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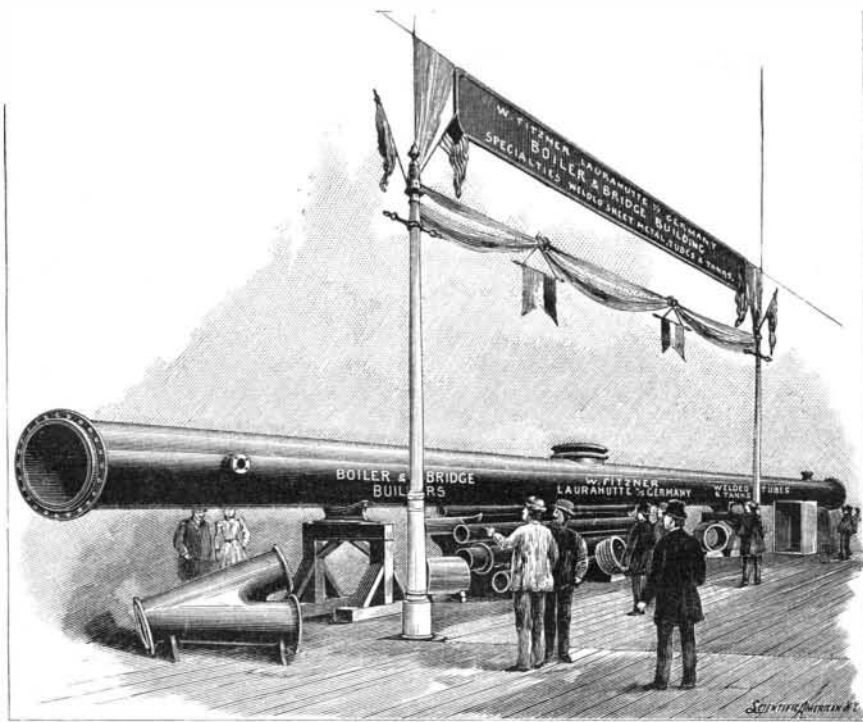
\$3.00 A YEAR.
WEEKLY.

THE WORLD'S COLUMBIAN EXPOSITION—THE BABCOCK & WILCOX BOILER PLANT.

In the SCIENTIFIC AMERICAN of July 8 we illustrated the manner in which the great Exposition was supplied with power by an assemblage of oil-fired, water tube boilers, the greatest in number and operating power ever before collected in one locality. Occupying a conspicuous place in this immense plant are ten boilers, of 3,000 horse power, of the Babcock & Wilcox Company, whose exhibit is shown in one of the views. It is now about twenty-five years since the original Babcock & Wilcox water tube boiler was first put upon the market, and the distinctive type of boiler known under this name, with the improvements made in it along the original lines adopted at the start, has attained a world-wide reputation for efficiency, safety, and practical economy under nearly all conditions, which only a well equipped



