

# SCIENTIFIC AMERICAN

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## THE MANUFACTURE OF THE HARRIS-CORLISS ENGINE.

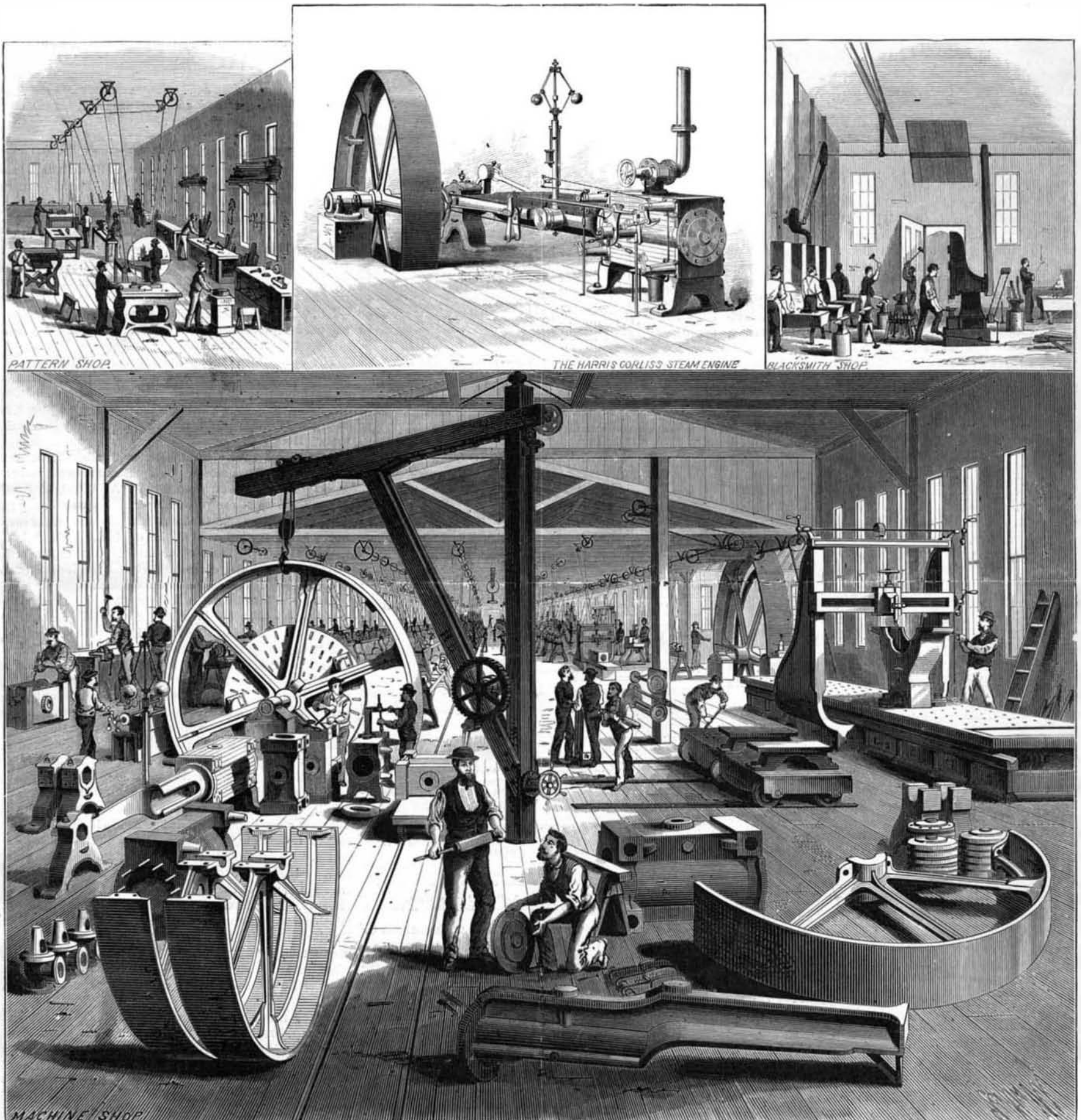
The details of the construction of the Harris-Corliss engine and the reports of its performances are already familiar to the readers of this journal; for this reason, and because the engine is now so widely and favorably known, it is unnecessary to repeat these items at length. It may be said, however, that this engine up to the present time maintains its superiority, and is to-day regarded as the standard engine.

