THE
WESTERN ARCHITECT

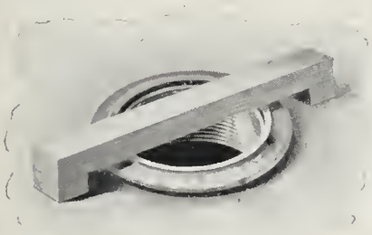
MINNEAPOLIS AND SAINT PAUL
VOL. IV. No. 1 JANUARY 1905 $5.00 A YEAR

THE SANITARY-PERFECT

SCREW CONNECTION

Connecting Closet direct to soil pipe without rubber gasket and bolts.

In these days of almost perfection in sanitary science, the connection of the water closet to the soil pipe may be looked upon as the one weak spot in an otherwise almost perfect system of house plumbing, the one connection that cannot be relied upon under all conditions.



This Gauge (sent with each closet) determines the hight of thimble above floor.

That absolute security is assured, and the question of careless or unskillful work disposed of by the Sanitary-Perfect Screw Connection, must be admitted by all; moreover, those who have seen and used this device, do not hesitate to say that it solves the question of water closet connection, and state, furthermore, that knowing such device to exist, they would feel in duty bound to recommend the same to their clients as the only perfect connection which they could guarantee under all conditions.

USED THROUGHOUT

Marshall, Field's New Retail Store, Chicago. New First National Bank Building, Chicago,
United States Government Buildings, Fort Sheridan, Ill.

Imperial Porcelain and Colonial Urinal

Plate 6065-R

Plate 6065-R is an admirable combination in every way and will appeal to architects, sanitarians and plumbers. The all-porcelain feature of the "Sanito" urinal is clearly indicated by the illustration. The back, sides and bottom are of one solid piece of heavy glazed porcelain, non-absorbant and impervious to the action of urine. Each time the cistern discharges, all parts of the urinal that come in contact with urine are thoroughly flushed, the proper distribution of the water being effected by the nickel-plated brass spreader. The fronts are half-rolled—that is, the inner half has full-round corner with inward projection so that water from the flushing spreader will not splash outside the urinal. The sides of the urinal are ground so that they will fit up snugly against the partitions.

The "Sanito" No. 2 Urinal is especially adapted for use in office and public buildings where the available depth below the floor is limited. The installation is exceedingly simple and inexpensive.

The "Sanito" Urinals have been installed in many of the Public Comfort Stations in Greater New York. The J. I. Case Threshing Machine Co., Racine, Wis. Kuntz-Remmler Co., Chicago. J. L. Stillson Co., Chicago.

THE J. L. MOTT IRON WORKS

90 Beekman Street, NEW YORK 135 Adams Street, CHICAGO

PUBLISHER'S DEPARTMENT.

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THE WESTERN ARCHITECT PUBLISHING COMPANY.

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J. WALTER STEVENS, St. Paul, Secretary.

F. A. GREENLAW, Treasurer and General Manager.
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A BUSINESS AND ARTISTIC TRIUMPH.

The holiday edition of "The Northwestern Miller" is undoubtedly the largest, most attractive and most costly number of a periodical ever issued in the United States. It would require the usual edition of an ordinary publication to adequately describe the splendid effort—its real magnificence; for no word but "magnificent" is appropriate. Just as Minneapolis is the greatest flour-manufacturing center in the world, so is "The Northwestern Miller" without a rival or even an imitator. Indeed, as a business enterprise alone it has become, through the wise and energetic management of Mr. William C. Edgar, a leading concern in the Northwest; and the interests which it represents recognize it as the only authority upon which they can implicitly rely.

"THE TIE THAT BINDS."

The "Imperial Spiral Lath" was the only backing that stood the extraordinary heat in a recent trial where blowpipe heat (the most intense possible) was used to test asbestos theater curtains, This lath (manufactured by the Imperial Expanded Metal Co., 1538 Monadanock Building, Chicago), can be fastened with staples, rough side out, on any brick wall without furring. Owing to the spiral twist the plaster is held firmly in place. One of the very great advantages of the "Imperial" is its flexibility which permits of its being moulded into coves, cops, etc. When fastened upon the studding it presents its entire surface to the trowel (the same as the wooden lath), and the plaster at once adheres and does not push through and fall off; and it is therefore a great saving of mortar. A special feature of this lath, is that the metal is cut cold without being subjected to a pickling process, and therefore, it will not rust. All in all, the spiral twist is not only "The Tie That Binds," but is also the "Tie that insures"—against fire.

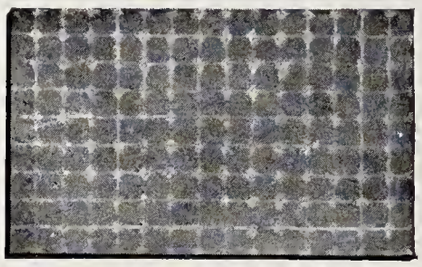
GRAND PRIZE WINNERS.

While the American Radiator Co., of Chicago, received the Grand Prix at the Paris Exposition Universelle in 1900, a more important recognition of the merits of their "Ideal Boilers" and "American Radiators" was the winning of the Grand Prize at St. Louis. Undoubtedly the "Colonial Model House" exhibited at the great exposition was in itself educational to the judges who made the award, as well as to the countless thousands of persons who desired to see and study the most perfect system for heating homes by the use of steam and water. The mechanical excellence and artistic aspect of the warming apparatus installed in the "Model House" certainly won general public appreciation as well as official approval. The company has recently issued a very pretty wall hanger, for gratuitous distribution, which fully illustrates (in colors) the "Colonial Model House," and which, upon inspection will serve, better than words, to convey an idea of the merits of the American Radiator Company's system.

THE RIGHT KIND OF PACKING.

The advent of superheated steam in power plants has brought the engineering profession face to face with a new problem in the packing line. The temperature generated in the use of superheated steam makes it absolutely necessary to use a packing that possesses the highest heat-resisting qualities.

Asbestos being the ideal material for this purpose, the H. W. Johns-Manville Company of New York have made extensive, practical tests with their well known "Vulcabeston" material with the result that superheat experts have decided that it is the only packing now on the market that is perfectly satisfactory for this condition.



"Vulcabeston" packing is "Asbestos" fibre combined by a patented process with vulcanizable compounds and graphite which imparts great strength, pliability and compressability, combined with the high temperature resisting properties of "Asbestos" and graphite.

"Vulcabeston" is furnished in sheet, moulded ring and special forms for joints, moulded concave and convex rings for movable rods and valve stems, twisted and braided rope form for stop valves and special extra-graphite form for work on steam turbines.

"Vulcabeston" has been adopted by the largest superheated manufacturers in the United States and is used in nearly every large power plant where superheated steam has been installed.

The manufacturers have published an attractive pamphlet descriptive of the various forms of "Vulcabeston" packing for superheated steam which can be had upon request.

CONCRETE HOLLOW WALL CONSTRUCTION.

Centuries ago concrete was a favorite building material. The great dome of the Parthenon, at Rome, was built of concrete; and now, after two thousand years of exposure to the elements, it shows no signs of decay. At this time, there is what may be termed a revival of the use of concrete in building operations, particularly in the United States. The essential elements of durability and economy in building construction are combined in concrete as in no other material. Some recent estimates of the cost of construction of a building of a certain size and for a commercial purpose, showed that it could be built of concrete for 20 per cent less than if built of lumber, and for less than 50 per cent of the cost of a brick structure. It is daily becoming more and more evident that concrete will soon practically revolutionize building operations throughout the entire country. It becomes, therefore, a matter of importance for every architect and builder to familiarize himself as quickly as possible with every new phase of concrete construction. Something which is particularly worthy of the close attention and study of every person interested in building construction at this time, is the systems and machines for building continuous hollow concrete walls, and among them all there is none so good or reliable as that which is supplied by the Concrete Hollow Wall Construction Co., 1520 Ashland block, Chicago, Ill. A letter to that concern will secure a booklet free which contains information of exceptional interest and value. Any person who contemplates building, or persons who desire to know something of a machine which they might desire to become the agent of, should address the above named concern at once.

