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NO. 1493

ARCHITECTURE

ENGINEERING

DECORATION

238 TREMONT ST.

CONSTRUCTION

BOSTON MASS.



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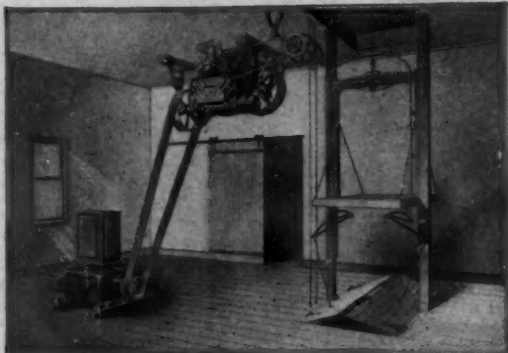
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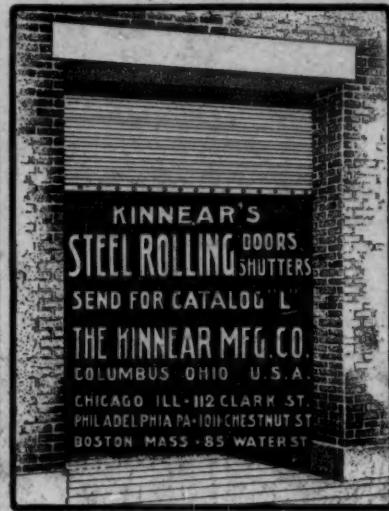
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A WEEKLY JOURNAL OF CONSTRUCTIVE AND DECORATIVE ART

VOL. LXXXV.—No. 1493.

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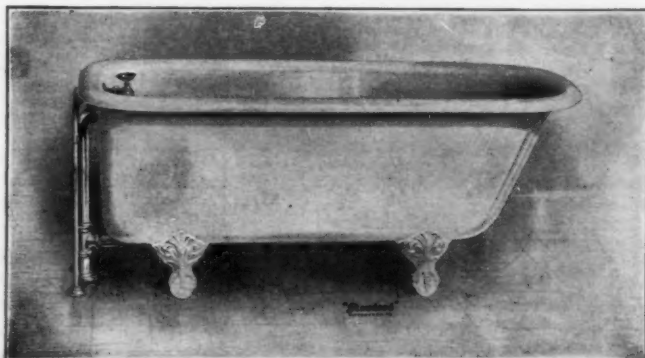
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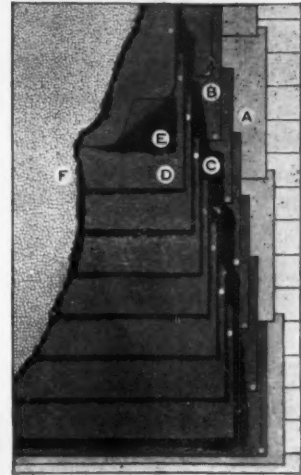
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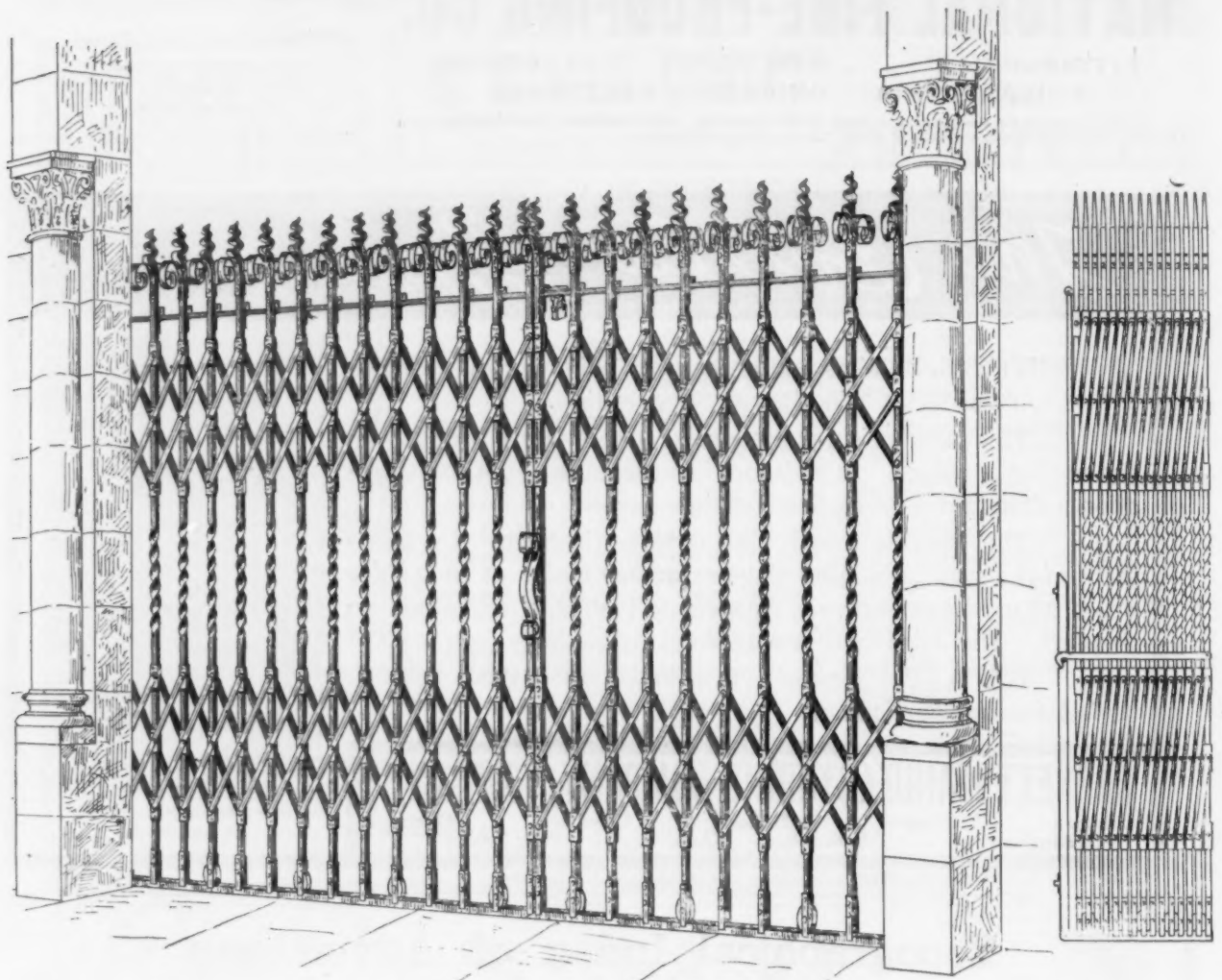


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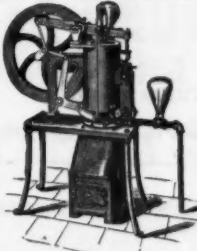
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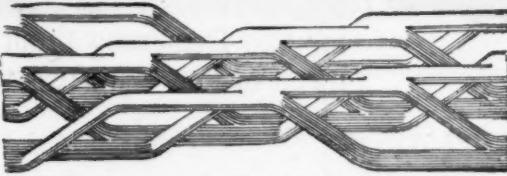
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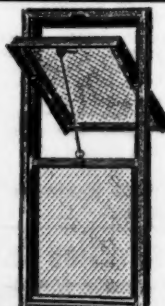
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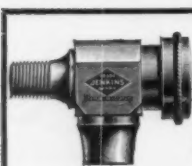
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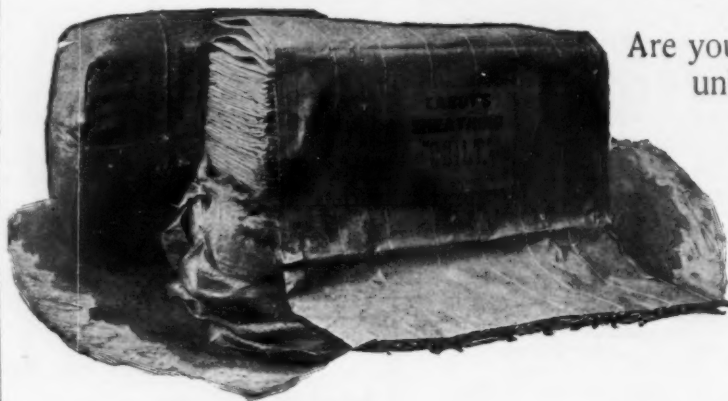
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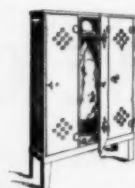
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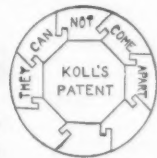
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BUILDING INTELLIGENCE.

(Reported for the American Architect and Building News.)

(Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.)

ADVANCE RUMORS.

ABERDEEN, S. D.—Five fraternal societies will unite in building a fraternal temple in Aberdeen to cost \$25,000. The Ancient Order of United Workmen contributes one-half of that amount.

ALTON, ILL.—It is stated that the trustees of the Unitarian Church have selected Ernest J. Hess, of St. Louis, Mo., to prepare plans for an edifice to cost about \$20,000.

BALTIMORE, MD.—The building of a 12-story hotel on the northwest corner of Baltimore and Charles Sts. is contemplated. Frank V. Newell, of Chicago, is preparing the plans which will provide for stores on the ground floor and 400 rooms above. The National Hotel Improvement Company, of Chicago, are the contractors of the new building, and as soon as the plans are finished work will begin. It is the intention

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(Advance Rumors Continued.)

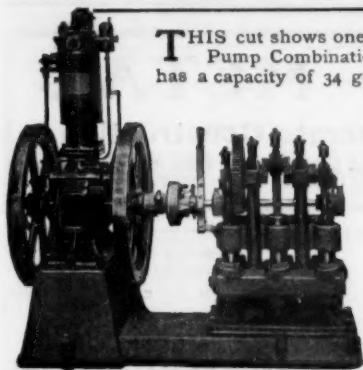
that the hotel shall be ready to open one year from September 1, prox. It will cost probably \$450,000.

It has been decided to invite competitive bids from Baltimore architects for plans for the proposed new Eastern High School building, at North Ave. and Broadway. The total cost of the building is not to exceed \$250,000, and the plans are to be for a building to cost not over that sum.

BRIDGEVILLE, PA.—It is stated that the contract to erect a 12-room stone school here has been awarded to Fair & Roland, at about \$40,000.

CHICAGO, ILL.—James Gamble Rogers has designed plans for the rebuilding of the Olympic Theatre, and they have been approved by the Building Department. The main auditorium is to be placed on the street level, and there are to be two galleries, balcony, fireproof stage, and an entrance through the Ashland block to Randolph St. The cost of the work is estimated at \$90,000.

The Calvary Presbyterian congregation will build a structure for church and Sunday school purposes at the intersection of Jackson Boulevard and 42d Ave., after plans by D. E. Postle. It will be a handsome stone structure of 75x125 feet ground



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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

dimensions, with stone front, and will cost \$65,000.

CINCINNATI, O.—A building permit has been issued for the erection of the Jewish Synagogue for the Congregation of Bene Israel at Rockdale and Harvey Aves. The structure will be of brick and stone, and cost \$200,000.

COLLINWOOD, N. J.—The Board of Education proposes the building of two schools, one in Collinwood and the other in West Collinwood, the total cost to be about \$30,000.

COLUMBUS, O.—Report states that John Griffiths & Son, of Chicago, Ill., has received the contract to erect a 12-story building for the Columbus Saving & Trust Co., at Long and High Sts., to cost about \$400,000.

CONSHOCTON, O.—The contract to erect a Presbyterian church has been awarded to C. B. Ballard, of Mattoon, Ill., at \$33,000.

DALLAS, TEX.—The congregation of the M. E. Church, at Maine and St. Paul Sts., intends to erect a new edifice at a cost of \$28,000. W. H. Crosthwaite, chairman Building Committee.

DAWSON, MINN.—Fremont D. Orff, architect, Minneapolis, has plans for a schoolhouse to be erected at Dawson, Minn. It will be 79x118, two-story and basement, of red pressed brick and cut stone trimmings. Estimated cost, \$32,000.

DAYTON, O.—The executors of the estate of Miss Belle Eaker have turned over to the Y. M. C. Association \$85,000 in cash, which will be used as an endowment, and the Eaker homestead, situated on one of the best corners in Dayton. It is valued at \$100,000. The association soon will erect a building on the site to cost \$350,000. The new building will be one of the largest Young Men's Christian Association houses in the country, and will accommodate a membership of 4,000. It will be 136 by 220 feet and eight stories high.

The School Board will erect a school on Haynes St., to cost about \$60,000.

DECATUR, ILL.—Report states that Abrogart & Ballard, of Mattoon, have received the contract to erect a new church for the M. E. congregation, at about \$71,284.

