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### THE SMOKE NUISANCE.

The Board of Health of Chicago is now prosecuting a vigorous war upon the authors of what is known as the smoke nuisance. Soft coal has of late years been so generally substituted for hard by manufacturers, by railroad companies, and by the owners of steam craft on the lake, that Chicago has become a very smoky city. Many buildings, especially those constructed of light-colored material, have been blackened and rendered very offensive to the eye. The soot finds its way into private dwellings, discoloring draperies and walls, while the garments of the people are quickly soiled when they go upon the streets, especially in the business portions of the city. Formerly hard coal was generally used in Chicago, and the clouds of black smoke which now hang like a pall over the city were unknown. But as new mines of soft coal have been opened and railroads have been extended the article has been cheapened, and those who consume large quantities of fuel have adopted it without regard to the effect its use would have upon the appearance of the city. A law was enacted which required all those who burned soft coal to use a smoke consumer, of which, it is said, there are at least thirty different kinds patented and unpatented. This law, up to March 30 last, was virtually a dead letter. Chicago having been selected as the site for the world's fair, the authorities of the city have been prompted to take steps toward the cleansing of the city, and one of the movements in this direction is the abatement of the smoke nuisance. Suits have been commenced against a large number of concerns and individuals. Some of these have paid their fines, others have agreed to go back to the use of hard coal, while still others have put in smoke consumers.

It is claimed that the smoke from soft coal would not be nearly so objectionable as it is were it not for the fact that the fuel is used in a wasteful manner. Firemen are accustomed to shovel more coal than is necessary into the furnace, and as a consequence large quantities of smoke goes into the atmosphere, which thus becomes charged with unburned carbon.

Cincinnati is so situated that soft coal is brought to her doors in large quantities and at very low rates. As a consequence she has also become a very smoky city. An ordinance is in force which provides "that every furnace employed in the city of Cincinnati, and every furnace upon railroad engines used for switching or yard purposes within the city limits, shall be constructed, or, if already constructed, shall be so altered, and shall have attached thereto efficient smoke preventives, as to produce the most perfect combustion of fuel or material from which smoke results, and so as to prevent the production and emission of all smoke therefrom, so far as the same is possible." This ordinance is not enforced. The city clerk of Cincinnati in a communication to the writer says: "There are so many manufacturers and others in the city whose business would be crippled were this ordinance enforced, that the inspectors (provided for in the ordinance) confine their work largely to fire escapes."

Cleveland is another city where the smoke nuisance prevails to an overpowering degree.

Pittsburg, Pa., was formerly known as the chief among smoky cities; but with the adaptation of natural gas to the uses for which soft coal was formerly employed, much of the smoke has disappeared.

It is claimed in some quarters that New York and adjacent cities are in serious danger of becoming victims of the smoke nuisance. The consumption of bituminous coal in this city and vicinity has increased, and the atmosphere is not as clear as it was a few years ago.

A leading coal dealer stated that a remedy would probably be found in the gradual adaptation of gas to all manufacturing and heating purposes. This movement had already commenced, and manufactured gas was being used to run engines, for cooking, etc.

In the meantime it would seem to be the part of wisdom for all municipal authorities to insist upon the use of such appliances as will prevent the escape of the smoke from soft coal, especially as experience has shown that this can be done. Chief Inspector Young, of Chicago, claims that between March 30 and September 1, 825 chimneys have been made to stop smoking.

Every railroad which enters the city excepting one has put smoke consumers on their locomotives, and the towing companies have adopted the same course with their steam craft. Preventive measures can be more easily enforced in localities where the smoke nuisance has not become so aggravated as in Chicago. This fact should be borne in mind by the authorities of New York and other cities where complaints are being made.

CONGRESS ought to issue a sufficient amount of fractional paper currency to facilitate exchange through the medium of the United States mail. The people found it useful, and it never ought to have been abolished.