AN ATTRACTIVE STORE FRONT.

The illustration given herewith represents a particularly attractive store front designed by Mr. A. Meier, architect, of St. Joseph, Mo., and built by Mr. G. M. Voltz of the St. Joseph Plating and Mfg. Co. Mr. Voltz, as the patentee of the "Universal Sash Bar," "Modern Brass Thresholds" and other important features in modern building, by personal endeavor, has developed

his company, (The St. Joseph Plating & Mfg. Co.), into one of the largest, most original and most reliable manufacturers of store fronts, rails and fixtures, thresholds, electro platers, sash bars, etc., etc., in the entire west. The illustrations indicates that Mr. Voltz makes a specialty of curves and angles and their supports; and with the use of his sash bars the gathering of frost upon the glass is prevented. The illustration shows better than words can describe just what Mr. Voltz is able to do in the way of putting in store fronts where glass is the principal material, and where it creates the most artistic effects. The front shown in the illustration was put in complete in two and one-half days. If architects and builders will submit their blue prints to Mr. G. M. Voltz, St. Joseph, Mo., they will receive suggestions of value in workmanship, economy of construction, attractiveness and saving of time and labor. In the line of show cases Mr. Voltz's work is exceptional; for with his method no ventilation is needed, and the glass will not frost under any circumstances.

A GREAT RECORD.

The Cement Machinery Co., of Jackson, Mich., manufacturers of Normandin cement-concrete construction block machines, made an enviable record at the recent great exposition at St. Louis. Not only did the "Normandin" machine receive the highest award in its class, but, what to every architect and builder is of still greater consequence, its product was given the highest awards in the Department of Mines and Metallurgy. Something which even surpassed in real importance the awards themselves, was the fact that the three machines which the company exhibited, were at the close of the fair immediately sold to different large contracting concerns in St. Louis. If history is now about to add to the "stone age," the "bronze age," the "iron age" and the "cement age," their every improvement in machines, which make better materials for use in the "Cement Age," must be received with enthusiastic approval by architects and builders; and every person who is so interested should avail themselves of the opportunity to address the Cement Machinery Co., Jackson, Mich., and receive the company's latest catalog. It contains so much useful, scientific and practical knowledge that every person in any manner interested in building should send for the catalog.

PROOF OF PROSPERITY.

The constantly increasing business of the Standard Sanitary Mfg. Co., of Pittsburgh, has necessitated larger and more commodious quarters for the concern, and it now occupies the entire top floor of the Bessemer building, corner Sixth street and Duquesne Way. In these fine, new offices there are ample and special accommodations for visitors, and all architects, members of the plumbing trade, builders, etc., are cordially invited to make themselves at home there when visiting Pittsburgh. The new Bessemer building is one of the most stately edifices of Pittsburgh, and the occupation of an entire floor by the "Standard" company is a proof of prosperity which its almost innumerable friends are glad to see.

Gust Lagerquist, the well-known elevator manufacturer, at Fifth street and Third avenue north, Minneapolis, is running his factory to the fullest capacity now on account of the large number of orders he has lately secured for his various elevators and among which may be mentioned the following: Simonson Bros. Manufacturing Co., an 8x16 freight elevator; in the McKnight building a 5x6 electric direct connected passenger elevator; a freight elevator in the Northwestern Knitting Works; one in the Masonic Temple building, and one in the Northrup, King & Co. building, 32 Hennepin avenue; a large 8x16, heavy electric freight elevator for the new implement warehouse being erected by the H. N. Leighton Co. at 708-10-12 South Third street, and a hand elevator in the Heywood Mfg. Co.'s building, 420 North Third street.

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A UNIQUE CALENDAR.

The American Sheet & Tin Plate Co., of Pittsburgh, Pa., has issued one of the most unique and serviceable calendars for 1905 that we have ever seen. It is styled the MF Roofing Tin Calendar and will be sent to any one who will send their name, business and address upon a postal card, and mail the same to the Advertising Department of the American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa. The calendar is of unique make and a convenience worth having.

OPPORTUNITY FOR CONTRACTORS.

The Brayton Engineering Co., New York Life building, St. Paul, Minn., is prepared to make arrangements with a contractor in each city in the United States and Canada, whereby the local contractor or agent will specially represent the company and erect all structures, built upon the Brayton System, for which designs may be furnished. This affords a rare opportunity for contractors to become identified with a first-class concern.

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Through palace sleeping cars will leave St. Paul at 9:00 a. m., Minneapolis 9:35 a. m., except Sundays, making connection in Kansas City union depot with "California Limited" and "Golden State Limited" trains. This is the only line operating sleeping cars connecting with the California limited trains. For tickets and berth reservations call at Minneapolis & St. Louis ticket offices.

Mr. Jessie T. Johnson, has succeeded to the office and business of the late firm of architects, of Dupont & Johnson, 1113 State Life building, Indianapolis, Ind., and would be pleased to receive catalogues and literature pertaining to building material and supplies.

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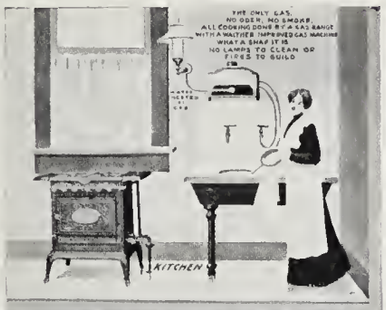

One of the strongest and most brilliant lights that can be made is made by this machine. It costs less than one-third of kerosene oil. The gas is made from gasoline with a cold air generator. No heat or fire of any kind used for generating the gas, making it absolutely safe from danger. The gasoline is put in a steel tank that is placed out doors under ground. The cost per light with a Welsbach burner for an 80 candle power is about 1-5 cent per hour.

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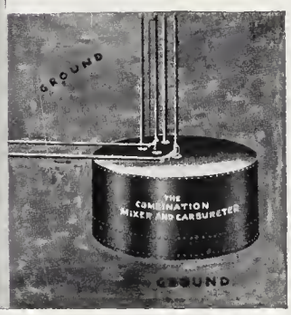
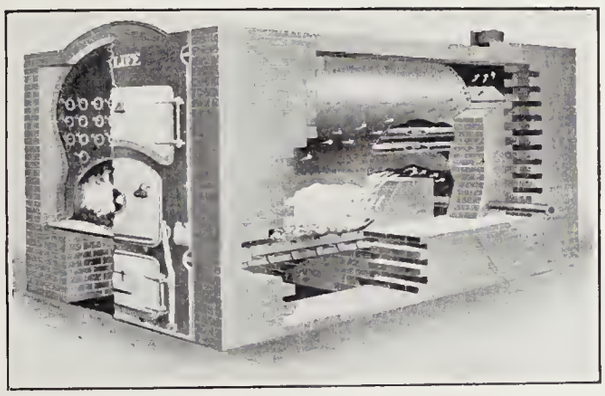


New Life and Steel Boiler



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The Western Architect

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DEVOTED TO ARCHITECTURE AND ALLIED ARTS

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THE second annual exhibition under the auspices of the Minnesota State Art Society will be held at the Library Building, at Winona, Minn., from Saturday, March 18, to Saturday, April 1, 1905, inclusive. The entire collection, before being sent to Winona, will be placed on view at the rooms of the State Art Society, in the new capitol, St. Paul, from Monday, February 20, to Saturday, March 4, 1905, inclusive.

IN a St. Paul case, the Minnesota Supreme Court has decided within a year that a city has, under its police powers, the right to prohibit the "dense smoke" proscribed by the ordinance, and the court then quotes and indorses a decision of the Illinois supreme court in a Chicago case, wherein that court says that it is not called upon to define or make an unusual ruling as to what constitutes "dense smoke," that such smoke as constitutes a nuisance in a neighborhood is within the understanding of every one and cities have the right to prohibit it. The court then intimates that it would not hold a prohibition of the use of bituminous coal to be within the rights of a city, provided the user employed such devices and skill to prevent smoke as were well known to exist.