DETROIT, MICH.—Kastler & Hunter have prepared plans for a new church edifice for the Hudson Ave. M. E. Society. Rev. W. G. Nixon, pastor.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

The Detroit post-office will have two new wings added. The drawings are now being prepared at Washington.

Pollmar & Ropes have prepared plans for a flat for the northeast corner of High and Beaubien Sts. J. Simon, owner, Chicago.

EL PASO, TEX.—Plans have been completed by D. H. Burnham & Co., of Chicago, Ill., for the Union Station to be erected in this city. The plans provide for a two-story structure, 143x103 feet, and a one-story wing, 61x247 feet. The body of the two stories and the wing will be of brick and the foundation of concrete. Probable cost, \$280,000.

EVANSVILLE, IND.—J. W. Gaddis, of Vincennes, is stated to have completed plans for an edifice to be erected here by the M. E. Society, at a cost of \$16,000.

FINDLAY, O.—Reports state that Eldridge & Higgins Co., of Columbus, will erect a five-story building here, at an estimated cost of \$50,000.

FORT WAYNE, IND.—It is rumored that Chas. McCulloch and W. S. O'Rourke are interested in the organization of a company to erect a business block in this city, the cost, including site, to be about \$450,000.

GREENSBORO, N. C.—Hook & Sawyer, of Charlotte, are preparing plans for a Carnegie Library to be erected here, at a cost of \$30,000.

HARRISBURG, PA.—The plans of J. A. Dempwolf, of York, have been accepted for erecting a four-story, 80x100-foot hospital on Mulberry St., to cost \$50,000.

HAWTHORNE, ILL.—It is stated that J. L. Simmons is preparing plans for a two-story, 100x56-foot brick and stone school to be erected here, for \$25,000.

LACON, ILL.—It is reported that the Marshall County Board has decided to erect a \$20,000 jail. Thos. A. Connell, County Clerk.

LA CROSSE, WIS.—The German Lutheran congregation of the South Side is having subscriptions taken with a view of erecting a large modern church, to cost between \$20,000 and \$30,000.

LITTLE ROCK, ARK.—The Immanuel Baptist Church Society has decided to build a \$35,000 church on Capitol Hill. The Building Committee has been organized by electing W. E. Berthe chairman, E. A. Kingsley secretary, and Dr. J. H. Estes treasurer. Secretary Kingsley has been instructed to



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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

ask for competitive plans for the building, and he will ask all the local architects, as well as several from other cities, to submit plans.

LUDLOW, MASS.—The contract for the erection of the new St. John the Baptist Church at Ludlow, Mass., has been awarded to Desrochers & Geoffrion, of Holyoke, Mass. Architects, G. P. B. Alderman & Co., Holyoke, Mass.

McKEESPORT, PA.—Marius Rousseau, Smith Block, Pittsburgh, is preparing plans for a six-story fireproof hotel, 40x90 feet, to be erected on Fifth Ave., by Thos. White, at a cost of about \$70,000. It is stated that bids for erecting same will be asked about Aug. 1.

MEMPHIS, TENN.—It is stated that D. H. Burnham & Co., of Chicago, have completed plans for an office building to be erected by the Memphis Trust Co. The building will be equipped with five elevators. Estimated cost, \$450,000.

MERIDEN, CONN.—Robertson & Potter, 160 5th Ave., New York, have been selected as architects for the new Town-hall for Meriden, Conn. It will be two-story high, of brick, with marble trim, and is estimated to cost \$150,000.

MERIDIAN, MISS.—Report states that the Meridian Terminal Co., recently incorporated, will erect a Union Depot in this city, at a cost of \$250,000. C. C. Harvey, president of the New Orleans & Northeastern R. R., is reported interested.

MERION, PA.—A two-story cut stone chapel is to be erected for the Misericordia Convent at a cost of about \$100,000. Plans have been completed for the building by Edwin F. Durang, 1,200 Chestnut St., Philadelphia, Pa.

MINNEAPOLIS, MINN.—An armory to cost \$150,000 is under consideration, and it is hoped to have the foundation ready before winter sets in. C. S. Hulbert, the City Treasurer, is a member of the Armory Board.

NASHVILLE, TENN.—A permit has been secured by the Russell Street Cumberland Presbyterian Church to erect at the corner of Ninth and Russell Sts. a handsome brick and stone church. The estimated cost of the building is \$25,000.

NEW ORLEANS, LA.—Robert Palestine has

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

completed plans for the new Pizzati Orphan Asylum, to be built on Esplanade Ave. Cost, \$100,000.

OAKLAND, CAL.—The Board of Education has adopted a resolution requesting architects to submit plans and specifications about Sept. 15 for three new schools and addition to three others. The schools to be erected are the Franklin, Prescott and Lincoln Schools, in each case the building to contain 22 rooms, and to cost not more than \$145,000; the additions are to the Grove St. School, of 6 or 8 rooms, cost not to exceed \$28,000; Lafayette School, of 8 or 10 rooms, cost \$38,000; and to Grant St. School, of 14 rooms, cost \$81,000.

POCANTICO HILLS, N. Y.—John E. Kerby, 452 Fifth Ave., New York, has completed plans for St. Joseph's Normal College, to be erected at Pocantico Hills, Westchester County. The structure is to be the novitiate and mother house of the Christian Brothers for this district, their present novitiate having been acquired by the city, as it is part of the water shed at Amawalk. It is to be of semi-fireproof construction, with exteriors of stone, brick and terra-cotta. It will be four stories and basement high, with a frontage of 355 feet, and a rear central wing will run back 300 feet. Estimated cost, \$250,000.

RACINE, WIS.—The directors of the Y. M. C. A. have adopted plans and specifications for rebuilding its present structure, at a cost of \$25,000.

SACRAMENTO, CAL.—A \$200,000 high school building has been decided on and bonds to that amount to pay for same are to be issued at once.

SOUTH PASADENA, CAL.—A new \$50,000 church is to be built for the Episcopal Society of which Rev. Melton E. Runkle is pastor.

STERLING, ILL.—It is stated that the Fourth St. M. E. Church is contemplating building a \$75,000 edifice.

ST. LOUIS, MO.—The Managing Board of the Manual Training School of the Washington University, it is stated, has arranged with Mauran, Russell & Garden, 721 Olive St., to prepare plans for a building to accommodate 300 boys and to be erected at Von Versen Ave., west of Union Ave.

ST. PAUL, MINN.—The Business Men's Association of the First Ward propose the erection of an auditorium to be 50x100, three-story and basement, of brick and cut stone, with a hall to seat about 2,000. Cost, \$30,000.

ST. PETER, MINN.—Kinney & Detweiler, Minneapolis, have had their design selected for the new building to be erected at the Gustavus Adolphus College, of this city. It will be 70x90, two high stories and basement, of pressed brick and cut stone trimmings, composition roof, and will contain a large assembly hall. Cost, \$25,000.

THREE RIVERS, MICH.—A new \$25,000 high school building will be erected in school district No. 1, which comprises Three Rivers and some of the adjoining districts.

WALLA WALLA, WASH.—The plans of Henry Osterman, of this city, are stated to have been adopted for erecting a brick and stone library here, at a cost of \$21,000.

WASHINGTON, D. C.—The officials of the Dept. of the Interior will soon ask bids for erecting the new building for the Freedmen's Hospital, for which Congress recently appropriated \$300,000.

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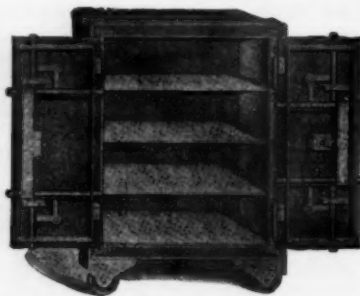
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

WATERTOWN, MASS.—Edward P. Whitman, of Boston, has received the commission to design the new school building to be erected in this place.

WAUSAU, WIS.—The Council has accepted the offer of Andrew Carnegie of \$25,000 for a public library.

WEST ALLIS, WIS.—North Greenfield school district No. 5, comprising about seven-eighths of West Allis, decided at its annual meeting to erect a \$30,000 school on the new site at National Ave. and Abbot St.

WESTFIELD, N. Y.—It is stated that the West Shore R. R. Co. has decided upon a site in this city, and will erect a depot to cost \$25,000. H. Fernstrom, Ch. Engr., N. Y. City.

WINCHESTER, MASS.—Samuel J. Elder has purchased 300,000 feet of land on Myopia Hill and will build a fine residence and stable, from plan by Robert Coit, 85 Water St., Boston.

WORCESTER, MASS.—Report states that Brown & Davis, associated with Gillespie & Carroll, 1,123 Broadway, New York, N. Y., are the architects for an edifice for the First Baptist Church to be erected on Main St. and Mower Ave., to cost \$115,000.

YALE, MICH.—The citizens have voted in favor of erecting an addition to the high school, at a cost of \$17,000.

PROPOSALS.

REPAIRS.

[At Hartwell, O.]

Bids will be received August 17 by the Board of Public Service at Cincinnati for unloading material and improving the City Indriary: work to consist of reinforced concrete reservoirs, remodelling toilet and bath rooms, tunnel, pipe-laying and valves, horizontal flue boiler, new steam supply and return piping. Samuel Hannaford & Sons, Architects, Hulbert Block, Cincinnati. GEO. F. HOLMES, Clerk of said Board. 1493

PROPOSALS.

ARMORY HALL.

[At Xenia, O.]

Bids will be received August 17 by the Board of Trustees of O. S. & S. O. Home for furnishing material and erecting an armory hall. H. W. Owen, Architect, Xenia. THOS. J. COLLINS, Financial Officer. 1493

HEATING.

[At Adams, Mass.]

Bids are wanted August 15 for installing new heating apparatus in Notre Dame Church. Address REV. L. O. TRIGANNE, Pastor. 1493

LIBRARY.

[At Cleveland, O.]

Bids will be received August 18 by the Board of Library Board for furnishing material and erecting a library on Miles Park Ave., including mason, bluestone and cutstone, marble and tile, roofing and sheet metalwork, plumbing heating, electric work, etc.; price for labor and material must be stated separately. CARL LORENZ, Secretary.

HEATING, ETC.

[At Hot Springs, S. D.]

Thomas R. Kimball, Architect, Omaha, Neb., has plans and will receive bids until 12 M. August 20 for heating and ventilating apparatus, elevators, wiring, plumbing and water supply for the Battle Mountain Sanitarium at Hot Springs, S. D. Plans may be seen with the Builders' Exchanges in St. Paul, Denver, Chicago and 346 Broadway, New York City. 1494

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 30, 1904. Sealed proposals will be received at this office until 3 o'clock P. M., on the 15th day of September, 1904, and then opened, for the construction (including plan b ing, heating apparatus, electric wiring and conduits) of the U. S. Post-office and Custom-house at Grand Haven, Michigan, in accordance with drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Grand Haven, Michigan, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1494

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 28, 1904. Sealed proposals will be received at this office until 3 o'clock P. M., on the 14th day of September, 1904, and then opened, for the construction (except heating apparatus) of the U. S. Post-office at Laramie, Wyoming, in accordance with drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Laramie, Wyoming, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1494

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PROPOSALS.

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 28, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 1st day of September, 1904, and then opened, for the installation of a conduit and electric wiring system for the U. S. Post-office at Norwich, Conn., in accordance with the drawings and specification, copies of which may be obtained at this office, or at the office of the Superintendent of Construction at Norwich, Conn., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1494

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 28, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 8th day of September, 1904, and then opened, for the low pressure steam heating apparatus, complete in place, for the U. S. Post-office at Norwich, Conn., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Norwich, Conn., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1494

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 28, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 6th day of September, 1904, and then opened, for the construction (including heating apparatus, electric wiring and conduits) of the U. S. Post-office at Marshalltown, Iowa, in accordance with the drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Marshalltown, Iowa, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1494

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 20, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 11th day of August, 1904, and then opened, for new partitions, plumbing, etc., in the U. S. Appraisers Warehouse, New York, N. Y., in accordance with the drawings and specification, copies of which may be had at this office or the office of the Custodian at New York, N. Y., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1493

COURTHOUSE.

[At Somerset, Pa.]

Bids will be received August 16 by the County Commissioners for erecting a courthouse. J. C. FULTON, Architect, Uniontown. 1493

COURTHOUSE.

[At Minden, La.]

Bids will be received about September 1 for the erection of a courthouse, to cost \$40,000. 1493

JAIL.

[At Opelousas, La.]