### Excursion of Scientists to Western Caverns.

During the Indianapolis meeting of the American Association for the Advancement of Science, an illustrated lecture was given on the great caverns of the Ohio valley, by Rev. H. C. Hovey, D.D., of Bridgeport, Conn., who has in a similar manner favored several annual meetings of this association. On this occasion the lecture was complimentary to the citizens, and was given at the request of the local committee, and was attended by a crowded and delighted audience. One result was the organizing of a large party of scientific excursionists to see the subterranean wonders so vividly described. At New Albany they were met by a delegation of citizens, who drove them for an afternoon amid the knobs that environ that city. The troglodytes were piloted by Mr. Ben Hains through the mazes of Marengo and Wyandotte, and by Dr. Hovey himself through those of the famous Mammoth Cave. In this connection the fact may be noted that 11,000 copies of Hovey's guide book have been sold, and the author has a new edition in preparation for the coming season. Considerable improvements have also been made in the management of the cavern, under the able direction of Mr. H. C. Ganter, by which the most remote regions of the great cave are now accessible regardless of the occasional floods to which the subterranean rivers are liable. Those who have distressing recollections of the rough ride by stage coach from Glasgow Junction to the cave will be glad to know that the trip is now made by railroad to the park at the entrance, but without disturbing the natural wildness of the surroundings.

### A Revolution in Printing.

The successful introduction of typesetting machines into a number of newspaper offices in the United States has greatly stimulated their competitors, and early in the autumn the New York *Sun*, *Times*, *World*, and other papers will commence their use. It is also said that the *Herald* will employ them. Probably one half of the one thousand compositors engaged upon the morning dailies will be dropped.

It is now announced that Theodore L. De Vinne, the printer of the *Century* magazine, has completed arrangements to have his typesetting done by machinery. Upon reliable authority it is stated that a syndicate of book publishers in New York have likewise made arrangements to put fifty or a hundred typesetting machines into a co-operative office, where all the body matter of cheap publications turned out in New York will be set up. This arrangement, which will be in working order upon the first of next January, is likely to increase the annual output of novels by one hundred per cent and reduce the already low price one-half.

The announcement that the *Century* magazine is to be set up by machinery, following so closely upon the action of several publishers of New York daily newspapers, who have made arrangements to introduce the Rogers and Mergenthaler machines into their composing rooms this fall, will be of momentous interest to the printers. A member of New York Typographical Union No. 6 says:

"Of course, some members of the Union are a little skeptical as to the benefit these machines will beto the followers of the craft, but the whole history of labor-saving machinery teaches us that nothing has yet been invented that has lessened the need of good workmen. When typesetting machines have been introduced into every newspaper office in the country, it will lessen the cost of composition to such an extent that papers which now contain eight pages will have twelve, and four-page papers will be increased to eight. The introduction of the machines will be a good thing for first-class men, but it may injure those who make a practice of tramping all over the country, working only one or two nights at a time."—*National Publisher and Printer*.

### A Peep at the Secrets of Life.

One of the most interesting objects for examination under the microscope is *Valisneria spiralis* (the grass which grows in aquariums), when prepared to show cyclosis or circulation of the protoplasm. Professor Lockwood, in the *Microscope*, says:

"I think that, to the amateur at least, a hint how to observe the circulation of this favorite plant to the best advantage must be acceptable. I have never seen it better displayed than when under the excellent manipulation of Mr. F. W. Devoe, of the New York Microscopical Society.

"Having selected a bit of leaf, not too mature, he shaves off one side with a sharp knife, although a razor is better. It is then put on a slide, the shaven side up. A drop or two of clean water and a cover glass of medium thickness, with good illumination, follows, Mr. Devoe using a prism illuminator. Begin the examination with a six-tenths inch objective, and continue up to a sixth or a tenth. The result will be a vision of startling clearness. The vivid individuality of each bioplasmic molecule, and the mystic, almost a solemn, movement of this pellucid stream of infinities of life, form a sensational picture of which the beholder never tires."

**The Pig Iron Industry.**

The Census Office has issued a bulletin showing the production of pig iron in the United States for the year ending June 30, 1890. Great credit is due Dr. William M. Sweet, of Philadelphia, for this magnificent achievement in statistical work. The following points condensed by the *Iron Trade Review* from the report will no doubt be read with interest:

The production of pig iron for the census year of 1890 was the largest in the history of the iron industry in this country, amounting to 9,579,779 tons of 2,000 pounds, as compared with 3,781,021 tons produced during the census year 1880, and 2,052,821 tons during the census year 1870.