Mr. William A. Harris, the proprietor of the Harris-Corliss Engine Works, at Providence, R. I., is now 44 years of age, and in the prime of life, an able mechanic and organizer. This, together with his twenty-four years' experience on the

Corliss and Harris-Corliss engine, afford an explanation of the great success of this engine and of its enviable reputation. He commenced the business in a small way, and his facilities were limited to the construction of engines of from ten to twenty horse power. The business being very successful and demanding larger quarters, he built new engine works at the corner of Park and Promenade streets, having purchased two acres of land there.

On a recent visit to these works we were impressed with the system and order with which the work is done. Notwithstanding the great amount of labor in hand, the smallest and least important piece is as carefully dealt with as the ponderous castings of the larger engines. Special tools are

adopted for a much wider range of work than is usual in establishments of this kind. The design of these tools, their adaptability to their work, the admirable organization of the establishment, together with the improvements which have brought this engine to perfection, are all due to the energy, tact, and talent of the proprietor of these works, and they place him prominent among the advanced mechanics of the day. When engineering ability of such high order is devoted to a single branch of manufacture, it is natural to expect higher results than are reached by those who engage in this, that, or the other—doing a great variety of work, but of poor quality. The works of Mr. Harris are devoted exclusively to the manufacture of his engine.



THE HARRIS-CORLISS ENGINE WORKS.

The new shop is located within six minutes' walk of the railroad depot and within ten minutes' walk of the business center of Providence.

The demand for the Harris-Corliss engine is such that one thousand horse power per month in engines of different sizes have been shipped from this establishment for many months consecutively.

A good idea of the appearance of the machine shop of this establishment may be had from the lower view in our large engraving on the front page.

The accuracy of the work done in this establishment, as well as the excellent quality of the materials used, is attested by every engine sent out.

We found in these works engines in process of construction for all portions of the United States, and we were informed that many of them have been exported for use in foreign countries.

The great success of the Harris-Corliss engine lies chiefly in the simplicity and precise action of the governing elements; the governor is an independent mechanism, saddled with no extraneous load, and free to instantly respond to variations in the angular velocity of rotating parts.

In the Harris-Corliss engine, when the steam port is opened for admission of steam to the cylinder no obstruction exists to the free flow of steam from the boiler, and when the connecting pipe is of proper size, with few bends and well protected from loss of heat by radiation, the initial pressure in the cylinder is within a pound or two of the pressure in the boiler.

A Large Cog-Wheel.

A cog-wheel, said to be the largest ever made in Paterson, N. J., has lately been finished. It is of iron, 20 feet in diameter, the periphery 10 inches wide, and it weighs 12 tons.

HUSNIK's plan for causing a chromated gelatine film to adhere to a zinc plate is to coat the zinc plate with a solution of three grammes of chromic acid in one thousand grammes of water; when the acid has acted upon the zinc, wash off the solution and first coat the plate with plain gelatine, and then with the chromated gelatine.

AN extraordinary statement is made by the Chief Government Engineer of the Province of Liège in his trade report for 1878. He alleges that during last year a good deal of hardware manufactured in Belgium was exported to England, whence it was shipped to British colonies after the Belgian trade marks had been obliterated and replaced by spurious English ones.

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NEW YORK, SATURDAY, SEPTEMBER 20, 1879.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles and their page numbers, including American Association, American Institute Exhibition, Atlantic temperatures, Band saw, wooden pulley, Bite of the skunk, Black lead for batteries, Brass, to lacquer, Bridge, Eng. Chan., proposed, Caves, in Britain, Cumberland, Cog wheel, a large, Determination of silver in galena, Diphtheria, new way to treat, Disinfectants, how to use them, Dissociation of chlorine, Electric light, economy of the, Electric motor, (29), Exhibition, a novel, Explosion in a Bessemer shop, Flange coupling, new, Fourth of July, Freckles, to remove, Frog farming, Fruit bearing, Geissler's tubes, Gelatine negatives, General Wool monument, Glacial acetic acid, impurities in, Harris-Corliss engine, Lifting metals in vacuo, Hydraulic ram, Iodine as a substitute for quinine, Inventions, agricultural, recent, Inventions, engineering, Inventions, miscellaneous, Lesseps and the canal, Lumber district, prosperity in, Metals, fusible, Metals, new, two more, Milk, skimming, Multiplication, abbreviating, Mustard, Northwest passage, the, Notes and queries, Optical illusion, Ornaments, bog oak, Patent your inventions abroad, Platinum in the United States, Polar expedition, new British, Press, oak, Gothic, Punching and shearing press, Railroad, expenses of, Railway making, progress in, Religious belief vs. epidemics, Rheostat, a cheap, Safety valves, weight on, Ship, swiftest in the world, Silk mills, English in N. J., Spines of Arkansas, Spines of the cactus, invisible, Spot on disk of Jupiter, Spontaneous ignition, Steam fitters, young, advice to, Timber in the English colonies, Transit instrument, new form of, Water supply pipes, Wine, Yellow fever, disinfection of, Zinc, to purify.

