

84. BAKER—*The Boys' Book of Inventions.*
  85. WHITE & HARPER—*The Aeroplane.*
  86. VERRILL—*The Gasoline Engine.*
  87. PUTNAM—*The Gasoline Engine on the Farm.*
  88. PAGE—*Motor Cycles.*
  89. REETZ—*Electroplating.*
  90. RADCLIFFE & CUSHING—*Telephone Construction.*
  91. McCORMICK—*Electricity.*
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The Committee on a High School Physics Library, consisting of Messrs. Rendtorff, Burns and Tower, has been busily engaged for over a year in preparing the above list of books. Yet they realize that they have been unable to get in touch with all of the literature on the subject. The Editor of this Journal is asking all people who read this article if they will not kindly send to him at once the name, name of author and of publisher, date of publication, and price of any book on physics which they think ought to be added to this list. Such a list of additional books will be published to supplement the above, and will appear in the next issue of this Journal.—EDITOR.

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### THE CLASS IN LOCAL INDUSTRIES.

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A year ago, upon the suggestion of Mr. W. E. Maddock, Superintendent of Schools, a class was organized in the high school for the purpose of studying the industries of Superior and vicinity. The work was placed in the commercial course of the school curriculum.

The class is fortunate in having a wealth of material from which to select. The industries of Superior are many and varied. They comprise the iron ore docks, blast furnaces, steel mills and foundries; coal docks, briquette plants, coke ovens with auxiliary industries and carbide furnaces; grain elevators, flour mills and a linseed oil factory; lumber yards, sawmills and wood manufacturing; electric power plants, transforming stations and telephone exchanges; a large harbor and ships; railroad terminals and repair shops, together with many minor industries. Though classes organized for this study in other cities may not have such a happy variety of material, still all towns and cities have enough to make the course decidedly useful.

The educational values are manifold. The first and most important is that of a ready acquaintance with the industrial units of the home community. It was found that less than ten per cent of the class had visited one-tenth of the fifty or more institutions before they had entered the class. Perhaps less than

five per cent of the citizens of Superior have visited more than one-tenth of the local industries. This estimate would probably hold true for any city over 25,000 in population.

The students, with a few exceptions, have no foundation in science. The subject matter is so treated that it could well be substituted for a general science course. The study of the harbor, soil and climatic conditions are lessons in physiography and biology. The blast furnaces, steel plant and coke ovens are lessons in chemistry. The electric power plants and manufacturing institutions are lessons in physics. Statistics and transportation are lessons in commercial geography. The discussions on supply and demand of the raw and finished products are lessons in economics. The written accounts in the notebooks are lessons in English. Vocational guidance is one of the great values of the course. One will touch on many other phases of education in a natural manner.

To illustrate the method of approach to the study of these industries, the iron group will be outlined. The locations of the iron centers are noted and compared. Then the iron ranges and ore transportation to the docks are studied. The class then visits the ore docks, noting the emptying of the ore into the pockets and the orepunchers at their work in and about the pockets. Here the students leave the dock and board the boat, where a better view of filling the hatches is obtained. Questions are asked in regard to the destination of the boat, number of pockets, capacity, number of men employed, wages, business prospects and possibilities for advancement. The docks are then discussed in the classroom, and a full account of the industry is written.

A trip is then made to the Zenith blast furnace. The charging of the furnace with ore, flux and coke, the drawing off of the slag and iron, the molding of pigs, and loading onto cars by means of electromagnets are noted and explained. Then, returning to the classroom, a simple explanation of the chemical changes involved and methods employed is given. Again an account is written. A trip to the Duplex foundry is next made. There the piles of pig iron and scrap cast iron, the furnaces, molds, pouring off of iron, the casting, smoothing and shaping of the castings in the machine shop, the wood department, and, finally, the assembling and shipping departments are observed and explained. The last trip of this series is to the steel mills. There, the steps are followed in a logical manner, simply explained and written up. First the coke ovens are investigated. Then the

charging of the blast furnaces and drawing off of the slag and the molten iron are noted. The slag is sent to the mills and the iron to the open hearth furnaces. From here the class follows the steel to the roller and rail mills. The last visit is to the power house where the huge gas engines are seen in operation.

The class meets the seventh and eighth periods. The last period is often used as a study hour. A full discussion of the last trip and introductory remarks upon the next trip are given. Simple experiments which pertain to the material and energy are made. One trip is taken each week, the excursions averaging about three hours in length of time. Of all the excursions made, only two encroach upon the time of the other school classes.

A news-clipping bureau was established. The class subscribes to two daily newspapers, and in addition the pupils are expected to read the articles pertaining to the industries in the newspapers taken at their homes. These articles are read, discussed and filed. Any written material pertaining to the industries is gathered and used for classroom work.

A photographer accompanies the class on all of the trips. The students buy the pictures at cost price and insert them in the proper places in the notebooks. Lantern slides are being made, and a lecture is being prepared to accompany the slides. This will serve as interesting instruction and entertainment in the classroom, the night school and community meetings.

From time to time, the students write articles pertaining to the local industries for the high school paper. Much of the best work in exposition done in the English department has been based upon the study of these industries.

In his seven years as a teacher, the writer has given no course toward which his students, both boys and girls, had an attitude of such interest and appreciation. A number of the class of the previous year, who are graduated and are holding commercial positions, have stated that the work has helped them greatly to be more valuable employees. The magic of the saw reducing logs to lumber, the loading of boats with iron ore and grain, the unloading of coal with four ton clams, the action of a hydraulic press, all are of such compelling interest and educational value, that the most phlegmatic student is drawn out of his lethargy and is instilled with an intelligent pride in his home community.