From 1870 to 1880 the increase in production amounted to 1,728,200 tons, or nearly 85 per cent, while from 1880 to 1890 the increase was 5,798,758 tons, or over 153 per cent.

The pig iron industry of New England has been practically stationary during the last twenty years.

Pig iron is now made in twenty-five States and Territories.

Pennsylvania produces about one-half of all the pig iron made in the United States.

Ohio retains second place, dropping, however, from 14 per cent in 1880 to 13 per cent in 1890.

Alabama advances from tenth place in 1880 to third place in 1890. Her increase over 1880 is 1,328 per cent.

Illinois, which was seventh in rank in 1880, is fourth in 1890.

New York retires from third to fifth place. Virginia advances from seventeenth to sixth, and Tennessee from thirteenth to seventh.

As showing the greater size and capacity of furnaces in 1890 over those of 1880, the fact is demonstrated that, while the production of 1890 was 5,798,758 tons greater than that of 1880, the number of completed furnaces actually decreased from 681 in 1880 to 562 in 1890. In other words, the average yearly capacity in 1880 was 5,552 tons, while the average yearly capacity of furnaces reported in 1890 was 17,046 tons.

The nine Southern States produced only 350,436 tons in the census year 1880. In 1890 they produced 1,780,909 tons, an increase of 408 per cent.

Kentucky alone, of all the Southern States, shows a decrease in production, amounting to 25 per cent.

Six Western States, Illinois, Indiana, Michigan, Missouri, Ohio and Wisconsin, produced in 1890 2,522,351 tons, against 995,335 tons in 1880, an increase of 153 per cent. Indiana, alone of these States, reports a falling off, amounting to 37 per cent.

During the decade, the use of anthracite has fallen off 71 per cent, while the use of mixed anthracite coal and coke has increased 163 per cent, coke and bituminous coal 343 per cent, charcoal 51 per cent, and castings direct from furnace 135 per cent.

Of Ohio's product in 1879, viz., 1,302,299 tons, the Mahoning Valley produced 527,164 tons, or nearly half.

The production of Bessemer pig iron in the United States during the census year 1890 amounted to 4,233,272 tons, of which Pennsylvania made 2,567,813 tons; Illinois, 616,654 tons; Ohio, 516,654 tons; and other States much smaller quantities.

One hundred and forty-nine thousand, nine hundred and fifty-nine tons of spiegeleisen were produced in the census year 1890.

**The Prismatic Fountain at Lincoln Park.**

The electrically illuminated fountain at Lincoln Park, Chicago, has been completed and is in operation nightly. Numerous jets of water are projected skyward to varying heights, and are kept continually changing, rising and falling irregularly, breaking and splashing, falling in sheets and breaking into spray while being illuminated with various colors that are continually changing, the effect produced suggesting the idea of shattered rainbows caught by a whirlwind. At times some of the jets leap fully 100 feet into the air, blowing for a time, while the falling drops sparkle in the vari-colored lights with the brilliancy of gems of the purest water. At one instant the streams will blend in a manner that suggests an iceberg, sparkling with its frosty crystals under the beams of white light, then instantly changing to a beautiful emerald or deep crimson. At other times the colors change so rapidly that the mind becomes weary in the effort to recall the names. For an hour the display continues ever-varying, never the same for longer than a few seconds, barely sufficient to allow the mind to obtain the impression, not long enough to permit one to realize the real beauty of the scene. The ever-varying changes of the forms produced by the jets in their varying irregularity, and the play of the numerous colors, reminds one of the glimpses of fairyland as presented in the spectacular dramas.