ST. PAUL'S Builders' Exchange, which has reached a membership of 320, representing 175 contractors and firms, under Secretary William's regime gave its third annual banquet at the Ryan on the 11th instant. Countless builders gathered at the tables and were regaled in every way, the governor and the mayor adding words to all the other good cheer.

MILITARY architecture, both afloat and ashore is suggesting the turtle in more ways than one. Not only does the naval specimen "turn turtle" but both fixed and floating fortress are so much more vulnerable from the under side. At least three battleships of the first class are said to be at the bottom of the seas about Port Arthur by reason of striking mines, and all of the late successes of the Japanese by land have been made possible by breaching the walls of fortresses from below. Neither of the battleships appear to have done the other fellows much harm, but the land fortresses, what was visible of them, had withstood everything that artillery could do for months before they succumbed to the old trick of the mine. No pneumatic spring bottom for either class of structure has yet come into use, that will pass up these shocks from beneath without harm.

PORTLAND cement enthusiasts, not content with efforts to displace stone masons, brick masons, structural iron men, makers of roofing tiles and such, now propose to drive cut stone men and ornamental terra cotta workers off the earth also. One of them gives out that with Portland cement and ground limestone of just the right sort, he can pour into water molds faced with very nice white sand such a pouring as will harden into ornaments handsomer, more durable, more fire-proof than either cut stone or terra cotta. The sand papery surface will, he thinks, be sure to take, and as to cost, these things will be so cheap that we may all have all we want of them—perhaps more.

Be this as it may, there is not only room but urgent need for a new trade in towns of any size. So many things need to be done nowadays that can be done more readily and cheaply with Portland cement at its present price than with anything else, that men who know how to handle it properly and who can read drawings are in constant demand. The latter qualification is much rarer than those who have not hunted for it would be inclined to believe.

Municipal art societies at the national capitol have not yet recommended a site for the whipping post, but in the absence of precedent it looks as if the choice of location would lay between the approaches to the White House and the capitol.

Solid progress in business affairs is oddly enough so seldom accounted for on a rational basis, that one would suppose that a large part of the public had forgotten that it depends upon substantial net returns for productive effort. The producer, if he be a farmer, is not to be envied if he gets good crops and prices and has to give his profits all over for rents, taxes and transportation charges, but he needs the good prices and crops any way. In spite of the great movement of population to cities, the west and south remain so largely agricultural, that a satisfactory state of business among farmers is needful to substantial progress. In the west most farm staples command good prices, but in the south the prices of cotton have fallen to a distressingly low level. These conditions cannot fail to effect general business in the two sections. Another reason that the west begins the new year in good form is that, so far as known, no great speculative movement finds support in the region. It is true that railway building, both steam and trolley, has been greatly repressed in the area of the big merger of late years, but that condition cannot long be maintained, and the section will profit accordingly when the break comes.

Insurance men are in a quandary as to the rates to be made on hollow cement block structures. The subject is made no clearer by their experience in a late fire in Oklahoma where the walls are said to have collapsed from the effect of a fire that left the window sashes and frames practically entire. Insurance agents are not all building experts, and as things go they make the rates they are allowed to make upon buildings of a given description and have small knowledge as to whether they are well, or illy built. When it comes to a cement block, few of them would know whether it was well made of Portland cement and good sand, or whether it was compounded of gypsumish stuff and whatever else came to hand. Of course fires show that many a brick wall is far from what it seemed, but insurance men know how they average. This new field of cement blocks worries them, and it is quite as well that such constructions are to be confined to small structures.

Loan agents are also likely to find more or less obstructions in the way of getting money for the promotion of these hollow cement block ventures. This department recently cited the case of the capitalist who was being importuned to loan upon one of these structures, and asked if this was not an "artificial stone." He had had experience with such and wanted no more. If makers of these hollow blocks would combine to insure quality of output, they might advertise their wares very favorably. They probably would not find laws to enable them to prosecute makers of bad goods, but they might perhaps secure the passage of such acts. To make unsafe building blocks, is not so much better than to adulterate foods.

Minnesota's new capitol building, to which state officials are just now adjusting themselves, meets with the usual amount of newspaper criticism, mainly inspired by the difficulty on the part of officials in making themselves fit. Real criticism will come later.

Agitation over the smoke nuisance of bituminous towns is somewhat spasmodic as well as epidemic in its nature. Just now it is the good fortune of the public that there is something doing in that line, and if anything more permanent comes of it let us give thanks. The fact that it is primarily a nuisance in the eye of the law is continually lost sight of, while lax officials add obscurity to the situation by pleading want of authority from ordinances. Laxness is a quality in which the public partakes as well. Why should A. who has a costly stock of goods for the retail trade continue to suffer damage to his stock from the soot nuisance when he and all concerned can look out of his windows and see smoke stacks belonging to B. and C. belching the stuff that blows through his shop and begrimes his goods, and when his attorney will tell him that the situation furnishes a good case against B. and C.? Does he think it a part of his duty as a citizen to suffer calmly until others succeed in getting the authorities to move? We have known an attorney, annoyed by soot from a chimney over the way from his office, to send, lawyer fashion, for the offender, and when he appeared in answer to the message, to call his attention to the law in the case in a way that led to genuine anxiety to be good, lasting for months. We have known city authorities to go about among the down-town chimneys, and without actually making an arrest, to get the smoke nuisance abated by fully two-thirds. Some of the offenders would confide to each other, meanwhile that they let her smoke o' nights, but even if true, the offenses would do far less harm than during the day, as far less fuel is used during night hours.

Before everything else, people who want the smoke nuisance abated must remember that the offenders have no case. To plead that "smoke consumers" or suitable stoking are more expensive, is not a defense even if proven. It is true that there are more devices for consuming smoke that do so at some expense in fuel, than there are which do not, but it is not true of all, and heating engineers are well agreed that proper stoking will nearly cure the evil.

The smoke evil is at bottom a bad habit, but luckily for American cities anthracite coal has in the main kept the domestic chimney from joining in. As this practically confines offenses to big buildings and locomotives, one would suppose the situation to be so simplified as to be manageable, and that a self-respecting community would be as particular about a decently clean atmosphere as about decently clean streets. Perhaps in time this will come to be the case, but down to date it seems necessary to apply legal pressure to most owners of large heating and power plants before they will be good. Good smoke ordinances help in this; probably bad ordinances hinder; but neither is necessary while the pressure is, with a proper seasoning of "eternal vigilance."

One coroner's jury has shown a suitable appreciation of the way things come to pass and has spoken right out. In the December fire in Minneapolis, resulting in the loss of ten lives and considerable property, much effort was made to shift the responsibility, mainly to the shoulders of the building inspector. Two five-story brick buildings were situated along Fifth street and nominally divided by an alley of perhaps fifteen feet in width. A fire broke out in the smaller, commonly called the O. H. Peck building from its principal tenants, and after a time, extended across the alley to what for the like reason is called the Boutell building, being mainly occupied by Boutell Bros., as a retail house-furnishing store. Boutell Bros. also occupied the rear portion of the Peck building and had connected the two buildings at different levels by wooden run-ways or bridges, with so-called fire doors at either end. Starting in the Peck building, the fire, at one time nearly under control, gained access to an elevator shaft and soon had its way with that building. Beside the run-ways, both alley walls were plentifully pierced with shutterless common windows. After burning for a time in the Peck building, the fire reached the Boutell building, breaking out everywhere with such speed that two firemen lost their lives in the effort to escape. The fire was now, by the hardest kind of work, practically confined to this Boutell building, which was wrecked in an incredibly short time. Portions of the lower three floors of the Peck building remained after the fire, and the entire front and rear walls as well as the party wall on side farthest from the alley. Portions also of the Boutell street walls remained and were at once ordered to be taken down.