Bids will be received until September 5 for erecting a jail for the parish of St. Landry, to cost about \$35,000. A. J. MÜLLER, Chairman, Building Committee. 1493

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THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, AUGUST 6, 1904

No. 1493



SUMMARY:—

Is our National Fire-loss an acceptable as well as accepted Evil.	
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THREE hundred million dollars' worth of buildings and their contents is, of course, altogether too much property for economical people to burn up in the course of a twelvemonth, and yet that appears to be the cost that we Americans are paying because we have been so long habituated to employing faulty methods of building construction and heedless practices in the conduct of our daily occupations and the care of our buildings. But our social system is adjusted so as to distribute the burden of the vast loss indirectly upon the public at large, and, more than this, it not only expects to meet these annual losses but one may almost assert truthfully it desires to have them. It would be a very serious matter to many people, if these annual fire-losses did not occur for a series of years. The first year in which no fire occurred there would be general jubilation, the fire-engine crews would welcome the rest and relish the return to unbroken nights' rest, and stockholders in insurance companies would be happy in their increased dividends. But in the second fireless year a good many business men would wonder what was the matter with their accounts, and building mechanics would find there was so little work to do anywhere that they must, perforce, forego the joys of continual strikes, while in the third year, unless human nature should change greatly, there would be a widespread outbreak of incendiary fires as a first step to restoring the building industries to their normal condition. It is fortunate, therefore, that the progress in replacing combustible with incombustible buildings is and must be slow, so that the working classes and those who purvey for them can gradually adjust themselves and their affairs to meet the changed conditions.

BUT as things are adjusted now, though very crudely, it is questionable whether the fire-loss is an unmixed evil. A recent report of the Insurance Engineering Experiment Station shows that during the last three years alone there were destroyed or in-

jured by fire very nearly ninety-five hundred public or semi-public buildings, such as theatres, schoolhouses, churches, hospitals, jails, hotels, etc. If we assume twenty thousand dollars as the average loss in each case, we find that the loss on buildings of this class accounts for practically one-fifth of the total annual loss, and this in turn suggests that, as these buildings are of a public or semi-public nature, the public has a better right to put compulsion on the owners in the matter of their fireproof building than it has to compel a private individual to build a fireproof house or shop for himself, and hence such compulsion could fairly be ordained by a general law. This would be all the more reasonable seeing that in the case of some of these buildings, as jails, hospitals, asylums and schoolhouses, they are not only inhabited, but their human occupants are there largely by virtue of the compulsion of the public, and are under such physical restraint as to make their efforts at self-preservation in case of fire almost certainly abortive.

THE young people of to-day know little of the aridity of the artistic furnishing of the houses of even the well-to-do in this country just before the Civil War. The slippery horse-hair-covered furniture had just given place to the lugubrious black walnut work in bulbous forms; carpets stared at you with wonderful presentations of plant life and wall-papers did equal violence to botanical truth; mezzotint engravings of Landseer's and Millais's pictures were the fashion, and those who could not afford to buy these novelties still left in place their "Washington crossing the Delaware" or their "Franklin at the Court of Louis XVI." In sculpture it was the day of the heroic ancestral plaster bust or the parian statuette, distorted in baking; some had advanced enough beyond Puritanical notions to feel they dared have a cast of the Venus of Milo, though they could not bring themselves to give house room to the Venus de Medici. It was into many houses thus bare of artistic equipment that a first lesson in art was brought in the shape of a statuette by John Rogers, who died last week at the age of seventy-five, and we believe he could rightfully claim to have done more to help the people of this country to discover that they did have an instinctive love of art than any man of his generation. The vogue of these statuettes was immense, and at one time Mr. Rogers must have had a very satisfactory income from the groups he published. People were not educated to the appreciation of sculpture of high merit, and there was little of it to be had. If the generality of people knew of Powers's "Greek Slave"—a notable figure in its day—they spoke of it in whispers and, if they had a chance, looked at it shyly. But people could appreciate and enjoy, because they understood, these groups of Rogers's, each of which told its story intelligently and artistically, because truthfully, and through this understanding were led on to enjoy and appreciate sculpture of really a higher worth. Coming out as these groups did with a considerable frequency during

the war, and dealing to a great extent with army incidents, pathetic, exciting or amusing, these groups because of their subject and their truthfulness became part and parcel of the great patriotic impulse that possessed the North at that time, a universal passion that men of the present day cannot understand. Many, perhaps most, of these groups of Rogers's—nearly fifty in all—were cast in bronze as well as in plaster. In his larger work the sculptor was not very successful; his equestrian statue of General Reynolds in front of the Philadelphia City-hall being distinctly a failure.

IT seems a little unkind that the Secretary of the Treasury should insist that the managers of the St.

Louis Fair should live up to their engagements and pay back at the stated times and in the agreed way the money loaned them from the United States Treasury. We do not know that government loans made to earlier international fairs were never repaid at all, but we are quite certain that in these earlier cases the government was a very lenient and considerate creditor. It would be an outcome devoutly to be wished, if the result of this exaction of the "pound of flesh" should be to put an end to granting Federal assistance to these undertakings, each one of which is devised for selfish purposes by professional promoters of such exhibitions. These vast undertakings are always accompanied with a considerable financial wreckage which need not have been encountered, and they are unsettling and consequently disadvantageous to the community in which they are held. If the local labor market could handle the matter the result might be favorable, but exhibition building is now so vast an affair that the work can only be accomplished by calling in largely outside help, which results in a glutting and subsequent disorganization of the labor market which lasts for years. Paris has found its exhibition periodicity of eleven years hardly long enough, while we, after our usual fashion of overdoing, have crowded into such a period the elaborate fairs at Chicago, Omaha, San Francisco, Buffalo, Charleston and St. Louis. The people are surfeited and are no longer willing to endure the cost and discomfort of sight-seeing, and so, since the government insists on being paid in full, no matter who has to go unpaid, it is more than likely that the St. Louis fair will show a larger deficit than usual.

CHICAGO has set afoot a very admirable undertaking which deserves imitation. New York, following the example of European cities, is furnishing for its poorer citizens an admirable series of recreation piers and public baths in different quarters of the city, and in Boston, too, we have some public baths and some of our public schools have bathing facilities provided; moreover, in connection with our park system, there are at South Boston and at Revere Beach a variety of buildings—bath-houses, restaurants, and so on—which the public can use whenever the public sees fit to take a jaunt in that direction. The Chicago undertaking, however, promises to go farther than this in the attempt to make the life of its poorer citizens not only cleaner but more enjoyable in an innocent way. Taking advantage of its large superficial area, the city has laid out its park system so as to bring a park of reasonable size into close juxtaposition with different centres of habitation, and fourteen of these small parks

are now being laid out, and it is proposed to furnish each of them with a public building, costing upwards of sixty thousand dollars, to which the people can resort as to a club-house. Besides a general assembly-room and smaller club-rooms to be used for games, smoking or conversation, there will be a simple gymnasium, bath-rooms—in some of the larger buildings even a swimming-tank—and a refreshment counter. Considering how great a hot-bed of labor discontent Chicago is and remembering how heterogeneous is its population, many of its alien citizens being accustomed to congregate in public places when the day's work is done, it seems to us that this providing a place where they can observe their national habit in quiet enjoyment is well worth copying by other cities.

THE Province of Quebec Association of Architects has effected a change in the matter of scholarships in architecture. Ordinarily, such scholarships have been founded in order that the successive holders might add to their professional equipment whatever of good they might be able to derive from a time of travel and study in Europe during the term of one or two years. These scholarships, whether founded by individuals, clubs or schools of architecture, generally come as the crowning grace of a prolonged period of educational effort, and they afford a welcome opportunity for correcting, assimilating and clarifying views and impressions that have been but imperfectly comprehended in the earlier stages of immature effort. The Quebec architects apparently feel that aid given in these earlier stages may be as welcome and perhaps as valuable as that which is offered later; they therefore have founded a scholarship which guarantees to the winner a four years' course of study for the degree of Bachelor of Architecture at McGill University in Montreal. The scholarship is open to the competition of natives of Canada who have been employed in the office of any member of the Association, provided they have passed the Association's preliminary examination and the University's entrance examination. The winner of the scholarship should be a youth worth helping, if proof is to be found in the winning of a competition and the passing of two examinations.

HOWEVER much one may be inclined to question the credibility of the theories which Professor William H. Goodyear has propounded, with supporting pictorial evidence of much value, with reference to the symmetry and assymetry of mediæval architectural design, no one can question the thoroughness of his investigations and the earnestness and self-sacrifice with which he has pursued them. There are numberless other patient investigators pursuing their work, sometimes useful and at others seemingly useless, of whom the world never hears, and largely because their investigations do not lend themselves to pictorial illustration and proof—and this is the age of instruction through the eye, as was never the case before in the world's history. These other patient workers will probably find as much pleasure as we do in learning that the Associazione Artistica Fra i Cultori di Architettura, of Rome, has made Professor Goodyear an Honorary Member of its honorable body in recognition of the value to architectural history of the investigations he has laboriously carried on.

THE CLOUD OVER ENGLISH LIFE.¹

FOR many years past the question of the smoke nuisance has excited from time to time a rather too languid interest amongst various classes in England. Probably were the evils connected with it more generally understood, the necessity of grappling with the difficulty would be fully appreciated. In a general sense I may sum up these bad influences as follows:

1. Wastefulness, thereby entailing unnecessary outlay.
2. Injury to the national health, thereby inducing physical deterioration.
3. Injury to our agricultural industry, thereby favoring food importation.
4. Interference with the comfort and beauty of social life by creating dirt, injuring property, and entailing much extra work.

Thus the indictment against the present system of coal consumption is a very heavy one; but when science, which is now doing so much to make the wheels of life run more smoothly, offers her assistance, is it wise for us to reject it? The innate dislike to change evinced by Englishmen even of the educated classes is in some respects a rather unfortunate characteristic. We are apt to bear with a long-standing abuse until it becomes intolerable: it is only then we look for a remedy, and consequently, in some directions, our national movements are slow. The smoke nuisance has now reached a pitch which urgently demands a remedy, and the more so because the attendant evils, if not checked, bid fair to become much more serious. In the following pages I aim at placing the precise nature of those evils and their extent before the reader.

It has been calculated that in the case of the ordinary domestic grate at least four-fifths of the heat goes up the chimney, and is therefore wasted fuel. According to this a householder purchases, say, five hundredweight of coal for cooking, heating purposes, etc., but he only gains the heating power of one hundredweight; he pays for the balance, but receives absolutely nothing for his money. At the same time he and his neighbors incur a very palpable injury, as will be seen later on, from the pollution of the atmosphere.

The extra expense representing outlay without benefit or reproduction figures as a large item in the expenditure of masses of people who have very small incomes, but to whom coal consumption is a matter of daily necessity. The householder individually is a direct sufferer, but, in addition to this, it is clear that we are annually wasting a vast amount of a most valuable national product of which we have only a limited but rapidly diminishing quantity in reserve. Yet it is on this very product that our national supremacy largely depends.

In every thousand pounds of coal there are, on an average, about eight pounds of sulphur, and when the coal is burned this escapes into the atmosphere as sulphurous acid. A portion of this sulphurous acid combines with the oxygen of the air, and then forms sulphuric acid (oil of vitriol), which falls to the ground, and is always destructive to vegetation or living tissues of any kind, in proportion to the quantity present. The air we breathe is, therefore, according to locality, more or less charged with sulphuric acid, which, always injurious to the general health, is most pernicious in cases of lung complaint. Mr. Estcourt, the city analyst of Manchester, as quoted by Mr. Wm. Thompson, states that out of every hundred tons of coal burned in the factories of Manchester, one ton remains in the air as soot from black smoke.² Chest affections are naturally much aggravated by this, especially as soot is not by any means simple carbon, but is laden with the acids formed by combustion. Not only our factory towns themselves but large adjacent areas are subject to this noxious influence. It may be said that over the whole of Staffordshire, Cheshire, and large portions of Derbyshire, Yorkshire, Lancashire, Leicestershire, Warwickshire, and Nottinghamshire, a great pall of smoke hangs, vitiating the atmosphere, and partially obscuring the sun's rays. In London the inhabitants while resident there never breathe really pure air; and for many miles around, according to direction of the wind, the noxious influence is felt. The fact that the air is continually charged with a superabundance of coal-smoke is undoubtedly one of the causes owing to which life in London is rarely, if ever, perpetuated beyond the third generation, unless reinforced by fresh blood from the country.³

For several years past the alarming increase of cancer in proportion to the population has occasioned natural anxiety and stimulated scientific research into the causes of the dire complaint, some medical opinion seeming to consider it of *fungoid growth*. It is also a scientific fact that fungoid growths are nourished by carbon, and coal-smoke is unconsumed carbon mingled with other unwholesome gases. There is a special complaint known as sweep's cancer, produced by contact of soot with the skin, and soot is unconsumed carbon in a more condensed form than as smoke. The air we breathe night and day is charged, sometimes heavily charged, with this unconsumed carbon, which has been proved to be productive of cancer when there may be a predisposition to it. Indeed, I have seen in a medical work a case cited of a gardener who contracted the complaint in his right hand from continually scattering soot on flowerbeds. The above facts are surely somewhat suggestive of the increase of the malady being associated with the increase of coal smoke, though of course there may be various other contributory causes.

