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FOREIGNERS ARE LEARNING OUR INDUSTRIAL METHODS.

It has long been our boast that America was able to produce better results in the technical field than those due to any other nation; even where hand work is concerned, this is believed to hold true in many respects. If it is simply a question of adhering to tradition and of reproducing the products originated by past generations, the foreign workman may equal or surpass the American. But it has long been remarked that where originality and an ability of thinking and working on independent lines is involved, the foreign highly specialized workman yields to the more independent American mechanic, as to one less hampered by tradition. Thus we find our country abounding in self-made men who began at the lathe and bench, and now own and conduct great factories. Their independent habits of thought have opened for them their careers.

Inventiveness, the great American characteristic, has had much to do with this state of affairs. The constant striving after invention, the introduction of ingenious machines and labor-saving processes, has relegated the old-country machine-like workman to the past. His work is done here by machinery, and those who attend the machines may be destined to be the inventors of others designed to surpass them. While hand-made goods, from their very imperfections, have a charm for the artist, the every-day user appreciates rather the constant good quality of machine-made articles. Our superior methods have given us the power of competing under primarily unfavorable conditions with the cheaper labor of foreign countries.

It is a question how long the supremacy of our methods will last. Foreign competitors in the industrial world have for some time past realized the fact that certain American-made articles sell better than their own; indeed, they find a similar state of things obtaining in many lines of manufactures. One way of meeting the case is resorted to in the production of counterfeit American goods. Discreditable as it is, there is no question that extensive operations of this character have been carried on.

But a more honorable way of meeting what seems to be a true emergency has been adopted. English manufacturers now send over students of our manufacturing processes, in the persons of intelligent young men, who enter our shops as workmen and labor there, studying meanwhile and learning all the details of our shop management and manufacturing processes. The United States is, in fact, treated as a technical school. The men sent pass from one factory to another, so as to get a good view of different processes. Then they return and use their knowledge to advance their own home industries.

In almost every field of technical work America has won renown. It is now evident that our neighbors are determined to find out why this is, and the placing of students in our shops is a tribute of the highest value to our methods of work.

THE ORIGINAL EDISON ELECTRIC RAILROAD.

We reproduce elsewhere an interesting illustration from the SCIENTIFIC AMERICAN of June 5, 1880. The cut represents Edison's electric railroad as operated at that time in Menlo Park, N. J., a station on the Pennsylvania Railroad, in those days celebrated as the abode of Edison and the site of his laboratory. The Wizard of Menlo Park, as he was then called, made the place illustrious by his work on the incandescent electric light and the first or "tin-foil" phonograph. As he left the train a short flight of steps or steep path led the visitor up a bank by the side of the track, and a few minutes walk on the more level ground brought him to the laboratory. Here Edison with his corps of assistants was at work on a variety of operations in the many branches of science which have always been carried on in his laboratories.

The inventions then being developed were from time to time described by us, the original phonograph making one of its earliest appearances in public in the office of the SCIENTIFIC AMERICAN, and being first described in our columns.

The year 1880 is an ancient period in electric engineering. To-day we see the horse-drawn street car disappearing from our streets, the local traffic of steam railroads transferred in great part to a new system of travel, and areas of country brought within frequent and rapid communication by a new agency. This element in transportation is the electric road. Starting from humble beginnings, deriving its energy originally from primary batteries in the days of Page, then using the rails or an insufficiently insulated conductor laid between the tracks for the transfer of mechanically generated electric energy; next using the overhead wire with trolley running upon it, and finally reaching its present efficient, if objectionable, form of trolley pole pushing up against the under surface of a conductor, the electric road has reached a position of first importance in local traffic, and may yet displace the steam locomotive on long distance work. In ten years a new element has entered our life and a new profession has been created.

The cut which we reproduce has a special interest for us at this day. It shows the electric railroad of 1880. If the next ten years witness as great progress in electric railroads as the last decade has sufficed for, the face of the country will be revolutionized.