How is it all produced? Simply enough. Below the reservoir which receives the water from the fountains is a room about thirty feet square having a cement floor, while the ceiling is but seven feet above. A long, narrow tunnel leads to this, and on one side are arranged numerous pipes and valves for supplying and controlling the water that forms the jets. Around

the sides of the room and through the center are numerous arc lamps, placed in a horizontal position, and fitted with silvered reflectors. Above the lamps are cylindrical tubes 18 inches or more in diameter that lead above the surface of the water in the reservoir. Near the bottom of the reservoir the pipes that furnish the water are laid, leading into the large tubes so that the jets and streams spout upward from their mouths. A thick plate of glass in the tube prevents the water from entering the room below. Beneath each tube is a lamp, the concentrated rays being projected through the glass plate. Between the lamps and tubes are frameworks carrying slides which contain large panes of different colored glass. Men stationed in different parts of the room keep changing the slides that produce the colors in the water. The valves, which are of the lever type, are changed continually by men stationed there for that particular purpose. There are fifteen arc lamps in the room, each under a separate tube. These lamps use  $\frac{5}{8}$  inch carbons and are connected up in series. They are adjustable by hand, but require very little attention to keep them in operation. This fountain and apparatus was presented to Lincoln Park by C. T. Yerkes, president of the North Side street railway system. Lincoln Park has always been a favorite resort on account of its beauty and the many interesting features which make it a pleasant place by day or night, but the most frequented part in the evening is the vicinity of the electrical fountain.—*Stationary Engineer.*

**The Double Turret Monitors.**

The popular interest excited of late in our new and fast unarmored cruisers, the San Francisco, the Philadelphia, and the Baltimore, and also in the great battle ships and other remarkable war vessels recently planned, has naturally drawn attention away from the five double turret monitors. But the pioneer of this class of ships is now practically completed and can be made ready at very short notice for her trial trip, which in any event will probably take place within a few weeks. The keel of the Miantonomoh was laid, as were the keels of her sister ships, the Monadnock, the Amphitrite, and the Terror, as long ago as the year 1874. They and their larger associate, the Puritan, have experienced many vicissitudes in policy and many changes in plan regarding them during this long interval, and at one time they fell into such disfavor as to acquire in some quarters the nickname of the "fraudeclads." But they have come out of their long trials in reasonably creditable fashion, and, in the opinion of many naval experts, will prove very good auxiliaries for harbor defense. The Miantonomoh, just now the center of interest among them, has, like her three sister ships, a length of 250 ft., with a beam of 55½ and a mean draught of a little over 14. This gives a displacement of 3,815 tons. With an iron hull, she has English compound armor, made for her by Brown & Co. and Cammell & Co. about five years ago, when no suitable plates could be promptly turned out in the United States. This armor is 7 inches thick on the sides of the vessel and 11½ on the turrets. The armor for the three other vessels of the same type will be of American manufacture, their completion having been undertaken later. They all have armored decks 2 in. thick, covered with wood, and their conning towers and ventilators will be protected by from 9 to 10½ in. of armor. The turrets are protected in their revolving machinery much more than under their original design. Good engines will give sufficient speed for the purpose to which they are devoted, that of coast and harbor defense.

How much in practical efficiency is to be expected of the Miantonomoh and the other monitors of her type? We are confronted at the start by the fact that with the exception of the big Puritan, which has been so altered that she is hardly of the same class, these vessels have only seven inches of side armor. This is a very imperfect supply for a modern armorclad, and it would not be repeated in any newly designed vessel. Still, when we reflect that their freeboard is only a little over two feet, it becomes evident that this low hull, protected with good armor, is a hard target to hit. Again, these vessels are of very light draught, especially as compared with that of the great foreign ironclads, which are the opponents they would chiefly fear. Hence they could take advantage of the shoal waters along our coasts, and might be maneuvered in such a way as to gain an advantage over more powerful adversaries from the course the latter might have to take. And while their hulls are low, the turrets, which are more exposed to hostile fire, have 11½ in. of modern armor, aided by their cylindrical shape. These vessels carry batteries that should make them formidable adversaries. Each will have four 10 in. rifled breechloaders, which, with a charge of 250 pounds of powder, a muzzle velocity of 2,100 ft. per second, and a muzzle energy of more than 15,000 foot tons, will be able to perforate fully 21 in. of wrought iron at a distance of 1,000 yards. Three of the Miantonomoh's guns are ready, and the fourth can soon be completed.

The other double turret monitors are less advanced.