TABLE OF CONTENTS OF THE SCIENTIFIC AMERICAN SUPPLEMENT No. 194.

For the Week ending September 20, 1879.

Price 10 cents. For sale by all newsdealers.

I. ENGINEERING AND MECHANICS.—Morin's Rotary Dynamometer. A simple, low priced and practical apparatus, 1 figure. Proposed Bridge over the English Channel. M. DE SAINTE ANNE'S project. House Drainage. Principles and experience of the Massachusetts State Board of Health. 2 figures. Explosion of the Flouring Mills at Minneapolis, Minn., May 2, 1878, and the Causes of the same. By S. P. PECKHAM. The danger of dry stones and inadequate supervision. II. ELECTRICITY, LIGHT, ETC.—Influence of Electricity on Colliding Water Drops. Lord Rayleigh's experiments. Probable explanation of the connection between rain and electrical manifestations. Jamin's Electrical Lamp. A simple and unique device. Illustrated. An Optical Illusion. Mr. R. A. Proctor learns an old trick. Disadvantages of eyes of unequal focal length. A Mirror Barometer. III. MEDICINE, HYGIENE, ETC.—On the Different Methods of Artificial Alimentation. By THOS. J. GALLAHER, M. D. Feeding by injection. Artificial digestion. Feeding by the Nose. Hypodermic feeding. Feeding through the skin. Morbid Fear as a Symptom of Nervous Disease. By GEORGE M. HEARD, M. D. Astrophobia. Agoraphobia. Topophobia. Anthropophobia. Gynophobia. Monophobia. Phobophobia. Mysophobia. Conditions and causes. Symptoms. Treatment. Mammary Inflammation Treated by Ice. A valuable experiment. Secretion of the Gastric Glands. Professor Heidenhain's observations. IV. TECHNOLOGY AND CHEMISTRY.—On a New Method of Preparing Gelatine Bromide of Silver. By DR. VAN MONCKHOVEN. Produces plates that are twenty times as rapid as the best wet collodion, and three or four times as rapid as the best English plates. Melting Points of the Elements and their Coefficients of Expansion Heat. By T. CARNELLY. Purification of Platinum and Iridium. Methods employed by Mr. G. Matthey. Platinum. Iridium. Alloy of Iridio-platinum. On Ultramarine. By M. T. MOREL. Methods of testing for brilliancy, firmness, coloring power, resistance to acids, and resistance to alum. How to determine the coloring matter of blue textile fabrics and paper. Ultramarine. By E. W. BUCHER. Method of preparation. Separation of Ferric Oxide Alumina from Manganese. A. Classen's method. V. THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE—Saratoga Meeting. On the Identity of the Laws of Oxygen with Bright Solar Lenses, as shown in photographs taken which increased dispersion. By Professor HENRY DEWAR. The history of the discovery of oxygen in the sun, and description of apparatus and methods employed. History and Methods of Palaeontological Discovery. By Prof. O. C. MARSH. (Continued from SUPPLEMENT No. 188). Cuvier, Jean Lamarck, William Smith, James Parkinson, William Buckland, Adolphe Brongnart, and the development of fossil botany, 1828 to 1832. The systematic study of invertebrate fossils, 1824 to 1836. Louis Agassiz and other students of fossil fish and reptiles. Richard Owen. Results of the third period of palaeontology. The fourth period of palaeontology. Natural selection. Dominance of the doctrine of evolution. Antiquity of man. Belief in universal laws. Mythologic Philosophy. Prof. J. W. POWELL'S address. (Continued from SUPPLEMENT, No. 188). Outgrowths from Mythologic Philosophy. Animism. Theistic Spiritism. Thaumaturgies. Mythic tales. Religion. Evolution of Mythologic Philosophy. Zotheism. Physitheism. Psychotheism. Comparative theology. A Short Biography of the menhaden. By Prof. G. BROWN GOODE, United States Fish Commission. The natural history of the most valuable and important of our coast fishes. Objects of Sex and of Odor in Flowers. By Prof. THOMAS MEHAN. An anti-Darwinian review of the best English subject. On the Phenomena of Heating Metals in Vacuo by Means of an Electric Current. By THOS. A. EDISON. Develops a new department of physical investigation. Homologies in the Lauraceae. By LESTER F. WARD. Illustrated.