The peculiar features of the primitive installation will be noticed. The use of frictional gear for throwing the motor on and off, the small traction car distinct from the passenger car, and the use of the rails as conductors are characteristic. It is curious that fourteen years have sufficed to produce relics in this engine and car which are as antiquated in regard to modern work as is the De Witt Clinton when compared with modern locomotives.

We feel that we cannot do better in the way of contributing to ancient history than to reproduce the text of the article describing this affair. The last paragraph is interesting, showing how hazardous it seemed to prophesy what the future has actually brought forth.

FIGHTING MAN'S MOST DEADLY FOES.

For two or three years past there have been indications, increasing in number, that chemists in many lands (one or more even in far-off Japan) are at last giving their minds and their labors to the study of the chemistry of the bacteria.

Already we have a probable working hypothesis, which furnishes a valuable guide to the chemist in this field. This is the view, which must at least involve much truth, that all bacterian diseases are the results of blood poisoning by certain products or educts of the growth of the bacteria, after these have effected a lodgment in the tissues of the body.

On this hypothesis have been based several methods of experiment, which we have not space for now. Our present object is to sustain assertions made above, by citing, as an example, results announced during the last year, on the authority of two German chemists, Wernicke and Behring. They found that the poisons of both the diphtheria and the tetanus (lockjaw) microbes were neutralized, after being introduced into the circulation of animals, by introducing also iodine trichloride. It appeared also that this compound acted as an actual antidote to the blood poison, inasmuch as it did not kill the bacteria themselves, while preventing them from killing the animal. To say the least, this is a most encouraging result, and justifies the hope expressed in the previous article referred to, that if these enemies cannot yet be actually destroyed, their baneful and debilitating agencies may be neutralized, so that the vital energies may have a chance to combat and overcome them. Experiments on men in this direction have been promised, and will be awaited with interest.

Test of Holtzer Projectiles.

The reception test of the second lot of 100 ten-inch armor-piercing Holtzer shells took place January 18 at the Sandy Hook proving grounds. The shells were made by the Midvale Steel Company, of Pennsylvania, after the celebrated French process. The gun used was a ten-inch breech-loading rifle, mounted on a barbette carriage. The steel armor plate was one which had been used before, having been made by the Bethlehem Company. It weighed 10 tons and was 11½ inches thick. Two shots were fired, each weighing 575 pounds. The charge was 183 pounds of powder. The test was highly successful, the plate and its oak backing three feet thick was pierced with ease, and the projectile was lost in the sand bank, but was afterward recovered and calipered. The gauges and calipers were passed along the shot and failed to reveal the slightest variation in length or thickness. The velocity was 1,625 feet per second. A crack in the plate almost imperceptible before firing was widely opened by the shot. The edges of the hole were turned out like rose leaves and the steel surrounding the hole was blued by the heat generated by impact of the shell.

Artificial Sunlight.

In a dark room with alternating currents of 800,000 voltage, Nikola Tesla, by means of atmospheric vibrations, caused a faint glow of light to appear. Explaining the phenomenon, he said: "If I can increase the atmospheric vibrations, say 1,000,000 or ten thousand millions, I can produce sunlight in this room. Of course, I can increase the vibrations by increasing the voltage. I can make the voltage 8,000,000 as easily as 800,000; but I am not ready to handle 8,000,000 volts of electricity. Currents of such strength would kill everybody in the room. I expect, however, to learn how to control a large voltage. When I have increased the atmospheric vibrations perhaps a thousand times, the phenomenon will be no longer electricity. It will be light. I am satisfied that sunlight can be made from electricity without doing harm to anybody, and I expect to discover how it is done. It is a grand idea, and whether the voice through which it came be hushed and still or yet resounds in the proclamations of new truths, the idea itself will be carried to fruitage, and the world will be wiser, whatever may be the issue."