

The Knowledge Bank at The Ohio State University

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BATTELLE MEMORIAL INSTITUTE

By HOWARD FRALISH
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THE next time that you are seated in the stadium waiting for the game to start cast your eyes directly south and in the not to far distance you will see a large modern building. That is Battelle Memorial Institute. In its capacious quarters,—90,000 square feet of floor space, are housed the personnel and equipment of one of the foremost industrial research plants of the country.

Battelle Memorial Institute was founded and established by Gordon Battelle and his mother, Annie Norton Battelle, to further scientific knowledge in metallurgy, fuels and allied fields. However, although endowed and hence conducting many research problems of its own, its services are available to industry. For such services, all that Battelle requires is that the Institute shall not incur any expense. Research for industry is conducted on a non-profit basis.

Battelle Organization

In order to realize full efficiency from its personnel, the Battelle Staff is divided into two groups, the business staff and the technical staff. This later is then subdivided into several departments,—metallography, ores, alloys and steels, physics, electroplating, chemistry, ceramics, fuels and machine shop. All these departments function in close unison with one another, and thus many different points of view are brought upon any particular problem or development, both before and after the project is attacked. Feasible ideas are quickly filtered from the non-feasible.

Battelle Laboratories

Engaged as it is on many problems, the laboratories of Battelle are excellently equipped.

In the metallography laboratory are microscopes, photographing microscope, grinding and cutting machinery to prepare specimens, and polishing machines for finishing metallic surfaces. Also the metallography department has complete facilities for all photographic work incident to making of graphic and pictorial records of work accomplished on the various projects.

The physics department includes as its equipment many standard pieces of testing apparatus necessary for examining the properties of metallic and ceramic materials, as well as ammeters, voltmeters, potentiometers, pyrometers, balances et cetera which are often assembled with special built apparatus for making the varied tests that suggest themselves as a project develops. The more permanent pieces of testing apparatus are those used for measuring electrical conductivity of metals, thermal expansion of rigid materials, thermal conductivity of metals, thermal conductivity of low temperature insulating materials, thermal conductivity of refractory materials at high temperature, thermo-elastic coefficient of metals, impact strength of metals, compression and tensile strength of metals and other rigid materials, hardness of metals, fatigue of metals, creep properties of metals, corrosion properties of metals and surface properties of metals by use of electron diffraction. Also the department has X-rays, bearing testing and standardization equipment.

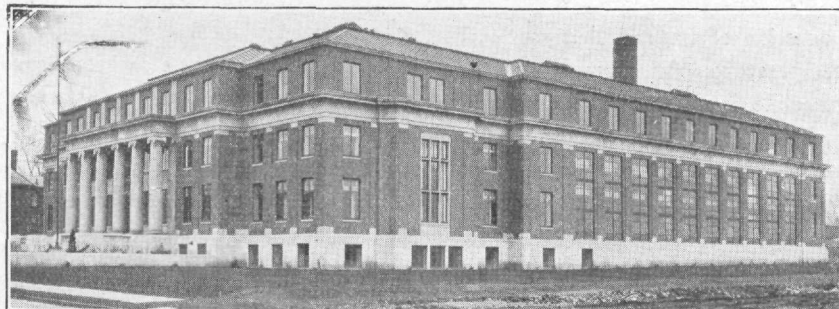
In the ores department stabilized equipment is not so prevalent because each project usually requires that special apparatus or machinery be built expressly for that job. However, it has available an air table, jigs and classifiers.

Chief property of the chemistry department is the analytical laboratory which is mostly concerned with analyses of steels and alloys. Here again though special equipment is built up and dismantled according to demands upon the department.

In the ceramic department are found batch mixers, ball mills, drying ovens, large and small gas fired kilns, and hydraulic press.

For the fuels department are a battery of furnaces to which can be attached oil burners, automatic stokers or gas burners. And again certain projects may require the building of entirely new apparatus.

To study the preparation and treatment of alloys and steels, Battelle has a foundry with necessary molds, sand mixing machine and several melting furnaces, one a carbon arc furnace, one a gas furnace, and another an induction



furnace. For heat treatment there are a gas fired heat testing furnace, small and large resistance furnaces, carbon arc furnaces, induction furnaces, and a Globar furnace. Also there are heat treating ovens and oil quenching baths. Many of the furnaces are equipped with the finest of automatic controls. For working of steels and alloys, there is a small rolling mill, and drop forge.