Dr. Leigh, formerly Medical Officer for Manchester, in a report to the Corporation of that city, stated that, with much more which was detrimental, ordinary coal-smoke contained, as gaseous constituents, carbonic oxide, carburetted hydrogen, and sulphuretted hydrogen. These are all more or less deadly, they are the results of imperfect combustion, and therefore their existence in the atmosphere is wholly unnecessary. It is also a fact that *post-mortem* examination on persons who have lived for long periods in our large towns shows considerable accumulation of black matter in the bronchial glands and lungs. In some cases this foreign matter causes a lesion of the lung itself. In the same report Dr. Leigh presents some very conclusive statistics as to the difference between the numbers of deaths owing to complaints of the respiratory organs in localities when the air was charged with coal-smoke, and when it was comparatively free from it. In Cheshire and Lancashire, where volumes of sulphurous acid and other properties from factory chimneys poison the air, the deaths from complaints of the above nature were 4,381 per million of the inhabitants, and for London 4,365; but for Sussex, Hants, Berks, and parts of Surrey and Kent, 2,835. Perhaps enough proof has been given, though more could be adduced, to demonstrate the ill effects of coal-smoke on health, but ample medical testimony is forthcoming to prove that the poisonous gases which the town inhabitants are continually breathing lower the nervous system, and the irritant gases excite disease of the respiratory organs. In fact, it is easy to realize the difference of hygienic conditions between those living in a smoke-covered town and in healthy country air by comparing the stunted, pale-faced factory population, and especially the flabby unwholesome children, with the stalwart fresh-complexioned inhabitants of an agricultural district.

Probably the evils springing from living in a dense smoke-laden atmosphere are not confined to mere physical deterioration. In Switzerland cretinism, in different degrees varying from feeble-mindedness to absolute and hopeless idiocy, is so common that from time to time searching inquiries have been made to ascertain the cause of its prevalence. The result of the investigation shows that cretinism exists in the mountain regions of Switzerland and Italy, also in the Pyrenees and the Himalayas, but it is always more prevalent in valleys surrounded by steep walls of rock, which exclude the light and prevent the free circulation of air. In Switzerland especially there are certain deep narrow valleys which are only exposed to the sun's rays for a few hours in the day, and it is these which produce the largest number of feeble-minded children. Experience amply proves that animal life suffers from want of the healthy, vivifying influence of sunshine, and by a parity of reasoning it is evident that in proportion as a dense pall of smoke intercepts the sun's rays, mischief as to mentality and physical development in some degree must ensue. It is calculated that in England and Wales there are about 42,000 feeble-minded children, and Mr. Dickinson, D. L., L. C. C., states that the number of these of all ages whose minds are not strong enough to enable them to take care of themselves would be about 100,000.⁴ The causes for such a deplorable state of things are various, being naturally due to unhealthy conditions of some kind, but amongst them must be reckoned the continual breathing of a vitiated atmosphere and the deprivation to a large extent of health-inspiring sunlight.

In London alone there are in round numbers 600,000 inhabited

¹ Portion of a paper by Mr. Charles Rolleston in the *Westminster Review* for July.

² "Some Common Sources of Air Pollution." By William Thompson, F. R. S.

³ "Life and Labor of People of London." By Charles Booth. 1st Series. Vol. III, p. 65.

⁴ "The Treatment of the Feeble-Minded." A paper read by him at the Central Poor-Law Conference held at the Guildhall, March 11, 1903.

houses; consequently the output of coal-smoke from domestic chimneys alone must be enormous, and Sir William Richmond¹ states that the cost therefrom to the metropolis must be about £4,000,000 annually. He also calculates that during the winter months London must lose about 50 per cent. of the sunlight which, so necessary to health, is enjoyed by those living in the country. As this gentleman truly remarks, "The injuries to health and property resulting from the excessive emission of coal-smoke are so numerous and apparent that it is difficult to account for the indifference displayed by the public in general in so vital a question."

As population is augmenting rapidly in England, the number of houses, and consequently of chimneys, must be increasing in about like proportion. The injurious effects on vegetation, however, of so much coal-smoke being spread over the land, though very great, has never been realized to its full extent. The injury springs from two causes, viz., the partial interception of the sun's heat and light rays which are required to vivify the growing plant, and the noxious gases which tend to poison it. In a pamphlet published by Mr. Holland on air pollution,² he gives it as his opinion that the air of the whole of England is polluted to a degree perhaps imperceptible to our senses, but sufficient to prevent trees from ever again attaining the dimensions they reached in former times. When forest trees suffer as they do, it follows that growing crops must be easily affected by masses of sulphurous acid in the atmosphere, together with the chemical result as sulphuric acid, which, according to the quantity impregnating the soil, kills or injures vegetation. That this is so requires no further proof beyond the fact that ground in the vicinity of several factory towns, having become valueless for agricultural purposes, has gone out of cultivation.³

Crops, trees, and flowers are injured, bees cannot exist, and a zone appears where even the grass will not grow.⁴

From Mr. Holland's pamphlet I quote the following, as indicating the noxious influence which must dominate a large portion of our country:

"Some years ago I had the honor of making an inspection of all the public parks of Manchester on behalf of the Corporation, and I furnished several reports of their then condition to the Parks Committee. I need scarcely say that, going as I did from the fresh green country, I was horrified to see the havoc that was being made. Fine open spaces—some of them nicely diversified with hills and valleys which ought to have been beautiful, and would have even been picturesque if well covered with trees, and which should have supplied pleasant recreation grounds for a population that sees far too little of country life and breathes far too little of fresh country air—rendered hideous by the blackness of everything with them—trees stunted, dying, flowers struggling to bloom and sometimes their species scarcely recognizable. It is no exaggeration; and as long as the surrounding chimneys send out volumes of sulphurous acid and of carbon there can be no improvement. There are certain chemical works in the neighborhood of some of these parks which send out other poisonous gases; but the gardens and parks in and around Manchester, I am convinced, suffer much more from coal-smoke than they do from any other pollution. In fact, 'the smoke nuisance' extends over a great part of Lancashire and Yorkshire, totally irrespective of chemical works, which are, for the most part, gathered into centres."

The enormous area affected by the smoke of a factory city may be, to a small extent, gauged by the fact that at Lockinge in Berkshire, when the wind has been in the southeast, dense clouds of smoke have been observed rolling over the downs and traveling on towards the north; carrying with them that well-known, peculiar, stuffy London smell. Now, Lockinge is sixty-four miles from London, and who can say how many miles farther those clouds proceeded in their course? The natives there speak of this as "London dirt," and say that in winter time it leaves its black traces on the snow. It is calculated that one factory shaft emits more smoke than two hundred small chimneys, so surely it is safe to say that half the London smoke comes from these, if we add what is produced by steamers, locomotives, electric-lighting stations and places of amusement, and all these, under the Public Health Act, are liable to prosecution if they create a nuisance.

¹ President of the Coal-Smoke Abatement Society.
² "Air Pollution as affecting P and Life." By Robert Holland, Esq., M. R. A. C., Consulting Botanist to the Royal Manchester, Liverpool, and North Lancashire Agricultural Society.
³ "Air Pollution as affecting Plant Life."
⁴ "Air Pollution: A Piece of Coal and What Becomes of It." By George E. Davis, F. I. C.

It is said that the atmosphere of London contains six thousand tons of unconsumed coal daily, and still we mourn the ever-growing scarcity of coal!

It is not only in the perpetual waste of fuel that the nation suffers. Coal-smoke injures ceilings, hangings, curtains, carpets, wall-papers, pictures, gilding, clothes, and furniture; so washing, cleansing and constant renewing must be looked on as the alternatives to a most palpable general aspect of griminess and dirt. Coal-smoke attacks metal work, it corrodes the stonework of our public buildings; orchards and flower gardens suffer according to their proximity to a factory town. The evil does not even stop there. Many kinds of the prettiest and most artistic work in bright colors, as furniture, decorations, or clothes, cannot be used in our large towns unless the owners reconcile themselves to the articles being destroyed in a very short time, and therefore they are out of the reach of the majority who have limited incomes. The town householder, in furnishing and decorating his residence, must always count on the defacing and destructive influence of the smoke-laden atmosphere, and therefore, if he desires to avoid ever-recurring expense, must limit himself to certain materials and sombre colors. It can readily be seen from this that many branches of industry which would tend to beautify the home and heighten the artistic sense must be considerably checked.

It is indeed seldom that any movement, though aiming at the most palpable benefit for the community, has achieved its purpose without noisy, often strenuous, opposition. In the case of the smoke-abatement nuisance there exists an obstructionist party who say that coal-smoke is a disinfectant, and that, without it, infectious diseases *might* be more prevalent than they are. This is, however, a mere surmise, and I imagine research would show it to be based on a fallacy. For instance, are infectious diseases more prevalent, in proportion to the population, in districts free from smoke than they are in cities and towns? I have never seen the slightest proof of this; were it the case, statistics would have settled the question long ago, and in fact whatever evidence there is on the subject bears distinctly the other way. In the late Dr. Angus Smith's twelfth and thirteenth Alkali Acts Reports, he says:

"I think it was sufficiently shown in one of my reports that the cases of scarlet fever were not diminished by the acids at Widnes. The amount of acid required to disinfect the air, so as to remove that disease, if any amount could remove it, would be very great indeed; and Dr. Spiers has since shown that other zymotic diseases are not driven out by alkali works on the Tyne."

In face of the many admitted serious and increasing evils springing from the volumes of coal-smoke which taint our atmosphere, the questions arise, are any means available to deal with the growing nuisance, which are the most applicable, and what is being done in this direction? An agitation which had been simmering for a considerable time past took definite form about four years ago by the establishment of the Coal Smoke Abatement Society, under the auspices, I believe, of Sir William Richmond. This gentleman has become its president, assisted by a strong board of vice-presidents and a council, whose names alone are a sufficient assurance as to the *bona fides* of the scheme. The society seems to be well and economically worked; its immediate objects being, by means of a staff of inspectors, to ascertain where and how infringements of the law relating to non-consumption of smoke exist, and to set the law in motion.

The causes of the smoke nuisance may be divided into two classes. The first is produced by the factories, steamers, locomotives, etc., before mentioned; the second, by the fires from private houses. The society occupies itself with the first, as it is alone subject to the law, and during its short term of existence much good has been achieved. Its efforts have, however, been greatly hindered by the fact that, in spite of its undoubted beneficial action, subscriptions have come in very sparingly. The society and its objects are known to comparatively few, it has not yet aroused the widespread interest it deserves, and it has met in many cases with but faint support from the local authorities. To substitute a smoke-consuming apparatus for the ordinary furnace would doubtless entail a certain expense, though in the long run the public would gain enormously; so the individual factory owner infringing the law takes chance of being prosecuted, and finds it cheaper to pay the fine than incur the initial expense of the smoke-consuming contrivance. Ultimately the factory owner gains considerably in economy of fuel and labor. Even when a

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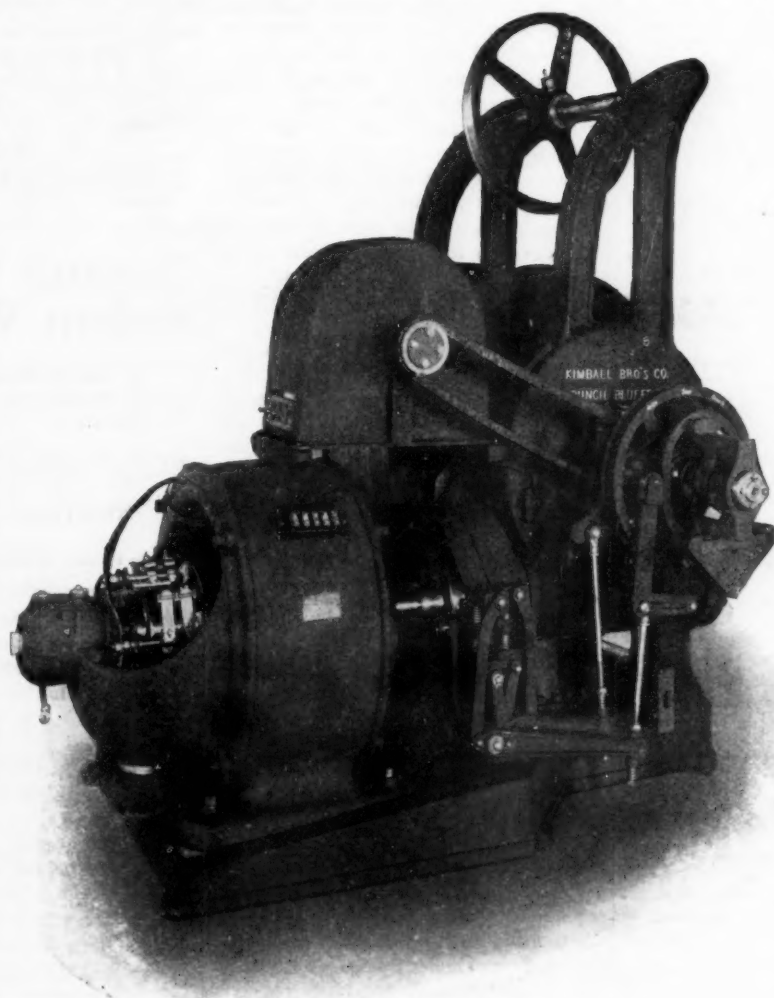
THE LATEST HIGH SPEED PASSENGER ELECTRIC MACHINE.