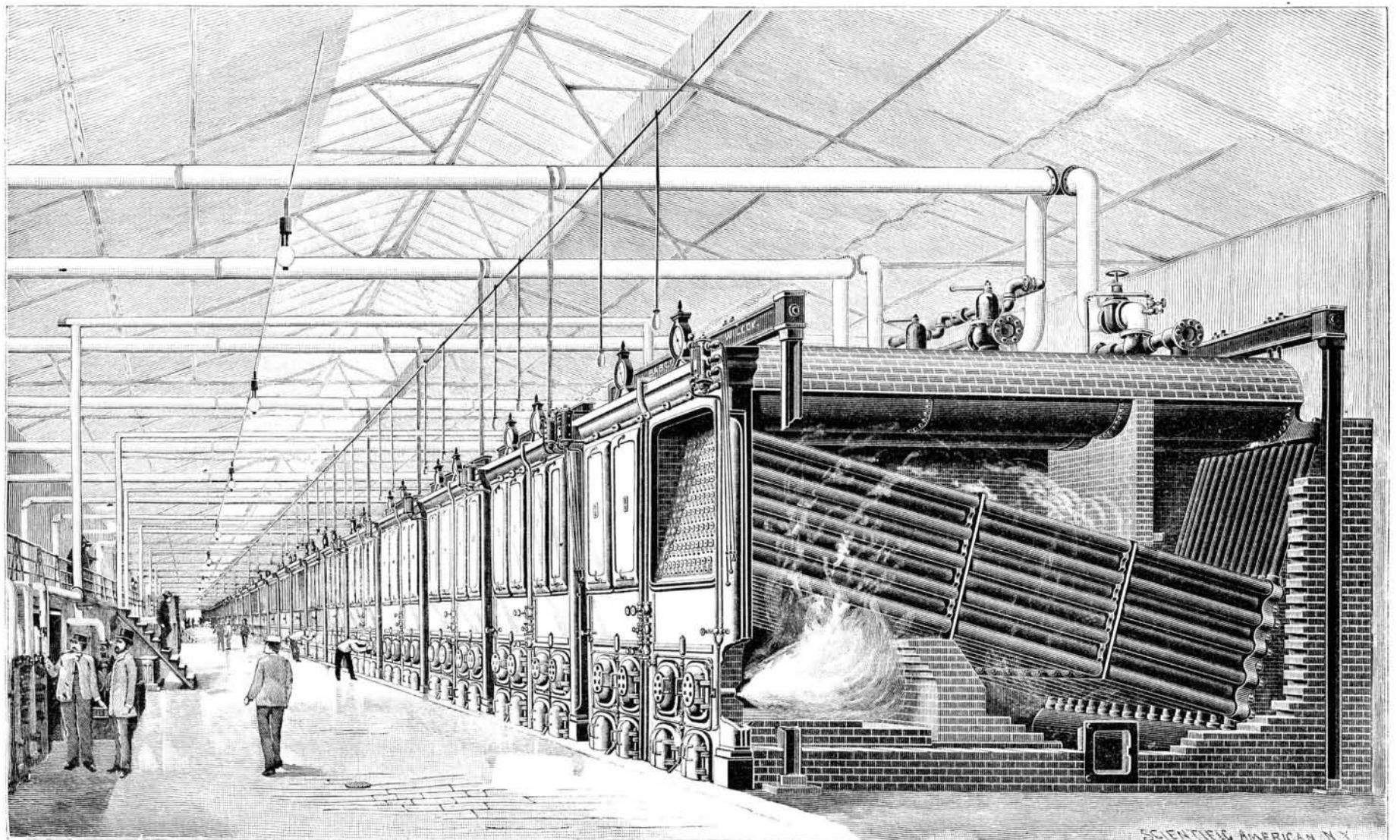
GROUP OF AMERICAN CHEMICAL AND PHARMACEUTICAL PRODUCTS.



A GERMAN EXHIBIT OF WELDED AND BENT TUBES.

engineer can fully understand and appreciate. The Babcock & Wilcox boilers at the Exposition have 126 four inch tubes, 18 feet long, arranged in courses 14 feet wide and 9 high, a mud drum 12 inches in diameter and 8 feet 6 inches long, and two steam drums 36 inches by 18 feet. They are supplied by Hancock inspirators and Snow pumps, and the oil fuel is afforded by thirty Larkin burners, of which we give an illustration.

The construction of this boiler is so generally understood that a brief description only is necessary. It is composed of lap-welded wrought iron tubes, placed in an
(Continued on page 103.)



THE BABCOCK & WILCOX BOILERS.

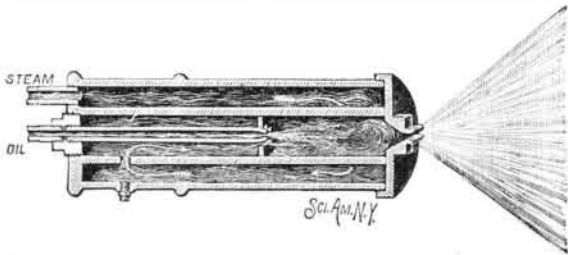
THE WORLD'S COLUMBIAN EXPOSITION—ENGINEERING WORK AND THE INDUSTRIAL ARTS.