THE AMERICAN ASSOCIATION.

Notice has been taken in other columns of the general proceedings of the American Association at its Saratoga meeting. On the whole it was an enjoyable convention, well attended by members, and well supplied with papers, though no part of the proceedings may be described as of extraordinary interest or importance.

No great scientific discovery or invention, that the readers of the SCIENTIFIC AMERICAN would consider entirely novel, was brought before the meeting. The main results of Mr. Michelson's investigation of the velocity of light had already been made public. The details of his work, however, were known to but few, and his paper was justly regarded as of superior value and merit. Professor Marsh's address was a masterly review of a great subject, crammed with information which will give it permanent value.

Major Powell's treatment of Mythologic Philosophy was not only intensely interesting and suggestive, but singularly original, and freighted with a wealth of information with regard to the mental conditions of American savages. No better evidence could be given of Major Powell's fitness for the great work he is engaged in under the auspices of the Smithsonian Institution.

Mr. Edison's researches in connection with the behavior of highly heated metals in vacuo are certainly promising; possibly they mark the opening up of a new department in the practical treatment of metals, as well as in scientific metallurgy. Whatever may be the issue of Mr. Edison's efforts in the direction of electric lighting, the results of his investigations are certainly important in furnishing valuable contributions to science.

We take great pleasure in laying before the readers of the SCIENTIFIC AMERICAN and the SUPPLEMENT full and exact reports of the papers and addresses mentioned, with others of value.

PATENT YOUR INVENTIONS ABROAD.

In a report to the Department of State on the International Machine Market recently held in Leipsic, Germany, the United States consul to that place calls especial attention to the national and personal loss which results from the too common neglect of our inventors to take out foreign patents. Not only is the direct export of American manufactures to Germany and other European states seriously diminished by such neglect—the manufacturers of those countries flooding the market with cheap and ill-made imitations—but, still worse, such imitations are often exported to neutral markets to compete with or ruin the sale of the genuine articles of American make.

The consul mentions several American inventions whose market in Germany has been spoiled by local imitations after a large trade in the genuine articles had been built up. He also instances one which, thanks to a German patent, has been able to command the field in spite of many local imitations. He says:

"There are twelve manufactories throughout Germany engaged in the manufacture of reapers and mowers, after the model of those constructed by W. A. Wood, of Seneca Falls, N. Y. But the Wood reaper and mower being patented in Germany, the imitators have avoided infringement thereon by a variation from the original. This variation enables Mr. Wood to keep the field in Germany with his machines, notwithstanding the fact that the imitations are offered at 40 per cent less than the original."

The moral is evident. A few years ago it did not matter so much whether the inventor's control of his invention abroad was secured or not. American products were little known in foreign countries and imperfectly appreciated; besides the cost of manufacturing here was so great that any considerable export trade was out of the question. But all that has been changed. Even if the article is one that cannot profitably be exported the right to manufacture it in any European state can be profitably disposed of in the vast majority of cases. The eagerness with which American inventions are snapped up by foreign makers liable to unlimited competition in the production and sale of them is evidence enough, were all other evidence lacking, that the exclusive privilege of manufacturing under a patent would be easily salable at a good price. There is much to be done, it is true, toward organizing, developing, and simplifying the means required for handling to the best advantage American patent rights abroad; but even now the possession of a good patent right in any of the leading European states is a valuable property. And foreign patents are much more easily obtainable than most people imagine. Excepting England and Russia the official fees for patents in Europe are now not very much greater than those in the United States; and when we take into consideration the value of the markets thus to be controlled, the costs become comparatively trifling.

For this reason we are forced to think that Commissioner Paine is misreported in a late dispatch to the Evening Post, in which he is charged with saying that American inventors quite generally prefer not to secure patents in Europe in consequence of the high and discriminating fees there exacted.

That American inventors do largely neglect to secure the advantages offered by foreign patent laws is evident enough; but it is not due, we think, to any deliberate balancing of cost and possible profit. More frequently the American in-