THIS machine is designed especially for continuous high-speed work. The worm is 7 inches in diameter, of conical shape, so that it has a bearing in the worm wheel of about 9 inches. The worm wheel is made from genuine phosphor-bronze, both being cut by special machinery to fit perfectly. There are two brakes: the safety-brake stops the elevator at top and bottom floors, and also in case the cables get disarranged or if the governor sets the safety-catches on the cage it will stop the machine immediately. This acts independently of the brake used to stop at different floors.

There is a step box on the outside end of worm case where the end thrust can be taken up both ways; this improvement makes it possible to remove and replace both sets of thrust-bearings in five minutes without locking car or weight or drawing oil out of worm case. These are ball bearings. The limit stop cuts off current and applies both brakes at bottom.

The motor is a self-starting motor, and there is no controller used. It is operated by a switch, which is connected to the hand lever by chain. This saves the extra cur-

rent that goes into a resistance-box. Instead of carrying this current through the resistance-box, it is carried through a series coil in the motor, which gives the machine



that much extra torque in starting, therefore using all of the electricity in the motor which has heretofore been carried off by heat in the resistance coil. This is one of the many styles of machines manufactured by the Kimball Bros. Co., of Council Bluffs, Ia.; Cleveland, O., and New York City.

THE QUESTION OF DURABILITY.

THERE is always a question of durability in the adoption and use of any style of fireproofing, and inasmuch as there has been question, and criticism on the use of re-enforced concrete, we are pleased to add a little chapter to the subject which is interesting in view of the fact that the authorities quoted are of the highest character. Some three years ago there was built a small annex to the Hotel Savoy, Boston. The fireproof system employed was the Expanded Metal and cinder concrete. The interior partitions and ceilings, in fact all of the exterior work also was built of Expanded Metal and plaster. The building has recently been torn down to make room for a much larger building. While this work of destruction was in course of operation, examinations were made by two very well-known engineering experts, and we are pleased to publish the letters from these two gentlemen. Their

names are sufficient to establish the credibility of the statements made.

"January 15th, 1904.

"EASTERN EXPANDED METAL CO.,
Boston, Mass.:

"GENTLEMEN:—At your request I made a careful examination of the materials that

are being torn out of the annex of the Savoy Hotel, which I understand from you was constructed three years ago this month. I find that the floors and roof, which were built of cinder concrete reinforced with three-inch No. 10 gauge Expanded Metal, are in perfect condition, the Expanded Metal being absolutely free from rust, and also the steel beams on which the original paint was intact.

"The Expanded Metal lath carrying the plaster of the interior partitions shows in places thin spots of rust, but in no case has this rusting seemed to have gone far enough to appreciably weaken the metal. Most of the lath shows the original bluish color of the metal.

"The outside walls of a part of the structure were made of plaster on Expanded Metal lath covered with Portland-cement mortar about three-quarters of an inch thick. In these outside walls the lath shows scarcely any signs of corrosion, certainly no more than you would expect to find in the lath before the mortar was applied, considering that it was erected in winter weather. The Portland-cement covering of these walls appears to be in perfect condition. I would say that the cinder concrete appears to have been excellent in quality, and shows no signs of the season of the year in which it was laid. Yours truly,

"(Signed) J. R. WORCESTER."

"February 6th, 1904.

"EASTERN EXPANDED METAL CO.,

Boston, Mass.:

"GENTLEMEN:—At your request I have examined the Expanded Metal construction of the portions of the rear of the Savoy Hotel, Washington Street, Boston, now being demolished to make room for other buildings.

"The floors and the beam coverings and in some cases the minor partitions contained Expanded Metal. The metal in the floors was three-inch mesh No. 10, and for the beams half-inch mesh No. 20. The floor metal had been painted before laying, with what appears to have been an asphalt paint. The lighter metal had been in part, tinned or galvanized. The floors were of cinder concrete $3\frac{1}{4}$ inches thick, and the partitions and beam coverings were in part Portland-cement concrete and in part of a patent hard plaster.

"A careful examination of the floor metal shows it to be as good as when put in position some three years ago, there being only, throughout the whole floor, occasional small spots of rust. These were, apparently, in every case due to a large cinder extending from the steel almost or quite to the outside of the concrete layer. At these places the spots of rust had not eaten into the metal by an appreciable amount, and had in no sense injured the metal nor loosened its bond with the concrete. The concrete itself was of good quality, with very few voids. Where there were small voids it is interesting to note that the paint was still in good condition, but where the concrete had been in contact with it the paint was little more than a powder. The rust spots and the voids excepted, the whole of the metal presented the same appearance that it had when it was laid in the concrete and was practically unaltered. The few rust spots, perhaps of a maximum dimension of about one-quarter of an inch, while showing as discolored places, did not affect the texture of the metal.

"The lighter metal in the beam covering with the patent plaster was not in as good condition, and its condition bears out earlier experience in the use of some of these plasters which contained considerable amounts of plaster of Paris. However, none of this metal which I could find was rusted sufficiently to be in any way liable to weaken the covering. The condition of the metal as a whole adds to my belief that steel of this character bedded thoroughly in concrete, made of Portland cement with stone or cinders, will last almost indefinitely. Further, the grip of the concrete on the

metal does not appear to be diminished by the partial disintegration of the thin layer of paint. Respectfully submitted,

"CHARLES L. NORTON."

HANGING WIDE BURLAPS.

In a recent interview, Mr. Paul Richter, president of the Richter Mfg. Co., manufacturers of Tapeptrolea burlaps, referred to a matter that is of interest to many decorators. He said: "When we originated the method of treating burlaps, nearly fifteen years ago, many decorators complained to us that the width, thirty-six inches, was entirely too wide to permit of hanging the goods easily. They said that paper-hangers were so accustomed to hanging ordinary wall-paper widths that when they came to handle goods just twice as wide, they were stumped. In a short time this opposition wore away and yard-wide goods were accepted as regular stock.

"In recent years there has been a steadily increasing demand for burlaps of greater width than usually carried in stock. This is no doubt due to the investigations of shrewd decorators who have found that there is considerable economy in labor in hanging goods as wide as the dimensions of the wall will permit. It has been found, also, that a much better job can be made with wide than with narrow goods.

"If a single strip is used to cover a side wall there certainly never will be any seams to open up or matching to be done; the strips cut out for the door and window openings can always be used to advantage somewhere, so that the extra cost of the wide goods is reduced to a minimum. A considerable part of our orders now are for widths wider than 36 inches.

"This demand has been so great that we have had to install special machinery. It is no uncommon thing for us to receive orders for 120, 144, 216 and even 278 inch Tapeptrolea burlaps. It indicates that workmen are becoming more skilled in handling such fabrics and that owners require a higher grade of work than formerly."—*Canadian Decorator and Painter.*

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THE Monarch Water Heater Company, formerly of Pittsburg, have removed to 1,300-1,342 River Ave., Allegheny, Pa., where their offices and large new works are now concentrated. The large demand for the Monarch water-heaters necessitated the securing of larger quarters for their manufacture and the company bought some months ago the works formerly operated by the Standard Sanitary Manufacturing Company and have remodeled them to suit their requirements. They have also built a foundry to make their own castings used in the manufacture of water-heaters, and are thus able to guarantee to the trade the very highest quality of materials used in the manufacture of their heaters. Their products consist of Monarch, Columbia and Colonial automatic instantaneous water-heaters, also the Mystic and Junior instantaneous water-heaters, and the Peerless, Caloric and Rival boiler heaters. They have also several new styles of water-heaters under way, which they expect to have in the market within a short time. The com-

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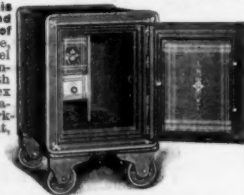
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conviction is obtained, the magistrates generally impose merely nominal fines, which are paid at once, and the abuse goes on.

SMOKE PREVENTION.¹

I DO not wish to appear as an advocate of smoky chimneys, since I prefer clean linen and a clear sky. At the same time,

I should like to try to add a little to our knowledge of the subject since it is only by accurate facts and clear thinking that we shall ever reach any improvement, and before taking up the logical development of the question I should like to tell of the result of one small branch of the investigation, viz., the value of automatic stokers, since this illustrates the errors which we may easily fall into. My first knowledge of these came from the promoters of the various types, all patented of course, though Watt designed and built many in the century before the last, and there has been a new crop every decade since. Now, all these promoters had authentic tests of their devices made in comparison with hand-firing that showed a saving of from 10 per cent up to 35 per cent or 40 per cent, and the average saving was at least 15 per cent. Fifteen per cent saving in the coal bill will pay a tremendous return on the cost of installation of any mechanical stoker, and it seemed, therefore, that boiler owners were losing a chance to make a very good investment. Before long, however, I began to run across instances of boiler owners who had tried stokers and discarded them on account of various troubles, such as failure to work, etc. The promoters of that stoker always assured me that the discarded machine was one of their old types and that the machine which they were now building would give no trouble. Later, however, I found cases where the boiler owner reported a decided and often large saving of coal after discarding the stokers, or an increase in the coal bill after putting them in, and in my own practice I got results from testing hand-fired boilers far better than the average stoker test and as good as the best, though of course I also found stoker tests better than some hand-fired tests. That some of the stoker companies should then admit to me (privately, of course) that they had tests on file much to the disadvantage of stokers was no surprise.

I then began to make a collection of boiler tests, in which I made the rule that I would include no test that was specially selected in any way. Thus I refused any tests whatever supplied by any company interested in any patented device and omitted any published tests, even by the best authorities, if they were illustrative of any such device, since I felt sure that if the tests had not been favorable they would not have been published. I took, however, such groups as all the tests I had made myself, all the tests which some fellow-engineers were kind enough to supply me, with a statement that they were all the tests they had made, and the groups of tests made at various competitive exhibitions, the latter being mostly foreign. Even when the tests were selected in this way there was a possibility that tests unfavorable to some patented device had been suppressed, nevertheless it is better than including tests that have been specially selected to show the advantages of some particular type. The whole series is at least not unfair to the patented devices.

Now all these tests amounted to over one hundred, and on carefully comparing them the automatic stokers showed up less than 1 per cent better than hand-firing. The moral is obvious.

Another illustration of the loose methods in vogue by the advocates of smoke-prevention laws occurred a couple of years ago, when some estimable Boston reformers secured the services of a famous professor from one of the smoky Western cities to testify how easy it was to reduce and prevent any emission of smoke, and he so testified before a committee of the Massachusetts Legislature. However, on looking through the reports on smoke prevention in this and corresponding Western cities I found two of the chief methods which had been successful in preventing smoke to be, first, the use of smokeless coals such as Pocahontas and New River without any change of grate, or the use of a mechanical stoker which enabled the use of a very much cheaper grade of coal. Now, Pocahontas and New River coal may be comparatively smokeless compared to Western coals, but these are the coals chiefly used in Boston and are the grade of coals against which these Boston reformers were complaining. The use of mechanical stokers permitted, in the Western city, the use of a cheaper grade of fuel and consequently resulted in a decided saving in cost of fuel; but the difference depended on the fact that in the Western cities, "run of mine," as ordinarily used on hand-fired grates, is more expensive than slack coal, while in

Boston "run of mine" is the cheapest grade, and to get slack coal would involve a higher cost of coal rather than a less cost. The methods that were available in the West were therefore absolutely unavailable in Boston, and if the whole story had been known the case of the smoke-law advocates would hardly have been as strong as it appeared to be on the surface.