Scaffolding for this work was hardly built when a high wind at night blew across the wreck of the buildings, leaving the scaffolding and dangerous street walls standing, and throwing down the upper stories of the long party wall of the Peck building, part of it crushing through a three-story hotel and killing eight lodgers.

From the evidence given, the jury found that a falling floor in the Peck building forced the flames through these run-ways in such volume as to cause the peculiar ignition of the Boutell stock and the consequent loss of the firemen and great destruction that came to the building; that these run-ways were put in by special permit obtained from the city council; and that except for them, enough of the Boutell building would have remained to break the force of the wind that threw over the wall upon the hotel, killing the lodgers. This wall, about 157 feet long, was an ordinance wall, the upper two stories which fell being 12 inches thick, and had been endorsed as safe by plenty of experts. Whether this endorsement went so far as to advise that it remain to be used in rebuilding is not clear, but in any case, the time between the fire and the wind was hardly sufficient to have taken down any part of this wall, and the street walls appeared so much more dangerous that work was naturally hurried there.

The only question affecting the judgment of the building inspector is, should he have ordered the hotel and stores underneath vacated until the wall was taken down? Probably nine out of ten familiar with buildings, would have said before the accident that such a precaution was not needed.

Whether all these evils may justly be laid at the door of the city council because of the run-ways existing by their special permit, is of course debatable; but this permit is only one of their minor lapses in the same direction. Across the street from the Boutell building, is a department store housed in a building from 150 to 160 feet square topped out with a rubbishy Mansart roof. Some years after this was put up by special permit without a fire wall, it was allowed to be extended clear through the block along its center, making an L-shaped building perhaps 330 feet at its longest, all without fire walls. The heat of the Boutell fire ignited the Mansart roof, which luckily had been converted from a sort of attic into a fourth story and equipped with sprinklers which effectually checked a fire, that without the sprinklers, would doubtless have got the better of the department and become general. Instances of still worse infractions of the building laws might be given. Not long since, a case of minor importance was brought into court, and the council was plainly told that they could not help to violate their own laws by special permits—that if they take down the bars for one, they must leave them open for all. This decision and this verdict will doubtless reduce the special permit evil—for a time.

This halftone shows a corner of the Boutell Bros. building after the fire referred to in another column. Across the street is shown one front of the department store building covering something over 30,000 feet of ground without a fire wall. The holes burned in the metal covered Mansart roof by the fire over the way, have been repaired with boards. The attic of this building had been fixed up and was used, the whole being well equipped with sprinklers. In the opinion of insurance men, these sprinklers enabled the fire department to control the fire at this point and saved the city from a general conflagration.

Projects for very large expenditures on railway terminals are announced for the near future. New York, Chicago and Buffalo are to be specially favored, the last city with an outlay of some $15,000,000, which although a smaller sum than any of the others named, is to be for a union station, with such accessories as such a project demands. A shrewd observer has pointed out that the experience of American cities with pretentious union terminals has heretofore been most unfortunate, as such enterprises have been unable to surround themselves with private business of an attractive nature, but on the contrary the approaches to all such continue to be of a sort to give the visitor a bad first impression of the city. Several reasons for this state of things might be given, but the smoke nuisance attaching to American railway traffic, is alone sufficient to drive everything attractive away from the vicinity of the railway station, not only making even respectable displays by retailers out of the question, but defacing everything of a decorative nature in an architectural way and making mournful failures of all attempts at lawn bloom or trees. If we include with the smoke nuisance the various noises of the steam locomotives, nothing more will be needed to account for the desire of people upon arriving at a large railway station, to put a goodly distance between themselves and the station before they rest, or conduct business.

That electric traction for the city ends of heavy railway traffic will soon be substituted for steam seems to be assured, and when this is done the reformation of the approaches to city railway terminals will become practicable. The Cleveland project for solving this problem, although still in the paper stage and much more comprehensive than practicable for most cities, will yet furnish good suggestions to all. So many fairs and expositions have had their way among us of late, that everybody is now expecting more of the grandiose and formal in municipal improvements, and important traffic terminals can no longer be left out of the reckoning when the larger interests of cities are enumerated.

Prof. Robert Koehler, Mr. Ernest Kennedy and Mr. W. M. Kenyon, who consented to act as a jury of award in the junior competition for the title page of the Western Architect, have placed the design of Mr. Thomas A. Cresswell first, that of Mr. Flint Stone, Jr., second, that of Mr. C. B. Chapman third, and made honorable mention of the design by Mr. M. F. Maine. Reduced copies of these Drawings will be published in our next issue, and the design placed first has been adopted for use.

Mr. J. R. Towne, of the Yale & Towne Co., was the guest of honor at a dinner given by W. K. Morison on the evening of the 9th at the Minneapolis Club. Besides Mr. Towne and several members of the Morison house, enough architects were present to fill the table round. After lighting up, Mr. Towne explained a great many things about how hardware is made and why it sometimes takes so long to make it.

ACCORDING TO ORDERS.

By Margaret Johnson,

In Architects' and Builders' Journal.

To the Architect's office, the Millionaire
  Climbed merrily up the winding stair.
"I have found," said he, "by the shore of the sea,
The jolliest place for house to be,
  On the edge of a picturesque jungle, O!
I know how I want it—don't *you* interfere!
A portico there and a chimney here—
I'll make you a plan, Mr. Architect man,
And then by my orders, as well as you can,
  You shall build me a sweet little bungalow!"

The Architect bowed—he was poor, though proud—
And the house arose like a Summer cloud.
But, at last, to visit the spot allowed,
He tore his hair, did the Millionaire,
And the language he used in his fierce despair
  Was innocent wholly of gilding, O!
"What a horrible mess you have made!" he cried.
The roof is too low, and the chimney too wide!
You can't get in and you can't get out—
Pray, what in the world were you thinking about,
  To build such a botch of a building, O!"

Then the Architect hid, as architects may,
The fiendish joy in his heart that lay;
And, "Alas!" said he, "I am grieved to see
Your dream is not all that a dream should be,
  Of a house on the edge of the jungle, O!
But as for me, I have done my best
To follow your very unique behest:
You made the plan, Mr. Millionaire man,
And I think you'll admit that—as well as I can—
  I have built you a sweet little bungle, O!"

POWER OF PUBLICITY.

Advertising, brains, competition are the alphabet of the progressive business man. Without them his career may be accounted short-lived. Primarily comes publicity. A man who does not in some way make known his business to the world of buyers is practically out of the race for success. It is admitted by those who have thoroughly tested the various means of publicity that newspaper advertising is by all odds the most effective. Sometime since a western firm, doing a large business in commodities of daily consumption, was convinced of this. It had conducted its business through letters, circulars and personal solicitation. An advertising agency made overtures to the firm to induce it to use newspaper space. It reluctantly consented as an experiment and advertised an article that had not previously been on the market. To make the test complete the drummers of the firm made no effort to introduce the commodity nor induce sales. Yet within three months the demand for this article was greater than for any other on the firm's list and the demand was attributable solely to newspaper advertising. This firm is today a strong advocate of press publicity. Many producers and contractors interested in building are not awake to the possibilities presented to increase business by advertising in the trade papers devoted to their lines.

AN APPEAL.

"What will I gain, personally?" is a question with which one is frequently confronted when appealing to architects to become affiliated with the Minnesota chapter, and particularly with the American Institute of Architects. To answer this question is easy, but not always convincing to the questioner.

All men agree that in numbers there is strength, and further, that only through united effort is any desirable end to be attained. These conceded facts explain the existence and success of our great fraternal orders, and the philosophy of the proposition is obvious. But with the professional man something of a higher order should be equally self-evident and demonstrable. While the association of architects for mutual good has possibly not been as productive of better conditions in practice as was desired, it is certain that existing conditions are much superior to those of ten or twenty years ago, and that the tendency is upward, not downward.