THE WORLD'S COLUMBIAN EXPOSITION—THE
BABCOCK & WILCOX BOILER PLANT.
(Continued from first page.)

inclined position and connected with each other and with a horizontal steam and water drum by vertical passages at each end, while a mud drum connects the tubes at the rear and lowest point in the boiler.

In their latest work of the highest grade the company are now making all parts of the boiler of wrought steel. The end connections are in one piece for each vertical row of tubes, the tubes being "staggered," or so placed that each horizontal row comes over the spaces in the previous row. The holes are accurately sized, made tapering, and the tubes fixed in place by an expander. The sections thus formed are connected with the drum, and the mud drum also, by short tubes, also expanded into bored holes, doing away with all bolts and leaving a clear passageway between the several parts. Cleaning openings opposite the end of each tube are closed by perfectly jointed hand-hole plates, held in place by clamps and bolts, tested and made tight under a hydrostatic pressure of 300 pounds to the inch, iron to iron, without rubber packing or other perishable substances. The steam and water drums are made of flange iron or steel of extra thickness, double riveted, made for any desired working pressure, but always tested up to at least 150 pounds per square inch. In erecting the boiler it is suspended entirely independent of the brickwork from wrought iron girders resting on iron columns, thus avoiding any straining from unequal expansion between it and its inclosing walls.

The fire is made under the front and higher ends of the tubes, and the products of combustion pass up between the tubes into a combustion chamber under the steam and water drum, thence down between the tubes and once more up through the spaces between the tubes to the chimney. The water inside the tubes, as it is heated, tends to rise toward the higher end, and as it is converted into steam rises through the vertical passages into the drum, above the tubes, where the steam separates from the water, and the latter flows back to the rear and down again through the tubes in a continuous circulation. As the passages are



THE LARKIN OIL BURNER.

all large and free this circulation is very rapid, sweeping away the steam as fast as formed and supplying its space with water, absorbing the heat to the best advantage, causing a thorough commingling of the water throughout the boiler and a consequent equal temperature. The steam is taken from the top of the steam drum near the back end of the boiler.

A handsome octavo book, with numerous illustrations, entitled "Steam," is published by the Babcock & Wilcox Co., New York, for the information of intending users of steam who desire complete data respecting this make of boilers. This book has now reached its twenty-seventh edition, and contains a great amount of most valuable information, not the least important of which is to be found in extracts given from lectures delivered by Mr. Geo. H. Babcock at Cornell University and before the American Society of Mechanical Engineers.

The correctness of the scientific principles on which the Babcock & Wilcox boilers are based, and the superior mechanical skill employed in their construction and setting, are attested by the fact that these boilers have now been in use for over a quarter of a century, during which period they have constantly grown in engineering favor, until now they are used in all parts of the world, and the measure of the horse power they daily generate is figured by millions.

THE FITZNER EXHIBIT OF WELDED TUBES.

The conspicuous and at the same time most interesting display of tubes, tube bending, tube welding, etc., shown in one of the views is the exhibit of Mr. W. Fitzner, of Laurahutte, Upper Silesia, Germany. This exhibit is in the center of the Mining building, and attracts deserved attention among engineers and mechanics generally. Their steam boiler and bridge building works and welded sheet metal establishment at Laurahutte cover several acres of ground, and the immense plant is furnished with every modern convenience for undertaking large contracts on advantageous terms. Welded tubes and every kind of iron welding is a specialty with them, and they have an improved system of lighting railway carriages by oil gas. They also make gas-light buoys. Among the leading articles in which they have developed a large business are coolers and brewers' coppers; wooden

boilers with welded interiors of iron for various chemical industries and specially for the manufacture of cellulose; also tubes of every diameter, thickness and length, with all possible threads and flange connection; welding boilers for transportation of compressed gas, oxygen, etc.; gas receptacles for lighting vehicles; hollow shafts, retorts, crucibles, galvanizing basins, etc.

