports from all parts of the state, we will have a valuable record. Make sure that your determinations are accurate and make the list as complete as possible. Our suggestion would be that you definitely plan two or three field trips for a bird survey. You may be surprised at the number of birds that are to be found in your vicinity. The success of this project will depend upon you. Let us have your reports.

By the way, why not introduce some winter bird study into your biology course? Field study does not need to cease during the winter. Nature has much of interest during the winter months. Why not have a feeding station? You may be surprised at the interest that this will create in birds.

EXHIBITS AS AN AID IN TEACHING

Complaint is often made that science subjects are difficult to teach. Many feel they are so abstract that there is nothing tangible with which to start. Since most of our industrial products are now very closely controlled by physical principles and chemical processes, it ought not to be difficult in the study of these subjects to arouse interest by calling attention to their uses in the industrial process.

Many of our manufacturing concerns being anxious to bring their products to public attention have prepared exhibits of their finished products and some have exhibits showing the steps in the processes of preparation. The last feature is splendidly illustrated in the construction of the modern light bulb. To look at a finished bulb one would get but little idea of the process of

manufacture. The Mazda Light Co. has tried to help solve this question for us by preparing a small cabinet exhibit containing the parts of the bulb arranged in the order of their assembly. A few minutes study of this cabinet with the real parts before a class would give more definite information than many pages of printed instruction and numerous illustrations. It could also be made the center of interest in a study of the sources and preparation of the various materials which are used in the manufacture of the bulb.

The lead storage battery is another piece of apparatus which has come into extensive use during the last few years. The exterior view gives but little information as to its interior construction and processes of manufacture. The Exide Battery Co. has prepared an exhibit showing the parts used in its construction and their order of assembly. The Willard Storage Battery Co. has a book especially on the selection of materials, their assembly, and the care of the battery which could be used in an intensive study of the storage battery. By using these exhibits the chemistry of the battery action may be made much easier. Doubtless with a better understanding of its construction and use, more intelligent care would be given the storage battery. In the study of the parts entering into its construction interest may be aroused as to the region of the country from which these parts are secured and the methods of securing and refining of the raw materials. Such a study creates an interest in related industries showing the interdependence of our industrial situation.

When the word chemical is used, it brings to the mind of some people many long rows of smelly bottles in a drug store with fancy labels and Latin names. If the word salt is used, most people think only of the substance they sprinkle on their potatoes or into which they stick radishes before eating them. But few realize there are hundreds of salts almost as common as sodium chloride. Some of our chemical firms are helping to overcome these difficulties by preparing cabi-

nets with simple bottles of a large variety of salts. With one of these cabinets before a class many different fields of interest are suggested as to their source, use and industrial relationship. The mysterious idea associated with the word chemical is simplified. Various groupings of these samples may be made as related to agriculture, war, medicine, or those used in the production of our food materials.

Previous to the World War we were almost wholly dependent on Europe for our dye materials. But the war cut off our supply and with amazing rapidity the American chemist came to the rescue and supplied our textile manufactures with dyes of as good or even better qualities. Some of these dye companies are now preparing exhibits of a large number of colors which they send out to call attention to the quality and beauty of their dyes. With one of these collections before a class a study of their manufacture will show the very intimate relationship of our war explosives, the mining and road construction explosives, the dyeing of textiles, and the production of fertilizer for our farms. With these samples many simple experiments in dyeing may be carried out to show the variety of dyes, the ease with which it is done, and their permanency with certain types of fabrics. Also the process of bleaching may be illustrated,—all these without the necessity of an elaborately equipped laboratory.

An interesting and useful series of studies can be arranged in connection with aluminum. Its reduction in price from \$240.00 per pound to 30 cents per pound is an enticing story. With this reduction in the price of production, aluminum is coming into use in many and varied lines. The American Aluminum Co. has an exhibit which is very helpful to high schools showing the highlights of the industry. A fascinating topic for study would be its relationship to the rapidly developing aeroplane industry. Other industries which are greatly benefitted by its use are the automobile, telegraph, and cooking utensil industry.

The people in the state where

the tall corn grows should be especially interested in the products made from corn. Perhaps the majority of people think of corn as a food for hogs, cattle, and horses, and to a small extent corn flakes and hominy for man. The list of samples which the Corn Products Co. will furnish, will give a very widening view of the possibilities of the utilization of corn in starches, oils, rubber substitutes, food materials, and stock food.

The lacquer industry is relatively new but gives promise in many instances of more satisfactory results in preserving surfaces and in decorating purposes than the old paint processes. The E. I. Du Pont De Neumours Co. have prepared a very valuable exhibit to help understand its efficiency. In the preparation of lacquer many other industries are called upon to furnish material, consequently these samples could serve as a nucleus for an extensive study by a class of the industries involved in production and the uses of the finished product.

The rapidity with which our farms are being depleted of nitrogen renders the fertilizer industry one of vital importance. A very valuable study of the maintenance of the nitrogen in the soil can be centered around an exhibit of the Chilean Nitrate Co. Their preparation of fertilizer as well as other sources of nitrogen fertilizer can be compared—thus making an attractive and profitable study.

The teacher can make a list of these exhibits and let each member of the class select one to secure and arrange for study. This will arouse much interest in the work.

Other companies such as the Washburn Crosby Milling Co. have a series of charts costing a few cents each which will help to understand the structure of a wheat grain, and the construction of a flour mill, and the milling process. The Barrett Co. has an instructive chart free of cost showing over one hundred fifty products made from coal. The General Electric Co. has a number of films illustrative of the manufacture of their products which they will loan free

of charge. With these they send lectures descriptive of the films.

The following companies have signified their willingness to send their exhibits to schools when requested by the proper authority. A letter having the endorsement of the president of the school board would be sufficient.

Corn Products Refining Co., Whitehall Bldg., 17 Battery Place, New York City.

The Electric Storage Battery Co. (Exide Battery), Marquette Bldg., Chicago, Ill.

Aluminum Company of America, Pittsburgh, Pa.

J. T. Baker Chemical Co., Phillipsburg, New Jersey.

E. I. Dupont De Neumours & Co., Parlin, New Jersey.

Chilean Nitrate of Soda, Educational Bureau, 57 William St., New York City.

Gold Medal Flour, Minneapolis, Minnesota.

General Electric Co., Schenectady, New York.

The Barrett Company, (Coal Products), 178 W. Adams St., Chicago, Illinois.

Willard Storage Battery Co., Cleveland, Ohio.

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THE AIR WE BREATHE

(Continued from page 3.)

carbon dioxide and carbon dioxide is always present in expired air. The chemist tells us that oxygen in the air is required by animals to produce oxidation in the body, and that carbon dioxide is waste material which is exchanged for oxygen every time we breathe.

(Lime water may easily be made by taking a small chunk of lime obtained from your dealer in building materials. Pour water on the lime and let it stand until it slakes and becomes "white wash". Later pour off the clear water for your experiment.)

To test the condition of the air in a school room in which there is much carbon dioxide, place a small quantity of lime water in a basin. After a time, examine it and see if it has become cloudy. If it has, then the need of ventilation is demonstrated.

Take a short lighted candle and