The "esprit de corps" so much in evidence at the annual gatherings of the Institute and similar bodies, through which so much has been effected for the betterment of architectural practice in the U. S. A., is cause for congratulation. The effect of the Tarsney Act has not been all that was anticipated, but it is certain that our government is today planning and erecting buildings of higher artistic merit, than since the days of Washington. This is to be credited mainly to the good influence of the American Institute upon legislation, and to the appointment as supervising architect of a man in thorough sympathy with the act and with the Institute.

Among other subjects to be discussed at the thirty-eighth annual convention of the Institute at Washington, D. C., this month are: "The Relation of the Architect with the Government," by Mr. Post, and the question of the selection of architects for government work by competition, or by direct appointment, Messrs. Jamieson and Pond on the former, and Messrs. McKim, Hastings and Hornblower, upon the latter. These discussions will probably bring out the best points for and against existing conditions. We apprehend that the older men will oppose competition because experience has demonstrated that dissatisfaction generally follows, while the younger men will probably favor them, with proper restrictions to exclude those who depend upon political or personal influence, rather than experience or fitness, to secure the work. The personal equation, here as elsewhere, is what makes the open competition so uncertain and so generally unsatisfactory; if assurance of absolutely fair and impartial enforcement of conditions can be relied upon, it will be esteemed an honor to be invited into competitions and the results will be more generally satisfactory.

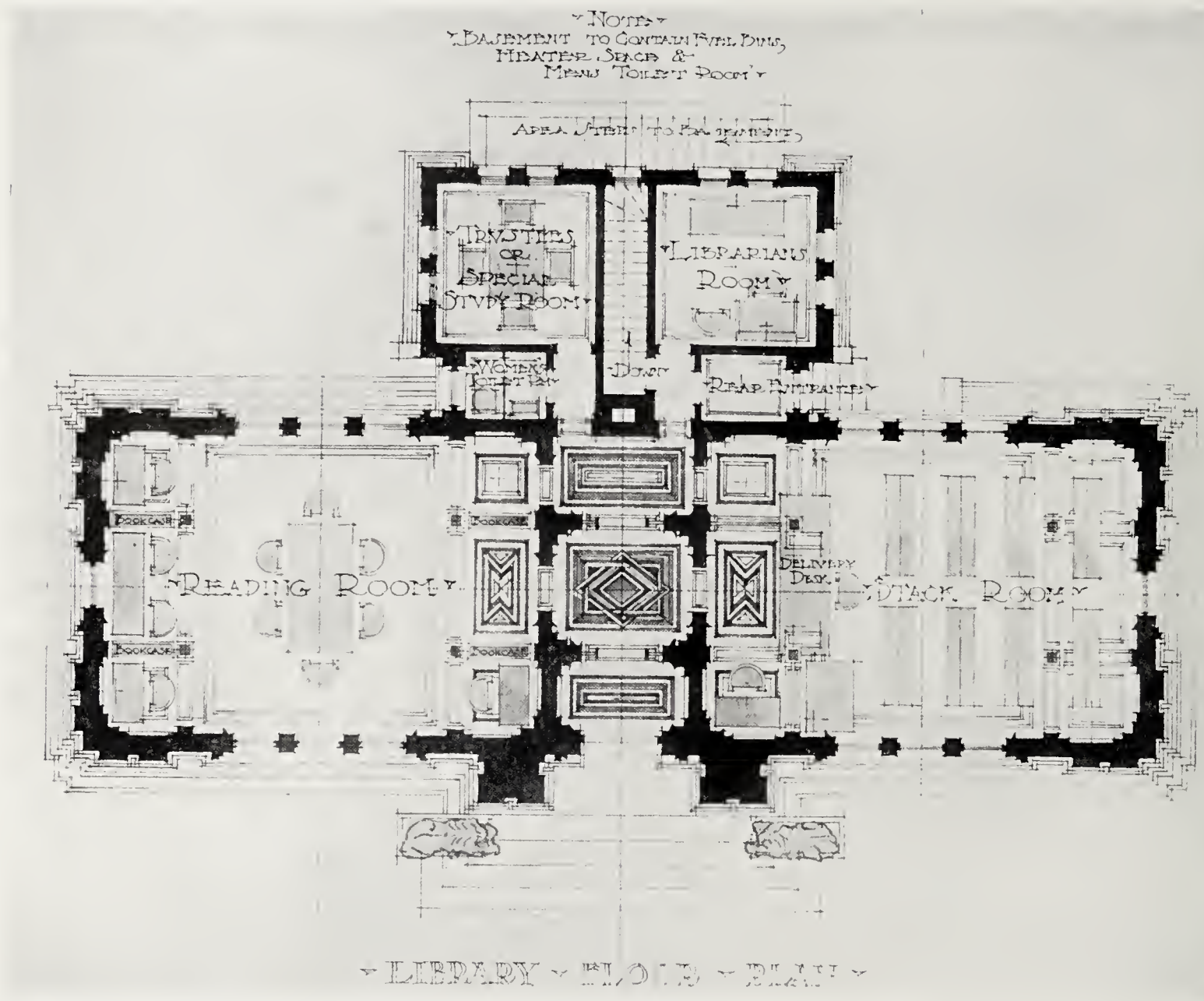
Membership in the American Institute of Architects should stamp one as experienced, competent, and above all, as honorable in practice. Because some men have gotten in who should never have been admitted, does not justify the conclusion that honest men receive no benefits from membership in the national body. They do, and that in a most satisfying sense. It adds to one's prestige, both at home and abroad, as well as to one's own esteem, to come into personal touch with men whose standing and reputations are national and world-wide. It is a stimulus to better and cleaner methods on one's own part and to just that extent it makes for a higher order of practice in general. These things being true, no architect whose ambitions are clean and worthy should hesitate to join hands with those who are endeavoring to raise the standard of practice, by affiliation, by open and frank discussion of problems of common interest, by the adjustment of differences of opinion, by a united front upon all matters affecting the honorable practice of architecture, and by the elevation of the designing and grouping of important public buildings, such as we have witnessed in the past four or five years in our principal cities. These things should stimulate all architects to lend their personal endorsement to the advancement of their profession by at least identifying themselves with the national body, which is possible only through membership in the state chapters, an important reason for the keeping up of which, is to afford an easy and inviting means of entrance to the American Institute which sets up and urges a high standard of practice, a course which, persistently and constantly followed, will bring about better conditions and ultimately assure to members of the American Institute of Architects a distinction not conceded to those who decline to identify themselves therewith, and by that course endorsing that society's stand for better conditions of practice.

E. P. Overmire,
Secretary Minnesota Chapter, A. I. A.

"Insurance Engineering," New York, explodes over the disasters of acetylene. Inasmuch as acetylene has scarcely ever done anything but explode the attitude of "Insurance Engineering" does not appear to be subject to criticism. The issue gives a list of 36 persons killed, 170 injured, 143 buildings destroyed with a property loss of nearly $200,000 in a period of five years. There is no attempt to decry the illuminating qualities of the gas, but its use except with care and intelligence is declared to be a source of constant danger. There is also some valuable suggestions on the setting and care of hydrants, an analytical index of typical fires and some lessons of fires with bright comment and current data.

At the second annual election of the Architectural Draftsmen's Club of New York, the following officers were elected to serve on the executive committee for the year 1905: President, L. A. Cramer; vice president, A. T. Rose; recording secretary, W. F. Anderson; corresponding secretary, W. T. Smith; treasurer, A. M. Hedley; chairman current work committee, E. H. Rosengarten; chairman entertainment committee, C. F. Winkleman. A program of varied and interesting monthly prize competitions, combined with a series of discourses by prominent professional men, will constitute the year's current work.