The most noticeable feature of this exhibit is a steam pipe with nozzles 65.5 feet long and thirty-one inches in diameter. The purpose in exhibiting this pipe was to show that iron manufacture was limited only by existing means of transportation. The thickness of this pipe is five-sixteenths of an inch, and it weighs three and one half tons. Tubes and pipes of various thickness are also shown. Not infrequently pipes of extraordinary thickness are made to serve as hollow shafts. One such specimen is shown which is sixteen feet long, with an exterior diameter of twelve inches and a thickness of an inch and a quarter. Hydraulic engine pipes for shaft pumps are shown. One of these pipes is twenty-eight inches in diameter and has a thickness of three-fourths of an inch, being designed to stand great pressure. Another pipe is shown designed for use as a well casing in artesian well use. This is made only three-sixteenths of an inch in thickness and is provided with stronger heads, which are welded upon the pipes and into which the threads are cut for purpose of making joints. Among the many other interesting features of this exhibit is a welded and turned centrifugal drum which is so constructed as to be impossible to explode. Other specimens of welding and tube making are shown which are well worth the careful study of users of these articles. Electric railway men will be interested in poles shown which are models of the poles used on electric roads at Breslau and Chemnitz. Detailed information regarding this exhibit may be had by applying at the office of the German Machinery Commission, in the Palace of Mechanic Arts.

CHEMICAL AND PHARMACEUTICAL PRODUCTS.

Another of the first page views represents the exhibit of the Roessler & Hasslacher Chemical Co., New York, the exhibit being in the Manufactures building, near north main entrance. It is one of the most conspicuous and handsomest in the American group of chemical and pharmaceutical products. It is particularly attractive and instructive, by showing not only a number of chemicals but also their application. The works of the company are at Perth Amboy, N. J., and they have a fully paid up capital of \$250,000. The showcase is in the form of an oblong of large proportions, the steps leading to it and its foundation proper being covered with tiles of delicate tints, showing the application of a number of their ceramic materials. At the four corners the roof is surmounted by four large bronze eagles, each holding in its bill the concern's trademark, and the roof is supported by pilasters again partly covered with tile work and showing on their faces handsome signs gilded with their fire gold and mentioning the products of the firm. One of these signs is conspicuous in the picture. The tilework is the product of the Maywood Art Tile Co., Maywood, N. J., of which Mr. E. Bilhuber is general manager.

Specialties of the company's manufacture are cyanide of potassium, chloroform, acetone and ceramic colors, of all of which they are large manufacturers. Big glass cylinders show cyanide of potassium in large white crystalline lumps of 98-99 per cent. purity, a product extensively used for electroplating, mining and other purposes. Chloroform and acetone are exhibited both in large globes and in bottles showing the style of original packing. The ceramic colors are exhibited in their original form of powders and also supplied on china, glass and iron work. Two beautiful big vases show a rich effect in gilding with their liquid bright gold. The maroons, blues, rose colors, etc., shown on decorated plates, etc., are of a delicacy of tint and richness of color not inferior to any English, French or German products.

A novelty among the products shown is peroxygene, an article in powder form made from peroxide of sodium and excelling the latter in bleaching capacity and facility of application. Peroxide of sodium has before been mentioned in our columns. Up to within two years being merely a laboratory product, it has in a short time found extensive use in Europe with dyers and bleachers of wool, silk and mixed goods, bone, bristles, feathers, hair and other material requiring a bleaching agent combining efficiency with harmlessness. It is fast gaining ground in this country, and we are informed that some of the largest concerns in Philadelphia and elsewhere have been regularly using it in quantities for some time. Like all new products, it requires a careful study for a short time by practitioners to familiarize them with its properties, and, as usual, the trouble is amply repaid to its first users by the start gained over competitors. In the Mining and Electricity buildings the R. & H. Chemical Co. has smaller exhibits, showing products more particularly belonging there.

Journalism in China.