We will now consider the question of smoke, not alone in the light of the experiments made by the promoters of smoke-prevention devices, but in the light of well-known facts of engineering and chemistry. First of all, we may note that anthracite coal makes practically no smoke and that coke likewise makes no smoke. Unfortunately, in all except a few districts hard coal or coke is much more expensive than soft coal. These fortunate districts such, for instance, as New York City, can reduce the amount of smoke to a minimum and at the same time increase the cost of their steam and of all the products of steam, such as heat, light, and power, by but a very small amount. It has been said that New York owes its immunity from smoke to its very drastic law and not to the cheapness of hard coal, but when many plants on the other side of the river in Newark, Paterson, etc., where there is no such strict enforcement of a smoke law, burn hard coal by preference, it is clear that the use of hard coal in Manhattan is no great hardship and that it is impossible to say what would be the result if soft coal were 25 per cent instead of 5 per cent or so cheaper than hard coal. I venture to say that if the relative prices of coal in Manhattan should differ by the larger amount instead of by the smaller, the officials of the New York Board of Health would either have to relax very much in the enforcement of the law or else flee for their lives. In fact, when the coal strike sent up the price of hard coal in New York the Mayor suspended the smoke ordinance by proclamation.

When hard coal or coke can be used the problem is solved. If soft coal which contains hydrocarbons must be used, it is impossible to prevent the smoke nuisance entirely. Soft coal, it is true, can be burned so as to give no visible smoke at the chimney-top, and it is likewise true that an oil lamp or gas jet can be burned so as to give no apparent smoke. Nevertheless, those who use electric light know how much cleaner their walls and ceilings remain than when they used gas or oil, while the discolored ceilings over a gas jet or oil lamp show where the soot comes from. I have had instances, in my practice, of serious complaint from soot in the neighborhood of a soft-coal furnace, though even the complainants admitted that practically no visible smoke came out of the chimney.

This leads us to one very important consideration, and that is the fact that it is the actual quantity or weight of soot discharged into the air that causes trouble, while it is always the appearance of the chimney top that causes complaint. For instance, consider a furnace that gave dense black smoke for ten minutes each morning and each afternoon, or say twenty minutes in each twenty-four hours or 1-72 of the time. If we compare such a chimney with one that gave only 1-10 as much smoke at any particular moment but gave steadily some light smoke, the latter would cause much less verbal complaint to the smoke inspectors, especially under such ordinances as are now on the statute books, but would really be giving about six times as much soot.

We may also compare a battery of boilers, each with its own chimney, as against the same boilers delivering into a common chimney. If a single one of these boilers smoked very badly and the others not at all, then with individual chimneys there would be much complaint, while with a single large chimney for the battery the top would show only a light smoke, which would cause but slight complaint, although the amount of soot would be the same.

Another point that should be carefully considered, but that is not always considered, is the question of central power-stations. The electric light and power companies are in large cities almost universally spoken of as the worst offenders against the smoke laws, but a brief consideration will show that we could afford to let them send forth almost any amount of smoke rather than put any serious burden on them. The choice whether a small factory or an office building shall put in its own plant to make its own light and power, or, on the other hand, buy electricity from the central station, is a close one, but the central station runs on a two pounds coal per horse-power, while the isolated plant seldom gets under six pounds per horse-power. Hence, for the same amount of soot given forth into the atmosphere, the central station should be allowed to make three times as much smoke.

Another point that is not often considered, in fact that cannot be considered, is that the amount of soot is not proportional to

¹ Extracts from a report by Mr. R. S. Hale, Engineer, issued by the Mutual Boiler Insurance Company, of Boston.

the color of the smoke. A small chimney attached to a boiler that is using but a small excess of air may show a dense black smoke. Change this over to a large chimney and let a large amount of air into the flue at the base of the chimney. Then the color of the smoke at the top will be much lighter, though the amount of soot may be the same as before. Supposing, for instance, that around a smoky chimney of 2 feet diameter we should build a shield 6-feet diameter, 15 feet high, open top and bottom. If the original chimney extended just above the roof, then this shield would look merely like a much larger chimney. The smoke from the small chimney inside would be so diluted with air by the time it could be seen by the neighbors that no complaint would be made, although the amount of soot would be the same as before. While such a shield has never yet been built, yet I have no doubt that much of the difference between some chimneys that cause complaint and others that do not is merely the difference in dilution by air leakage into the chimney and is not due to any difference in amount of soot discharged.

We thus see that different grades of coal from anthracite to very soft bituminous make different amounts of smoke, and that the apparent amount of smoke at the chimney top may differ without changing the real amount of soot. It is, however, also true that the same grade of coal from the same chimney may vary in the amount of soot it gives out according to various conditions of the combustion and boiler setting and furnace, and of methods of firing.

Coal, as we know, consists of carbon, hydrogen, sulphur, nitrogen, oxygen, and earthy matter, and these are chemically combined into various compounds. Combination with the oxygen of the air causes these to form CO_2 CO H_2O SO_2 and certain nitrogenous compounds, all of which are colorless or practically colorless gases. Incomplete combustion gives soot which is composed of either pure carbon or of carbon-hydrogen compounds. Other hydrocarbons such as C_2H_4 and the gases are colorless. Now, naphtha, kerosene, and, in fact, all the light oils and heavy oils formed when coal is distilled have a colorless vapor, hence are not soot, but as we get above the oils and into and beyond the compounds such as paraffine and towards the compounds with a very large proportion of carbon we find the soots. The question, therefore, is what are the conditions under which these sooty hydrocarbons are formed and burned or not burned in the furnace. The question of their formation need not bother us, for if they are not at first part of the coal, yet we know that when compounds such as paraffine and other constituents of coal are heated they "crack" according to the chemist's term and dissociate into the lighter colorless hydrocarbon gases and the heavier sooty residue.

These sooty hydrocarbons having been formed from the coal as it heats, the question is how to burn them. For this the requisite conditions are of course that oxygen shall be present, and that the temperature shall be high enough.

The question of mixture of the air with the hydrocarbons is seen to be very important when we figure the time allowed. A rate of combustion of 20 pounds coal per square foot, per hour is not unusual. This makes roughly about 20 pounds gas per pound coal, or 400 pounds gas. At ordinary temperatures, say 60 F. or 500 absolute, this makes about 13 cubic feet per pound, while at combustion temperature of, say 2000 C., this is about 100 feet per pound of gas, making a total of 40,000 cubic feet per square foot per hour, or 11 feet per second. In some forms of water-tube boiler the gases have but three feet or so of travel before they enter the tube nest, or the time for mixture and ignition is but one-third of a second. By providing a large combustion chamber, as may be done, for instance, in a horizontal tubular boiler, this length of time may easily be increased four times. It is impossible to do more than estimate this average time. In a horizontal tubular boiler, for instance, some of the gases undoubtedly travel the whole length of the boiler. Others travel only the vertical distance from the grates to the shell, but if they then deflect they may mix with other gases hot enough to keep up the temperature to the proper point and have a longer time for ignition. It is only possible to make a rough comparison of different types of boiler and different types of setting, but we have an interesting case in some boilers, designed by Mr. E. D. Leavitt, which are under the charge of our company. There are two batteries side by side, the old battery set two feet above the grates, the new battery four feet. Otherwise, the boilers are practically duplicates, but the lessened smoke emission from the latter is very marked and is probably due to the larger combustion chamber. Of course, it must be remembered that this dif-

ference in setting increases the headroom required, increases the cost of setting and increases the annual repairs to the setting.

The advantages of a brick combustion chamber or brick arch in maintaining the temperature are very obvious. On the other hand, such construction, especially the arch construction, needs frequent repairs, and some designs of brick combustion chambers, such as checkerwork, check the draft and reduce the capacity and need frequent cleaning from ashes.

Another method of maintaining the temperature is the down-draft principle, whether in the Hawley type or in the underfeed stoker. These supply the coal where the fire is coolest instead of where the fire is hottest, and force the gases as distilled from coal when first heated to pass through the hot fire. The effect obviously must be good.

The cost of these is high both for installation and repairs, and it must be remembered that the apparent cost of repairs is not the only cost. Repairs involve laying off the boiler, and the fixed charges, such as interest and taxes, all go on whether the boiler is used or not; in addition to this the use of any apparatus subject to repairs involves keeping extra plant ready in case of accident that may happen unexpectedly to a minor part and cause the laying off of the boiler. Any such apparatus further requires more supervision on the part of the superintendent or manager. A much larger proportion of the time of the superintendent will be found to be devoted to the power plant when any special apparatus is employed.

We will return to special devices for smoke prevention later, but will now consider the methods of firing.

Careful firing of only a small quantity at a time is an effective means of reducing smoke. If a large quantity of coal is fired at one time the hydrocarbons distill first and require an almost impossible amount of care to prevent smoke. As soon, however, as the coal is coked the smoke stops and no further attention is needed until further firing is required, when the same difficulty again appears. On the other hand, if one or two shovelfuls of coal are placed on a hot fire the temperature is usually enough to burn these hydrocarbons as they are formed, and if the firing is kept up steadily a little at a time, much less smoke is formed than if a larger quantity of coal is fired at once. It must be remembered, however, that this means very much harder work. It is nearly twice the work for a fireman to fire 15 shovelfuls of coal at two-minute intervals than to fire 17 shovelfuls at once and then rest half an hour. The actual work is much harder, so that more wages would have to be paid, and in addition there must be some sort of supervision to see that the method of firing is carried out. It would be impossible to get any man, even for double wages, who was both willing to do the extra work required by the one-shovelful method and trustworthy enough to have no supervision at all. Supervision in a large plant might not be very expensive, but in a small plant would be a serious tax, since a small fraction of the superintendent's time would cost as much as the whole wages of the fireman.

Mechanical stokers which feed the coal in a little at a time are of course nearly equivalent to the one-shovelful method. In large plants the saving in labor by the use of a mechanical stoker is often sufficient to pay the fixed charges and maintenance, and in such cases they may even reduce the total costs. In small plants there is no saving in labor, and the high fixed charges and maintenance make them an expensive luxury, even if they should be found to reduce the coal bill, and, as I have pointed out in the beginning of this article, the trend of the evidence of all except the stoker promoters is opposed to the idea that stokers save any coal. Further, while automatic stokers reduce the smoke they do not get rid of it entirely.

Steam jets which blow a mixture of steam and air above the fire undoubtedly reduce smoke, the action being probably just the same as ordinary air admission. They are effective because they are more fully under control than ordinary methods of air admission above the fire. They result, on the average, in a distinct loss of economy.

The considerations of the three factors of temperature, sufficient air, and sufficient time for mixture shows us at once why boilers working easily smoke less than when pushed. If a boiler is worked at half its rating the gases have twice the time to mix with the air supply above the fire before they strike the cooling surfaces, and, in addition, the same amount of soot per pound of coal makes but half the bad appearance at the chimney top.

From the above discussion it is seen that it will be perfectly possible to reduce the smoke nuisance either partially or absolutely. To prevent it absolutely requires only a law forbidding smoke emission, and this will practically force the use of hard

coal or coke. In certain districts, such as New York City, this involves very slight increase of cost to the boiler owner. In other districts it would mean a very great increase of cost.

Short of the use of hard coal or coke, smoke cannot be entirely prevented. In a manufacturing district dependent upon the production of cheap power for its very existence, it is probably unwise to put any limit on the production of smoke. Any such restriction will increase the costs of manufacturing, and the reformers, while they may reduce the smoke nuisance, will find they have checked the development of the very basis of existence of the town.

In districts partly residential, partly manufacturing, it is a question of judgment. Some restriction on smoke production is probably wise. Complete restriction is undoubtedly unwise, unless it is practicable to force the use of hard coal.

The question of the form of the law is a very difficult one. As has been shown, the amount of soot is the governing factor in causing annoyance, but this cannot be determined except by tests of the gases, collecting and weighing in a chemist's balance, and this is commercially impossible. In fact, it is found impracticable even in many expert boiler tests. Hence, the appearance of the chimney mouth must be used, though that is known to be subject to error, in showing the real harm done by the soot. The average appearance should be at least a factor, since a chimney that gives dense smoke for a few minutes a day, but is smokeless the rest of the time, is far less injurious than a chimney that continually gives forth light smoke. Absolute prohibition of even dense smoke is impracticable since it would be impossible to get a fireman so careful as not to make such smoke at times when firing for a sudden call for steam or when cleaning fires.

The following is suggested: The emission of dense smoke for more than fifteen minutes during the twenty-four hours to be forbidden.

Smoke to be divided into dense, medium, light, and none, counting say 3 for dense smoke, 2 for medium, 1 for light, and 0 for none, and an excess of over an average of $1\frac{1}{2}$ during any ten hours to be forbidden. In cities using much soft coal of smoky varieties these limits might have to be increased, while in cities such as New York, where hard coal can be easily and cheaply obtained, they might be diminished.