W. T. Smith,
Corresponding Secretary,
Tel. 779 Mad. Sq. 1133 Broadway, N. Y. City.

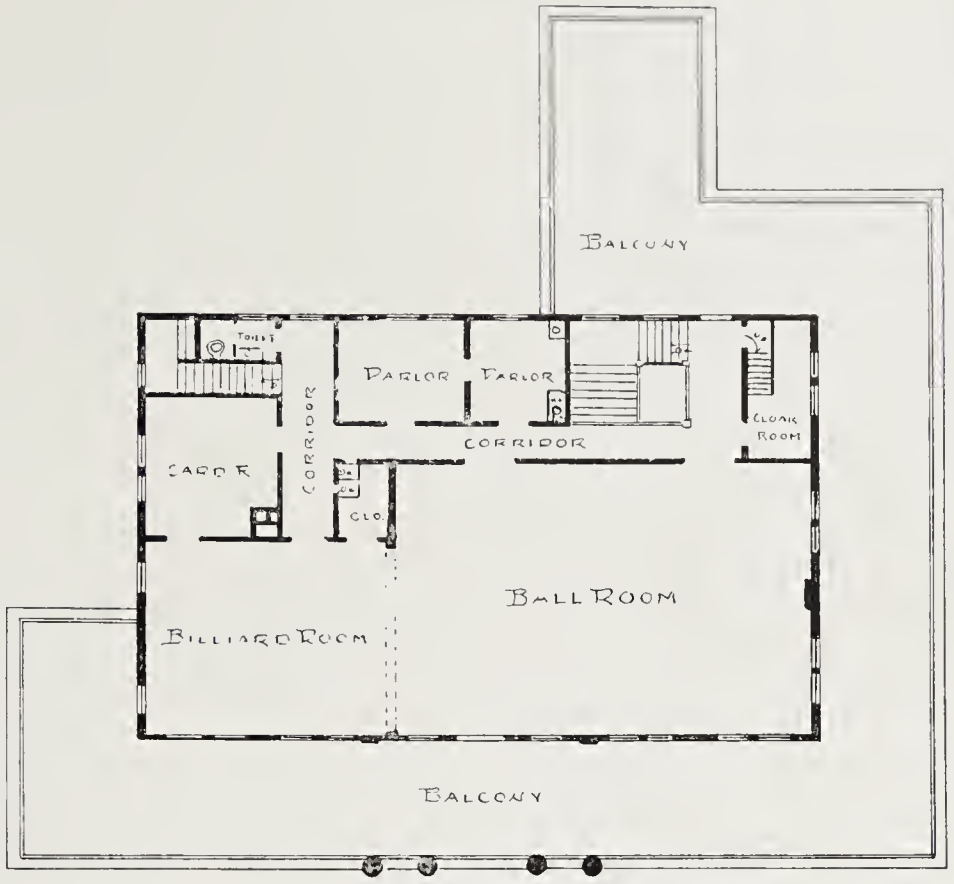


A VILLAGE LIBRARY

SCALE ⅛" = 1 FOOT

FIRST PRIZE DESIGN FOR A VILLAGE LIBRARY BY THOMAS A. CRESSWELL

Exhibited at Minnesota State Art Society's Architectural Competition at St. Cloud, Minn.

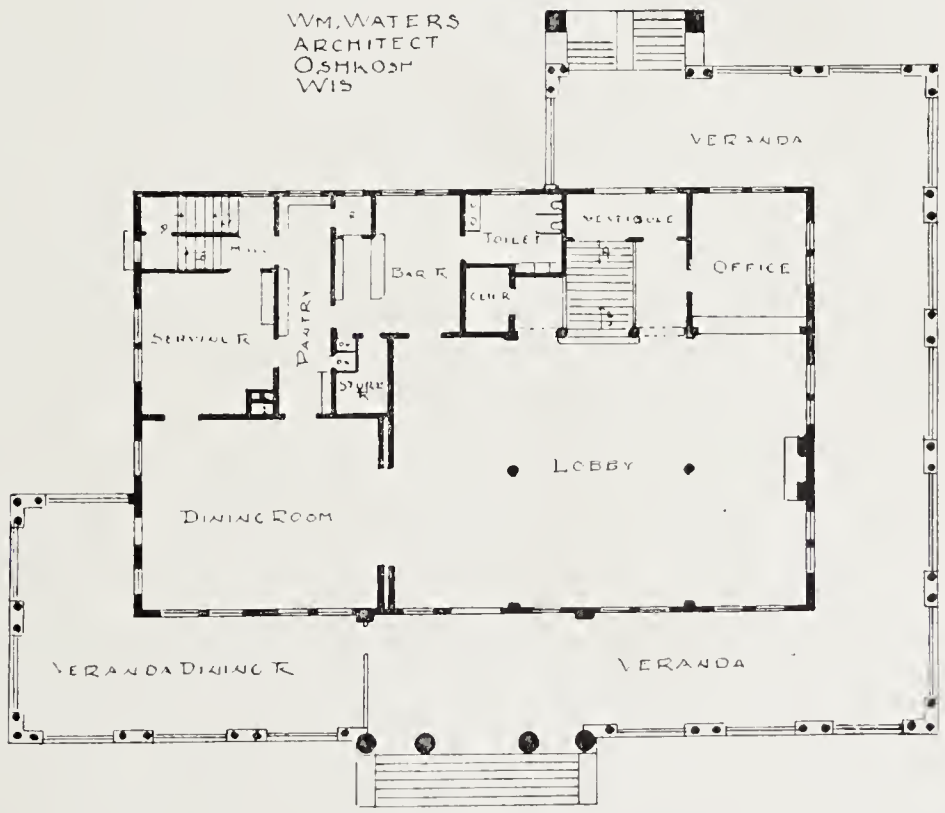


SECOND STORY PLAN

OSHKOSH YACHT CLUB HOUSE
LAKE WINNEBAGO OSHKOSH WIS

PORTE COCHERE

WM. WATERS
ARCHITECT
OSHKOSH
WIS



FIRST STORY PLAN

SCALE 1/16 INCH TO 1 FOOT

FLOOR PLANS OSKOSH YACHT CLUB HOUSE, OSKOSH, WIS.
Wm. Walters & Son Architects Oskosh

THE LEWIS AND CLARK EXPOSITION.

The managers of the Exposition which is to be held in Portland, Oregon, this year, the hundredth anniversary of the Lewis and Clark expedition, have wisely determined upon making the affair educational with reference to the resources and advancement of the marvelous empire which the explorers traversed, rather than to present that type of over-elaborate display of which exposition visitors have become wearied.

There will be upwards of $5,000,000 expended to the end that the exposition shall be an object lesson to the American people of the greatness of that portion of our country which lies between the Mississippi river and the Pacific ocean, and then presents a coast line upon the world's largest waterway of more than double the mileage possessed by any other nation. Indeed, the Portland Exposition will be of greater educational value to the people of the United States than all of the great expositions of the country combined have been. Even if comparatively few of the millions of Americans who know only of our eastern, middle and southern country visit Portland this season, the impressions which they cannot fail to take home with them and disseminate among their people, will revolutionize popular opinion concerning the real magnitude and importance of the western part of the United States.

Every individual who has even a very moderate amount of money to expend upon the acquirement of personal knowledge, which is necessary to success in everyday life, cannot afford to miss the unusual opportunity offered by the Lewis and Clark Exposition. The accompanying illustrations indicate somewhat the beauties which will characterize the affair.

One robin don't make a summer, neither will one good advertisement keep a shop full of orders. Follow it up with another and another, and you are bound to win.

On a government reservation in California a thrifty sequoia is said to be claiming the distinction of being the largest tree in the world, basing its claim upon its fifty-one feet of diameter.

NORTHWESTERN CONCRETE CONVENTION.

The Northwestern Concrete Convention will be held in the city of Minneapolis from January 24th to 26th. It is expected that manufacturers of this product, as well as concrete building block manufacturers from every state in the Union will be represented at this convention when matters of utmost importance will be thoroughly discussed and samples of material and machines for making hollow blocks will be exhibited.

Chicago is at present passing through a crucial period of its business activity, due largely to the labor demands and disputes which have harassed trade. A recent statement shows that about sixty manufacturing concerns, which gave employment to an aggregate of 15,000 persons, have removed from Chicago to other localities, and the cause assigned for a majority of these changes, is the unreasonable demand of labor. It is computed that during the past four years strikes have cost Chicago from $50,000,000 to $75,000,000 and have sent more than one concern into bankruptcy. The removal of these plants and the general depression of trade are causing much concern as to the industrial and trade future of that city.