Were it true, as has been said, that it is necessary to count the journals of a country in order to have its rank in the scale of civilization, it would be necessary to make an exception in the case of China, which, eleven or twelve centuries ago, ignored the journal, although as compared with Europe it had at that epoch reached a high degree of civilization and was already in possession of xylography, or impression upon plates of wood.

On the contrary, the Chinese government conceived the official journal at an early date, and, while our *Moniteur Universel*, founded about 1789, did not become official until the 1st of Nivose, year VIII., the *Pekin Gazette* (*Tsing-Pao*, "news of the capital"), organ of the government, was already in existence more than 740 years before our era. Primitively printed by the aid of engraved wooden plates, it is at present printed by means of movable wooden characters—a process again in which the Chinese anticipated us. There are, moreover, three editions of the *Pekin Gazette*, and it is the official edition alone that is printed in this manner. The second is printed by means of tablets of wax, upon which are engraved the characters, which, traced in haste, are consequently not very legible. The third is manuscript.

The official edition, according to data furnished to the Geographical Society by Mr. Imbault Huart, French consul at Peking, consists of from ten to twelve double sheets (printed upon one side only, because of their thinness), 7 inches in length by 4 in width, divided into seven columns by violet ink, each column comprising fourteen ordinary characters. It appears every morning.

The edition written by hand (*Sie-peun*) is 6 inches in length by 5 in width, and appears several days before the official edition. The price of it is \$6 per month, while the official edition costs only about 25 cents; at least that is the price to the Chinese, for foreigners pay more for it. It is the latter, also, who especially constitute the subscribers to the manuscript edition.

The reading of this *Gazette* is very instructive. It is a true panorama, not only of the official, but of the social life of the Chinese. The reader finds in it, among other official documents, the date at which the Emperor has decided that the summer hat should replace the winter one. Moreover, we see therein that six candidates for license were more than ninety years old and thirteen more than eighty, and this establishes the absence of age limit for examinations in China.

This *Pekin Gazette* has been the only journal published in China up to the last twenty years, which have seen spring up at Shanghai, Tien-Tsin, and Canton five journals, founded especially by the initiative of the English with the aid of Chinese *litterati*. Again, two of these journals have been recently suppressed, one of them by order of the English consul for having treated the foreigners as "barbarians."

Since 1885, the *Chen-Pao* ("news of Shanghai") has published a weekly illustrated edition of eight double sheets, with a red cover, and costing 5 cents. The engravings are line drawings in the Chinese style. The last Franco-Chinese conflict has its history largely represented therein, and we see in it Commander Fournier in the costume of an English admiral.

All these journals together, exclusive of the *Pekin Gazette*, print scarcely more than 15,000 copies—a small number for a population of four hundred million souls.

Two interesting details are noted by Mr. Huart: First, that misplaced characters are unknown in the *Pekin Gazette*, at least in the prose edited within the confines of the palace, and that the displacing of them might well cost the loss of one or more heads; and second, the singular phonetic transcription into Chinese of various French words culled from journals, ultimatum becoming *ou-ti-ma-toung*, statu quo *sseu-ta-tou-ko*, telephone *to-li-foun*, etc.—*Revue Scientifique*.

A More Effective Street Car Brake Wanted.

Many of the serious accidents which now frequently occur might be averted if a more effective brake could be invented. Something should be devised to prevent the sliding of the wheels when the track is slippery. On the general subject the *Electrical Review* says:

"A brake is essentially an apparatus or device which serves the purpose of retarding the motion of a car or other vehicle. In other words, the brake is simply used for gradually preventing the inertia of the moving car from acting. Friction upon the periphery of the car wheel has been the means employed, and, as a matter of fact, this seems the only feasible manner of diminishing the acquired speed. But the brake now in use cannot immediately stop the car; a minimum distance, when a car is traveling at about eight or ten miles per hour, in which all motion is arrested, is about fifteen feet, or nearly half the length of the car. This is satisfactory for ordinary use, but when danger is imminent, we want something better than this. Not an immediate stop, of course, for that is almost impossible, and the effects would be little better than a collision, but a brake whose action is automatic, rapid, and safe."