Finally for the cutting and shaping of various specimens, and building of much of the special equipment there is a machine and carpenter shop. A trio of lathes, a shaper, large drill press, small drill press, rotary saw, band saw, planer, welding equipment and tool room answer nearly all the machining and carpentry needs of Battelle.

The building proper has been excellently designed for the purpose it serves. All laboratories are equipped with gas, compressed air, hot and cold water, steam, battery and generator direct current, alternating current at 2, 4, 6, 8, 10, 20—250 volts, fume hoods and acid proof drains. Very little was overlooked in providing for the varied needs of a modern laboratory.

Although a library might not be classified as a laboratory, the facilities for library research are beyond reproach. Besides being a comfortable library, a rare sort of thing indeed, the library at Battelle has in the neighborhood of 5,000 books and bound periodicals, all technical in nature and closely akin to the particular fields in which Battelle is interested. In current periodical room are found practically all the domestic and outstanding foreign journals on metals, engineering, ceramics, and fuels. After six months on the shelves these journals are bound in Battelle's own bindery and transferred to the bound volume section.

Battelle Research

Although it would be almost an impossible task to even sketch the nature of every project undertaken by the Battelle Staff, a gist of its general nature can be quite clearly indicated. As has been mentioned previously, the problems attacked lie in a more or less restricted field but, even so, they are very numerous.

For instance, the use of high-speed engines for automobiles called for better valve steel and better bearing metals, along with several other metal problems. It is just such problems as these that Battelle attacks.

The steel industry is always interested in new and better ways to prevent corrosion of steels. In fact corrosion of both steels and alloys is a subject about which a great deal more would like to be known.

Then there is the question of natural decay of steels with time, use, and temperature. An example, the steel drive shaft of an automobile is much of the time under torque and bending moment; how many revolutions can it make before breaking. Tests will show whether a new type of steel will stand up longer than the one previously used. Another example, steel used in the tubes of high pressure steam plants are subject to heavy strain and high temperature. It was found that under such conditions

they tend to gradually stretch out,—creep is the word used. Tests show again what type of steel is most resistant to these conditions. Innumerable examples of other troubles in the metal industry could be sighted and each, with study and research, is usually lessened.

In the ceramics field, the question of ceramic lumber has arisen. Probably Battelle will have a hand in the development of such a material. At present more concern is made about the development of light weight, high temperature, insulating refractories and improvement of the heavy refractory products such as must be used in glass factories, and steel furnaces. Enameling was another problem attacked with the resultant development of "Crystal-cote."

To research in fuels has come the development of methods for burning lower grade coals with efficiency, and improvement of furnace design.

Cleaning and segregation of lower grade ores with minimum cost also presents a fertile field for research.

And so one could go on sighting more and more examples of troubles and problems that present themselves in just these limited industrial fields. To progress means that someone must investigate the nature of trouble and try to eliminate it. Such is the function of Battelle.

Battelle Research Fellowships

Although Battelle is a private research institution it cooperates with Ohio State University in many ways and one which should be particularly interesting to engineering students is their offer of Battelle Research Fellowship to Ohio State students who are candidates for doctor's and master's degrees.

READING SPEED

How fast can you read? Dr. Alvah H. Lauer of Iowa State College has some expert suggestions for increasing your effective speed. "Force your speed in reading," he says, "but never read faster than you are able to understand." If you find your mind straying from the subject matter, Dr. Lauer suggests that you stop immediately. Or, redouble your effort. All reading must be silent. Reduce the number of times you "fix" your eyes. Make an effort to see phrases, instead of individual words. The next step is to try to grasp, instantaneously, the meaning of whole sentences, then whole paragraphs.

Dr. Lauer has twenty short tests for increasing reading speed. He tried these tests on 397 students and found that their average increase in reading speed was 35.3%, and 98% showed noteworthy improvement. The reading speed of some of the students was actually doubled.

Therefore, it is obvious that if you double your reading speed, you will be able to read twice as many books or magazines, you will get twice as much pleasure out of reading, and twice as much benefit. One of the benefits will be the matter of your studies.