Of modern inventions none, it may be asserted, has become of more general utility than the telephone. What a quarter of a century ago was regarded as a novelty has become a recognized necessity, a time saver and an expeditious servant. The commercial and mercantile world no longer monopolizes this ever ready means of communication. The telephone has become a feature of the home as well as the business office. The housewife calls up the grocer, the butcher, the drygoods store, the doctor or lawyer; she holds converse with her social friends and makes her appointments. As an index to the future general use of the telephone as an adjunct of the home, architects are including in their plans for private residences telephone conveniences. New inventions are continually improving the methods and in time the cost of service will be cheapened to the extent that a telephone will be regarded as essential as the gas supply or electric light.

TO ARTISTS AND ARTISANS OF THE STATE OF MINNESOTA.

The following sections from the Constitution of the Minnesota State Art Society, and the conditions and rules following, will explain to all interested who contemplate entering the annual contest, what is required of them:

Sec. 16. Annual Exhibit—It shall be the duty of the Minnesota State Art Society to provide through its committee on exhibition an annual art exhibit, which shall not be held at the same city twice in succession. Such exhibit shall include paintings, sculpture, drawings, carvings, pottery, tiling, cabinet work, wrought metal designs, architectural designs, exhibits of textile fabrics, and all art craft which in the judgment of the society shall tend to elevate the standard of beauty and value of home manufactures. No work of art shall be exhibited without first having been accepted as worthy by the Exhibition Committee.

Sec. 17. Annual Prizes—At each annual exhibition, prizes to the amount of one hundred dollars or more shall be offered by the state, said sum to be determined by the Governing Board, and to be paid out of the funds of the society for the best original work done by any (Minnesota) artist in any line of art or art craft which shall have been accepted for competition by the Exhibition Committee. These prizes shall be given for paintings, sculpture, decorative designs of any kind, designs in architecture, or for manufacturing designs or the finished product after such design. These works of art may become the property of the society by proper compensation, either in the form of prizes or by direct purchase, all works of art acquired by the society in this way or those tendered by patrons of art to said society, shall, upon acceptance, be turned over to the Art Collection Committee. The art collection thus acquired shall be the property of the state, under control of the society. Said art collection may be in part or in whole loaned out to different parts of the state, according to rules and regulations prescribed by the Governing Board.

All works receiving cash prizes, unless in private possession, are thereby to become the property of the State Art Society, provided the selling price does not exceed the amount of the award; in the latter case, the society, at its option, by adding the difference between the amount of the award and the listed selling price.

In accordance with the above, the following awards are offered:

1. A first prize, consisting of $100, will be given for the most artistic work, designed and executed by a Minnesota resident artist or artisan.

2. Four prizes, consisting of $25 each, for works in painting (in any medium), sculpture, architecture (design in perspective), and book illustration.

3. One prize of $15, for the best architectural plan for a private "garage," to be located on the rear 60 feet of an 80 foot level inside city lot, which is bounded by a 20-foot alley. The garage is to be of stone or brick, one and a half stories high, and to contain on the first floor space for four automobiles and a small work room. On the second floor will be a chaffeur's room and storage place.

Required—

A block plan, showing the first floor plan and the treatment of the rear 60x80 feet of the lot, at a scale of one-eighth inch to the foot, a sketch plan of second floor at one-sixteenth inch to the foot, two elevations at one-eighth inch to the foot. All to be on one sheet of Strathone (or similar board), 14x22 inches in size and to be rendered in India ink.

Plans to be submitted at the rooms in the new capitol not later than Wednesday, February 8, 1905.

4. A prize of $10 to be awarded to the second best plan for the above.

5. Six prizes consisting of $20 each, for works of Art Craft in wood, glass, metal, leather, textile, lace and other materials, and for Applied Design.

6. A prize of $10, to be awarded for the best study in color, from nature, by a student in the state.

Honorable mention for the second best.

7. A prize of $10, to be awarded for the best study in black and white, from nature, by a student in the state.

Honorable mention for the second best.

8. A prize of $10, to be awarded for the best design for book cover in three colors; the title to be "Through Wood and Field."

Honorable mention for the second best.

9. Three prizes for the most artistic photographs in the following three classes: Portraiture, Landscape and Figure or Still Life Composition. A total of not more than three examples will be accepted from any one exhibitor.

10. Silver and bronze medals and honorable mentions will also be awarded, if in the opinion of the Governing Board of the Minnesota State Art Society, this shall seem advisable.

The Governing Board also reserves the right to withhold any or all awards offered, in case the works submitted do not show sufficiently high artistic merit to warrant the distinction.

The Jury of Awards will consist of five members, to be elected by the competing exhibitors. Ballots, giving names of available candidates, will be sent to the exhibitors in due time.

All works submitted for exhibition must be original in thought or application.

All works not intended for competition must be so designated on the form, and will be so marked in the catalogue.

All works intended for this exhibition must be sent, charges prepaid, to the "Minnesota State Art Society," Capitol building, St. Paul, not later than Wednesday, February 8, 1905.

Work not accepted by the committee will be returned at the owner's risk and expense.

All accepted work will be insured and returned to the owner, after the exhibition, at the expense of the society.

Efforts will be made to effect sales of articles exhibited, and a commission of 10 per cent will be charged.

The Exhibition Committee,
ROBERT KOEHLER, Chairman,
4816 Portland Ave., Minneapolis.
JULIA C. GAUTHIER,
ERNEST KENNEDY.

CONCRETE-STEEL CONSTRUCTION.

What the Stresses Are—How They Should Be Treated.

By Louis F. Brayton, of the Brayton Engineering Co.

In the following discussion it is the intention to explain what the stresses in concrete-steel are, in order that it may be more clear why the Brayton system is arranged as it is. The discussion, however, is perfectly general, and will apply to all classes of concrete-steel designs; whether of the type used in the Brayton system, or whether of a plain rod construction. Particular attention is called to the diagram for the calculation of beams and slabs, which we believe is the most up-to-date and the easiest method of calculation for this class of work.

STRESSES IN CONCRETE-STEEL.

Tension is that property of concrete which causes the ingredients to stick to each other. It would be more properly termed cohesion. Tension in concrete is variable because of shrinkage cracks, imbedded cracked stone, or sand holes, but may run up as high as 500 or 600 pounds as an ultimate load at thirty days of age. It is uncertain to get, is easily destroyed, and should not be depended upon to assist in the strength of a structure.

Sheer is the resistance of one portion of the concrete to sliding past the adjoining portion. Experiments have not shown clearly the real value of shear in its ultimate strength, but engineers usually allow a safe load of 50 pounds per square inch, which, considering a factor of safety of four, would indicate that in their minds failure would take place at about 200 pounds per square inch. The writer thinks that failure attributed to shear is almost invariably failure by tension and that the real ultimate value of pure shear is far in excess of the above figure.

In a few cases, as in footings, it may be possible to so design that tension may be eliminated and shear attain its real value. In the super-structure, however, the same sources of failure may arise as in tension and it should be regarded with distrust.

Adhesion, as here used, is the tendency of the concrete to stick to the reinforcing steel. In the majority of systems this property of concrete is required to make them possible. Beams, girders, floor slabs, columns and trusses depend upon it for their stability.

Adhesion is due to a chemical combination between the steel and the concrete. If the concrete does not come in close contact with the steel, or if it is too dry when placed, no salt is formed and adhesion is lacking. Next to tension it is the most unreliable property of concrete and it should be depended upon only in minor members. Round and square bars develop an ultimate adhesion of about 300 pounds per square inch of surface. It is probable that a large portion of this 300 pounds is due to the friction of the concrete on the bar which in turn is caused by the shrinkage of the concrete.

Compression, when tested to the ultimate or breaking load, is found by tests of blocks of concrete thirty days old to range from 2,000 to 3,000 pounds per square inch, where the concrete is without lateral support and of ordinary quality.