The important question, however, lies in the administration of the law. It is absolutely impossible to draw up a smoke law that will operate itself or that can be trusted to unskilled hands. The question of smoke is, in fact, like our police laws. We have laws against drunkenness, but if every man who got drunk in his home or club or even on the street was arrested and fined, what a howl there would be! We have laws against betting and gambling, but if every man who bet a cigar or every church sociable that had a grab-bag were hauled into court, what would people say? The question of the enforcement of these laws is left to the discretion of the police, and the question of smoke abatement should be treated in much the same way. The law itself may be reasonably rigid; its enforcement must be reasonably lax. There should be no need for a separate smoke commission since the multiplication of departments with special offices, clerks, and other paraphernalia is unwise. The Board of Health, the Board of Public Works, the Street Department, or the Police Department itself are all suitable bodies to have charge of the enforcement of the smoke laws if the members are wise and intelligent.

There is one principle that has never to my knowledge been included in a law that is, I think, workable and suitable, and that is the placing of a tax on the use of soft coal. As we have seen, there is no possible way of getting rid of all the smoke and soot if soft coal is used at all, even if the chimney should appear absolutely smokeless. It would not be reasonable to forbid the use of soft coal absolutely except in very special cases nor to put a prohibitive tax on its use, but it would seem to be reasonable to say to coal users: "If you insist on using soft coal you must contribute to the public funds some, though not all, of the profit that you make by its use." In cities, for instance, where, after allowing for the different quantities of steam produced per ton of coal, soft coal is \$1 per ton cheaper than hard, it would be entirely reasonable to collect a tax of 25 cents per ton on semi-bituminous coal containing, say, between 7 per cent and 17 per cent of volatile hydrocarbons to total combustible, 50 cents per ton on coal containing between 17 per cent and 30 per cent, and 75 cents per ton on all coal containing over 30 per cent, or if these seemed too onerous, the tax could be made a graded one, 10, 20 and 30 cents. Such a tax could be easily collected when the coal entered the city either by rail or boat, with appropriate

provisions for coal that was merely in transit through the city. It would require but little analysis, as most coal would fall at once into one of the grades by mutual consent without any tests, and even when tests were required for the tax and were not required by the purchaser of the coal to make sure he was getting what he was paying for, the expense would be very light.

While such a tax would, I think, be highly successful, and while the average smoke emitted over a long period should be just as much considered as the number of minutes during which dense smoke is emitted, instead of only considering the latter, as is now the case with most smoke ordinances, yet it is on the personnel of the commission that has the enforcement of the law rather than on the law itself that successful results will depend. If the commission should devote itself to the encouragement of proper design of boilers and setting and to the installation of suitable capacity, then, if it does this wisely, it can do good without causing friction among coal users or greatly increasing their costs. Without such intelligent work, however, nothing can be accomplished in the line. For instance, in Boston there is a rule that no new boiler will be allowed unless its owner agrees to burn hard coal or to put in a smoke preventer. This is a good rule, but in its enforcement the officials care nothing about the form of smoke preventer and take no interest in the design of the boiler or of the setting, and as a result the provision is of but slight practical effect in smoke prevention, but does increase the costs to the boiler user.

The methods to be adopted by those who have enforcement of the laws cannot be laid down exactly, as they will require the exercise of great tact and discretion so as to obtain the best results with the least increase of cost to the users of coal. Some remarks, however, may prove of value.

In the first case, all new installations should be submitted to the commission or inspectors and influence should be used to get ample capacity, *i. e.*, ample grate surface and ample heating surface, as these are very important factors in reducing smoke. Influence should also be used towards providing an ample combustion chamber. Unfortunately, this latter requirement will lead to the discouragement of the use of certain patented forms of boilers, but this is unavoidable. The use of hard coal should be encouraged as far as possible.

The commission, still exercising its powers with tact and discretion, would, of course, discriminate between plants in the purely residential parts of a city and plants in the business or manufacturing portions, just as the board of police or license commissioners exercise a wise (or what should be a wise) discretion between granting liquor licenses in different portions of a city.

In dealing with existing plants the same principles would apply. A boiler user has no right to inflict soot and smoke on the city merely because he would like to get double the power out of his present boiler plant, unless he had the right originally when he put in his plant.

I think, therefore, that we may fairly conclude that the smoke and soot question is like the liquor evil, the social evil, and the gambling evil. We can seldom or never get rid of it entirely, but by a wise discretion we can diminish its evils.

This wise discretion lies in the hands of those who enforce the law, and those who desire the evils diminished should devote their attention to seeing that the enforcement is in the hands of wise, able and discreet men. Tampering with and amending the smoke laws will have no more effect than the various tinkering of the liquor laws have had in the past. In any districts where it is wise to put any restriction at all on the production of steam, almost any kind of a law may be put on the books provided its enforcement is in the hands of an able, honest and intelligent commission.



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THE RAILROAD STATION, ZURICH, SWITZERLAND.

THE BATHS, SPA, BELGIUM.

CHARLECOTE HOUSE, WARWICKSHIRE, ENGLAND.

MONUMENT TO LOUIS XIV, NOTRE DAME, PARIS, FRANCE;—MONUMENT TO CARDINAL CARAFFA IN THE CATHEDRAL, NAPLES, ITALY.



DURATION OF SOME ENGLISH MASONRY.—In 700 years the stonework of three successive parish churches erected at Rowley Regis, Staffordshire, England, has perished, and it has now been found necessary to erect a fourth church.—*Exchange*.

A SIX-THOUSAND-YEAR-OLD CYPRESS.—The statement recently made that there are yews in England which are the oldest living things on this earth is not correct. These yews are old, very, very old; there is no doubt about that; some of them were stalwart trees even before Cæsar landed on those shores. There is one now standing in the churchyard at Fortingal, in Perthshire, which Decandole, nearly a century ago, proved to the satisfaction of botanists to be over twenty-five centuries old, and another at Hedsor, in Bucks, which is 3,240 years old. How Decandole arrived at an apparently correct estimate of the enormous age of these living trees is a simple thing, and the principle is doubtless well known to-day to all. The yew, like most other trees, adds one line, about the tenth of an inch, to its circumference each year. He proved this after an investigation extending over several years, and we know now, a hundred years later, that his deductions were correct. The old yew at Hedsor has a trunk twenty-seven feet in diameter, proving its great age, and it is in a flourishing, healthy condition now, like its brother at Fortingal. Their years are few, though, compared with those of the trees I had in mind when I made my first assertion that the statement printed about them in a scientific journal was incorrect. In one chapter of his writings Humboldt refers to a gigantic baobab tree in Central Africa as the "oldest organic monument" in the world. This tree has a trunk twenty-nine feet in diameter, and Adanson, by a series of careful measurements, demonstrated conclusively that it had lived for not less than 5,150 years. Still it is not the oldest organic monument in the world, as Humboldt declared, for now Mexican scientists have proved that a huge cypress tree, standing in Chapultepec, with a trunk 118 feet and 10 inches in circumference, is older than it—older, too, by more than a thousand years—for it has been shown, as conclusively as these things can be shown, that its age is about 6,260 years. To become impressed with wonder over this, one has only to dwell on that duration for a little while in thought. Yet it is not so remarkable when one stops for a moment to remember that, given favorable conditions for its growth and sustenance, the average tree will never die of old age—its death is merely an accident. Other younger and more vigorous trees may spring up near it, and perhaps rob its roots of their proper nourishment; insects may kill it, floods or winds may sweep it away, or its roots may come in contact with rock and become so gnarled and twisted because they have not room to expand in their growth, that they literally throttle the avenues of its sustenance; but these are accidents. If such things do not happen, a tree may live on for century after century, still robust, still flourishing, sheltering with its wide-spreading branches the men and women of age after age.—*St. Louis Globe-Democrat*.

EFFICIENCY OF THE ELECTRIC CRANE.—Hydraulic and electric cranes are working side by side at the Middlesborough dock of the Northeastern Railway of England, so that their relative advantages can be tested. According to the *London Electrician*, the traffic department finds the electric crane to be of great advantage. The controlling of the crane by one handle is a distinct

advance both over the steam and the hydraulic cranes. The automatic cut-off in the electric cranes interrupts the current in one case at three tons five hundredweight, and the other at ten tons ten hundredweight, and this device prevents an overload on the crane. Should the current fail at any time, the brake on the lifting gear is applied automatically, and will hold the full load in any position in safety. To obtain some definite idea of the speeds of the various cranes when working under ordinary conditions, they were tested separately. The steam crane had a load of two tons put on, and this was lifted 30 feet, carried transversely through 106.5 feet, lowered 30 feet; light hook lifted 30 feet, carried 106.5 feet, and lowered 30 feet. The total time for these operations was 1 minute 44 seconds, or at a rate of 34 cycles per hour. The hydraulic cranes, under precisely the same conditions, occupy 1 minute 40 seconds per cycle, or equivalent to 36 cycles per hour. The electric cranes did the same work in 64 seconds per cycle, or 56 cycles per hour, and this is capable of being increased beyond even this point with a good driver. Therefore, in ordinary working, electric cranes are doing 50 per cent. more work per hour than the hydraulic or steam cranes. On actual test it was found that the electric cranes can be released from the rails, moved 30 feet, and refixed to the rails in three minutes. When it was necessary to remove the hydraulic cranes, to suit the work into the various ships' holds, six men had to be called out one hour earlier in the morning to set the four cranes which are required for each vessel. With the electric cranes the men need not be called earlier, since two men in summer and four in winter can disconnect and connect up four cranes in fifteen minutes. In winter, on frosty nights, four men have been employed six hours each for keeping fires to prevent water in the cylinders of the hydraulic cranes from freezing; with electric cranes there is no need for this. When the steam crane has to be gotten ready for work, the driver has to commence one hour earlier in order to obtain steam, whereas the hydraulic and electric cranes are ready for work at any moment. The actual saving effected by electric cranes in the cost of handling cargo is 25 per cent.

A SIMPLE PROOF THAT THE EARTH IS ROUND.—Although it was demonstrated more than 2,000 years ago that the earth is globular in form, there are certain persons who maintain that it is flat. About thirty years ago a controversy on the subject waxed so hot that it was determined to put the matter to direct experiment in order to settle the question once for all. The place chosen was near Bedford, England, where there is a straight six-mile stretch of water. At both ends and in the middle of this water posts were erected, each of the same definite height above the water level. Upon looking with a telescope along the tops of these three posts it was clearly seen that the centre one overtopped the others by about six feet, owing to the curvature of the surface of the earth. These experiments were recently repeated in a more scientific manner by H. Yule Oldham, who read a paper on the subject before the Glasgow meeting of the British Association. The same results were obtained, with the important difference that by the employment of a tele-photographic lens and camera the six-foot prominence of the middle post was recorded in an unmistakable manner.—*Philadelphia Record*.

LIGHTNING STRIKES A DYNAMITE MAGAZINE.—Lightning struck the magazine of the Kelley's Island Lime and Transport Company, a Cleveland corporation, in Marblehead, near Sandusky, O., Saturday night, July 9, and about twenty-five tons of dynamite and 200 kegs of powder in the building exploded. Every building in the village was damaged, and about 100 persons were injured.—*Exchange*.

A CASE OF LEGALIZED PREMATURE BURIAL.—As there is a law against burying in the city of Albany, the Bishop had to have a special act of Legislature to be buried in the Cathedral. He was successful in having the act pass the law-makers, but his friends were astounded and worried when they read its text. It began with the usual verbiage. The ending was something like this: "We do grant that Bishop Doane be buried within the precincts of the Cathedral at Albany. This act to take effect immediately."—*Lippincott's Magazine*.

ICE-MAKING IN INDIA.—Dr. Wells, a London physician, in 1818, in his published essay on dew, was the first to draw attention to the curious artificial production of ice in India. Shallow pits are dug, which are partially filled with perfectly dry straw. On the straw board, flat pans containing water are exposed to the clear sky. The water, being a powerful radiant, sends off its heat abundantly into space. The heat thus lost cannot be replaced from the earth, for this source is excluded by the straw. Before sunrise a cake of ice is formed in each vessel. To produce this ice in quantities clear nights are advantageous, and particularly those on which practically no dew falls. Should the straw get wet it becomes more matted and compact, and consequently a better conductor of heat, for the vapor then acts as a screen over the pans, checks the cold and retards freezing.—*Boston Transcript*.