Foremost among those of 3,815 tons displacement is the Terror, which will soon receive her machinery. The Amphitrite and the Monadnock, the former of which is to be completed at Norfolk and the latter at Mare Island, will hardly be ready under two or three years. The Puritan has been turned into a powerful barbette ship. With a length on load line of 281 ft., an extreme beam of a little over 60, and a draught of about 18 1-5, she will have a displacement of 6,060 tons. Her turret armor will be 11¼ inches thick and that on the hull will have a maximum of 14, while powerful engines will give her a speed of at least thirteen knots. She is likely to carry a battery of twelve-inch guns. As to the Miantonomoh, even were there no other interest attaching to her approaching trial trip and her subsequent commission for service, the fact that she will carry the heaviest guns ever afloat in our navy will bespeak for her a large share of public attention. She may already be counted upon as one of the most important factors in the defense of New York Harbor, which, with this vessel and the new shore batteries for rifled guns and mortars now about to be constructed, begins to see its sources of at least partial protection assembling.—*N. Y. Times.*

**A Check is not Cash Payment.**

The Supreme Court of Minnesota has lately rendered a decision of much interest to the business community in declaring that bank checks are not cash, and do not possess legal value as money until cashed. In other words, the giving of a check on a bank is not a payment when passed between debtor and creditor, but only becomes so when the money is received on it.

The court holds that in accepting a check from a debtor there is no legal presumption that the creditor takes it in absolute payment, but only conditionally, or as a written acknowledgment of the debt. Where goods are sold for cash on delivery, and the purchaser tenders payment in a check or draft on his banker, such payment is only conditional; and the delivery of the goods, if made, is also conditional. If the check is dishonored on presentation, the seller may retake the goods for the purchase money, even from the possession of a third or innocent party, unless it can be shown that the seller has been guilty of such negligence as would estop him from recovering in equity.

This decision is among the first rendered by higher courts that is so far-reaching, and if supported by other high tribunals, will settle a mooted question in commercial circles. The same principle has been applied to unpaid notes by one or two courts, which have held that the seller does not lose his lien, for purchase money, on goods sold, until he receives the actual cash, and may retake at any time prior thereto if the indebtedness be not met at maturity.

**Overthrow of the German Telephone Monopoly.**

Until lately the German post office arrogated to itself the sole right of erecting or licensing private telephone installations, thus prohibiting the development of a most convenient means of communication and excluding legitimate industry from a branch which ought to be its domain. The well known telephone manufacturing company, Actien Gesellschaft Mix and Genest, Berlin, determined on principle, and in the interests of the telephone world at large, to try the point in a court of law. To this effect they brought an action against the German government (Reichsfiskus), claiming that: "It (the German post office) had no right to restrain or prohibit the plaintiffs to erect and maintain private telephone installations (a) between buildings belonging to the same landlord but situated at a distance from each other and separated by property of other land owners, or by public roads or otherwise; (b) between property belonging to different landlords, i. e., from one part of a city to another." This claim was decided on July 10 in the Royal High Court of Justice (Königliches Landgericht I) of Berlin entirely in favor of the plaintiffs, thus putting an end to a state of things which has lasted too long to the disadvantage of all those interested in this daily progressing industry.

**New Mexico Onyx.**

Mrs. L. J. Caldwell, of Chicago, is the sole owner of ricolite and green onyx quarries now being operated in western Grant County, New Mexico. This is one of the most remarkable discoveries. The stone has the form of true fissure vein fifty feet wide and over a mile in length, and it is taken out in massive blocks and taken to Chicago, where it is becoming very popular for house decoration, inside and outside. The stone is susceptible of a very high polish, and of a variety of colors—dark green and cream, striped and mottled, also pink and salmon. In fact, it carries what are termed the "lost colors" in stone. It is very tough, is superior to Mexican onyx, and is the only stone of the kind in the world that can be carved. Contracts have been signed to supply it to the new Alhambra theater and hotel and other public buildings in Chicago for decorative purposes. Mrs. Caldwell offers blocks of it to be used in the construction of the New Mexico exhibit pavilion at the world's fair.—*Stone.*