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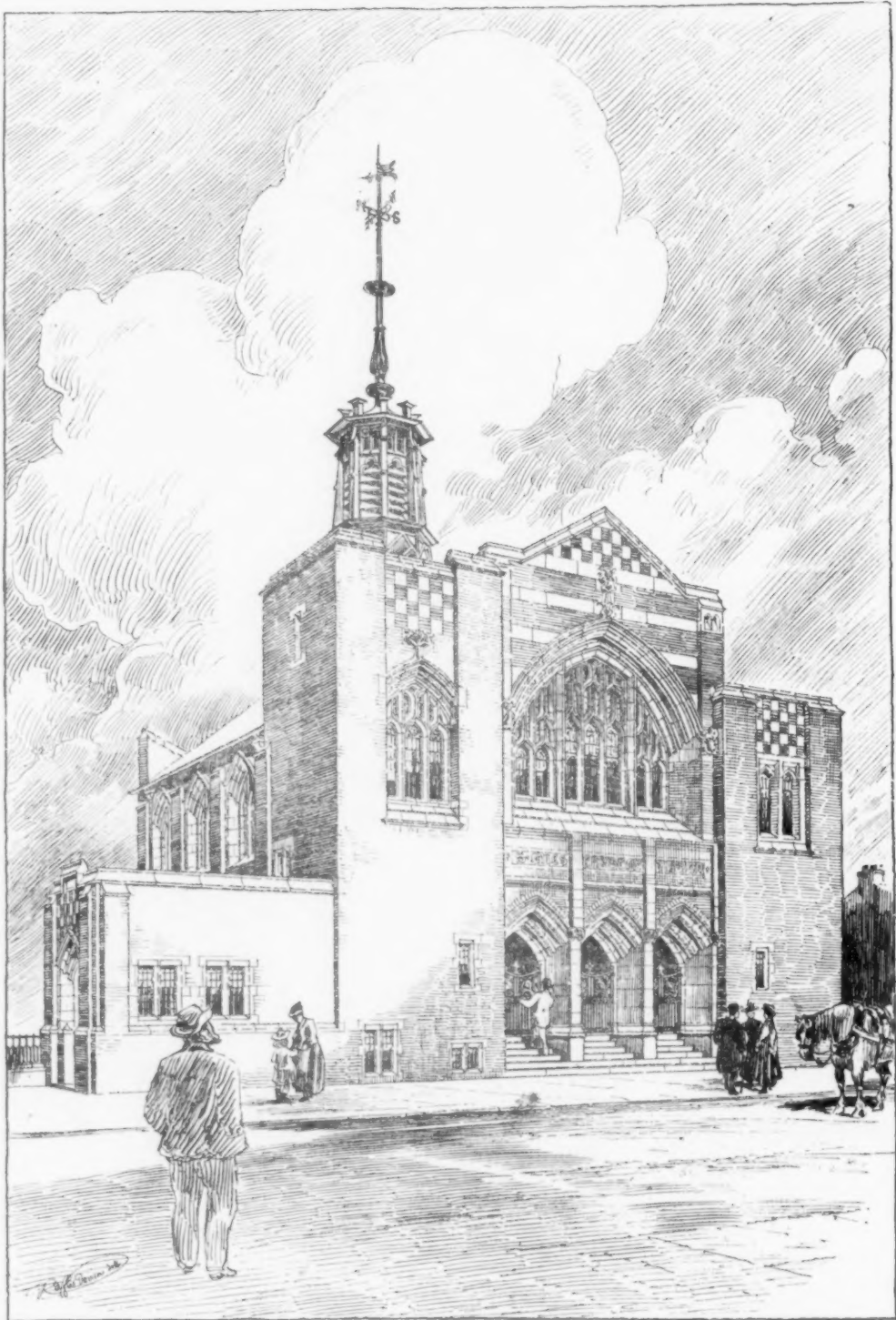
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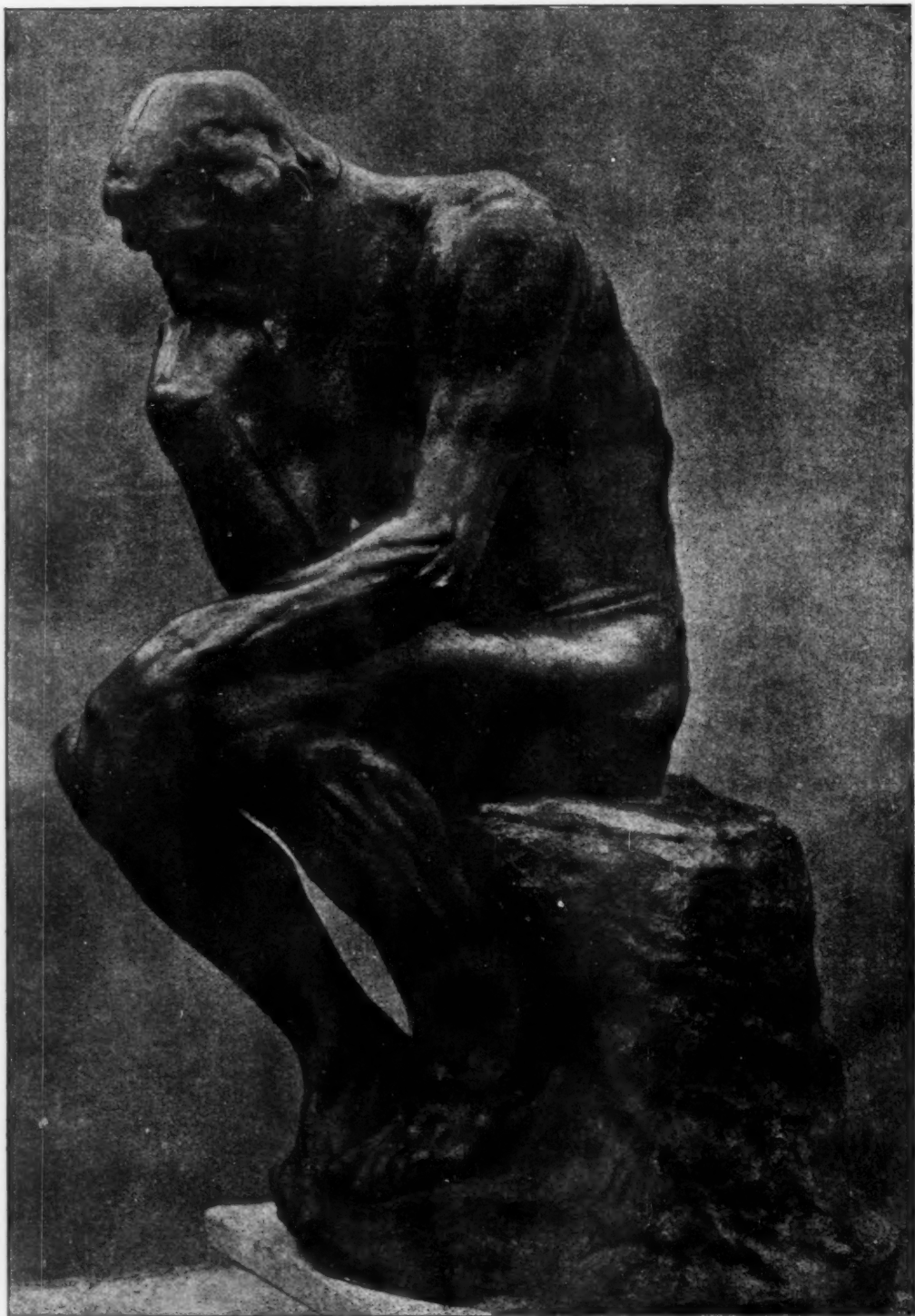
The American Architect
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From The Architect.

St. Giles's Mission Church, Great Wild St., London.

Ernest Runtz and Ford, Architects.



"LE PENSEUR," AUGUSTE RODIN, SCULPTOR.

FROM ART ET DECORATION.

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SCULPTURE AT THE LAST SALON.



"A PULL AT THE COLLAR," G. DEBRIE, SCULPTOR.



A FOUNTAIN.
JULES DALOU, SCULPTOR.



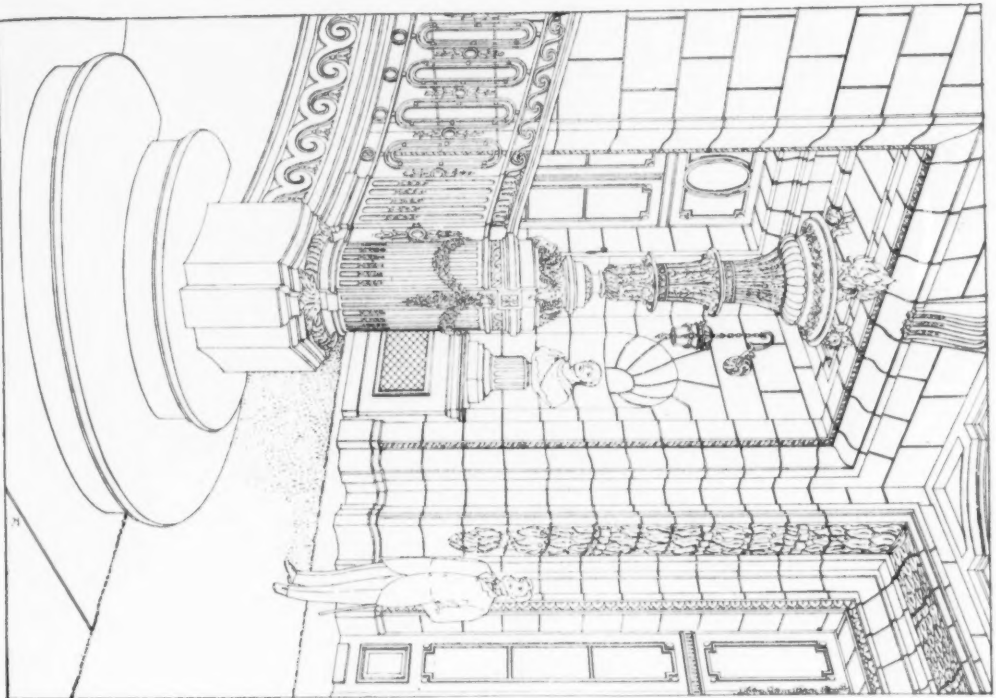
HIGH-RELIEF FROM MONUMENT TO LEVASSOR.
E. DERRÉ, SCULPTOR.

FROM ART ET DECORATION.

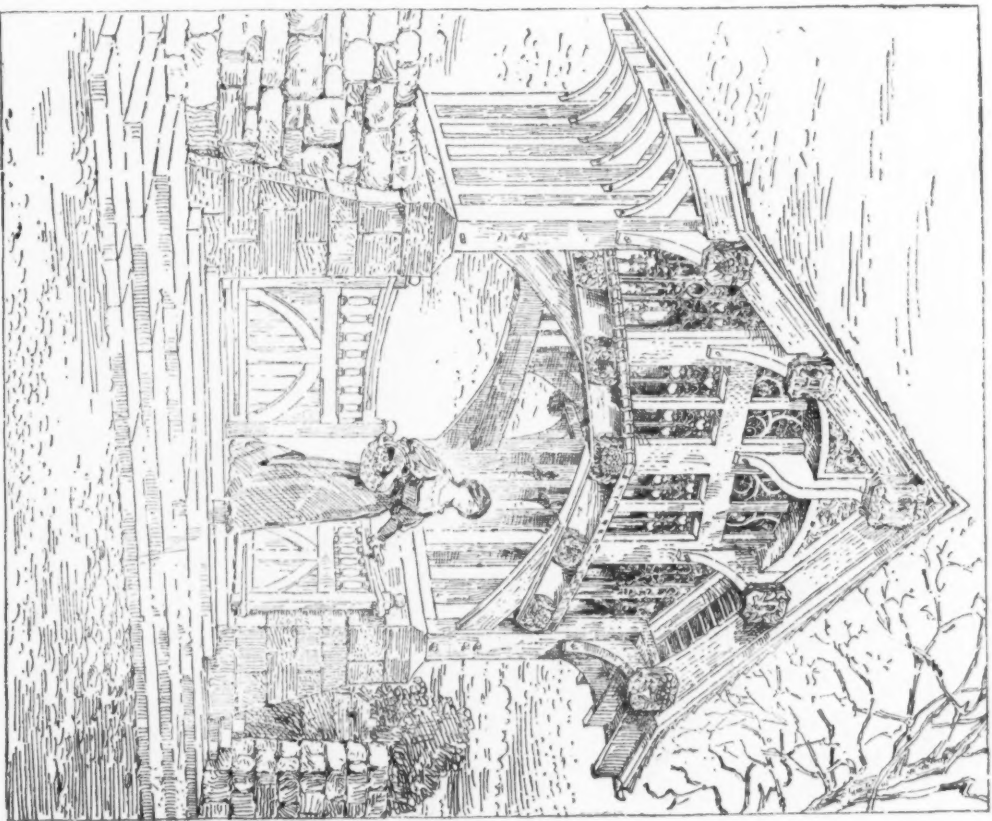
SCULPTURE AT THE LAST SALON.

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From *L'Architecture*.
Newel-Post: Hotel at Neuilly-sur-Seine, France.
 R. Bowers Van de Boven, Architect.



From *The Builder*.
Lyth Gate, Bramham, Eng.
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