The above figures are those commonly attributed to concrete as its ultimate strength in compression.

The writer thinks that the failures occurring at those figures are rarely failures by compression, but that to the lack of tension qualities in the concrete, is due the fact tnat no higher results are attained.

When a block of concrete is subjected to a compression test it fails by the sides spalling off or by cracks appearing nearly parallel to the direction of pressure. This is because so little tension exists to hold the block from bulging. A column of water collapses from its own weight because it has no tension value to keep it from bulging and yet we say that water is incompressible. Surround water with a steel jacket so that it cannot bulge laterally and we have the principle of the hydraulic press whose power is limited only by the strength of the enclosing jacket.

Concrete may be treated in practically the same way and the real compressive value developed.

Armade Considere, chief engineer of the French government bureau, found that he could increase concrete in compressive value from 2,400 pounds per square inch to 10,500 pounds per square inch by wrapping it with spiral bands of iron.

Concrete in compression may be trusted with more certainty than tension, shear or adhesion. A split or cracked stone imbedded in the concrete which would prove a total failure in tension, could not be crowded any closer together, and hence does no harm in compression. A pocket of poor concrete or perhaps sand totally lacking in cement, might be imbedded in a structure. It would cause a failure in tension. In compression it would do no harm for it would be as incompressible as if the cement were there to bind it, for the surrounding materials would prevent its bulging. Heavy railroad bridges have been built on tin cans filled with sand, and slowly lowered into place by raking the sand through a hole in the bottom of the can.

If a settlement of the building occurs a crack may be caused in the concrete. The resistance to tension and shear are totally destroyed but in compression the crack will close up and be practically as strong as before.

Summing up we might say: Tension in concrete is uncertain, often totally lacking, and should not be depended upon.

Shear as it is commonly termed, is probably only a form of tension and should be treated with equal distrust. Where the concrete, really in shear, is so placed that a tension failure is impossible, it may have a large and comparatively definite value, but as yet this has not been verified by tests and it should not, therefore, as yet be depended upon.

Adhesion, where not assisted by mechanical means, is more or less uncertain, and should be trusted only in those parts of the structure where the conditions permit of tension members of small sectional area and close spacing, and a consequent maximum area of contact.

Compression may be considered the one safe property of concrete. In the present usage it can be depended upon for an ultimate load of at least 2,000 pounds per square inch. Neutralize the bursting effect by steel binding members and we have a range of possibilities not yet determined.

HOW TO DESIGN CONCRETE-STEEL BEAMS.

It is not our purpose to make here an exhaustive treatise of how engineers have arrived at the correct methods of designing concrete-steel, but to save the reader time by giving him a short and accurate method of solving plain beams and tee-sections.

For very well designed tests and exceptionally well drawn conclusions we refer to Professor Arthur N. Talbot's article, "Tests of Reinforced Concrete Beams," in Engineering News of Aug. 11, 1904, and to Prof. F. E. Turneaure's article of the same title in Engineering News of Sept. 8, 1904.

From a study of these and other tests the solution of a concrete-steel beam as shown below has been deduced.

It is assumed the compression area is a triangle with its center of gravity at two-thirds of the height. The neutral axis is located at a depth of 0.45 of the distance from the extreme compression fibre to the center of tension. Thus the effective depth which is the distance between the centers of tension and compression, is equal to 0.85 of the distance of the center of tension from the extreme compression fibre. The moment of resistance is equal to the effective depth multiplied by the tension. The exact location of the neutral axis is not of great importance for it can be seen that if it were lowered, increasing the compression triangle, the effective depth would also be decreased and the moment of resistance consequently influenced in a less degree.

Considering a beam 12 inches wide and 1 inch deep from the extreme compression fibre to the center of gravity of the steel, the compression area is found to be 2.7 square inches, with a total pressure of 1,350 pounds. The effective depth is 0.85 of the total depth, and the tension required in steel 1,350 pounds, all as shown by the diagram.

The moment of resistance in foot pounds is equal to the stress in the steel multiplied by the effective depth in feet, giving a result of 95.62 foot pounds.

This diagram is designed with the idea that the extreme fibre will attain its full safe capacity of 500 pounds, which is a factor of safety of four on the concrete when the steel is stressed to one-half its elastic limit, giving the regulation factor of safety of two required for steel in combination with concrete.

If the bending moment is such as not to require the full development of the concrete in compression the conditions will change only in the amount of steel supplied, and the pressure on the concrete or the location of the neutral axis need not be considered. If only 56.6 foot pounds of resistance were required then only 800 pounds tension would be needed in the steel and the area would be reduced by one-half.

For the moment of resistance of any other beam developing the full capacity of the concrete the process is merely by proportion as called for in the diagram.

Example:

(1) What is the moment of resistance of a concrete steel beam 12 inches wide by 20 inches deep? (2) What is the area of steel required, the steel having an elastic limit of 32,000 pounds per square inch? (3) What area of steel would be required to give a moment of resistance of 34,000 foot pounds?

Answer:

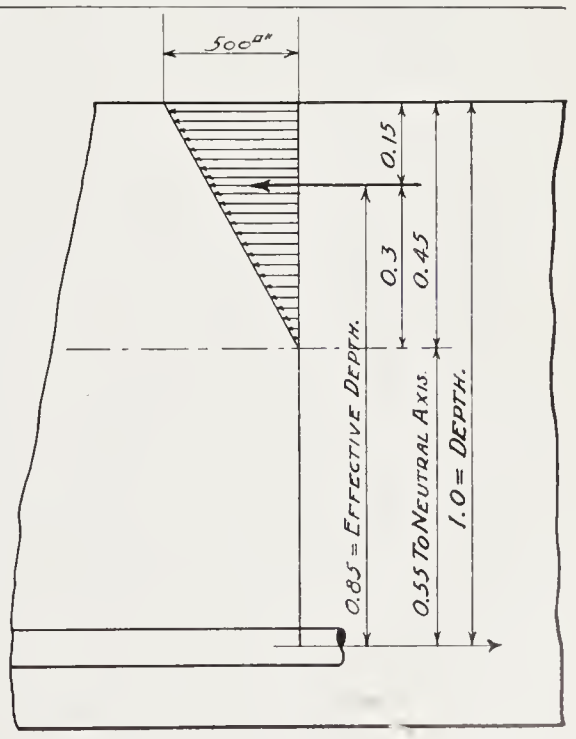
(1) Moment of resistance $= 95.62 \times 20^2 = 38248$ foot pounds.

(2) Area of Steel $= \dfrac{1350 \times 20}{16000} = 1.69$ square inches.

(3) Area of Steel $= \dfrac{34000 \times 12}{0.85 \times 20 \times 16000} = 1.5$ square inches.

CALCULATION DIAGRAM FOR CONCRETE-STEEL SLABS

FOR A BEAM 12 INCHES WIDE AND ANY DEPTH.	FOR A BEAM 12 INCHES WIDE AND 1 INCH DEEP.
Stress in Extreme Fibre=500 lbs. per square inch.	**Stress in Extreme Fibre**=500 lbs. per square inch.....
Compression. Total=1350 X depth.	**Compression.** Total 1350 lbs. .....
Neutral Axis =At 0.45 of the depth.	**Neutral Axis** At 0.45 of the depth.....
Moment of Resistance. =96.52 X depth.^{2}	**Moment of Resistance.** =95,62 foot pounds.
Tension. =1350 X depth.	**Tension.** =1350 lbs.....



TO RESIST SHEAR.

In spite of the fact that shearing stresses are of equal importance with chord stresses, they are often entirely overlooked by designers. It is an error of the utmost importance to omit provision against shear from a beam or a floor slab.

In our discussion of shear we have called attention to the fact that failure by shear is really failure by tension and that the only way to guard against such a failure is to provide steel tension members along these lines of stress. The designer must be consistent throughout his design. Remember that a chain is no stronger than the weakest link.

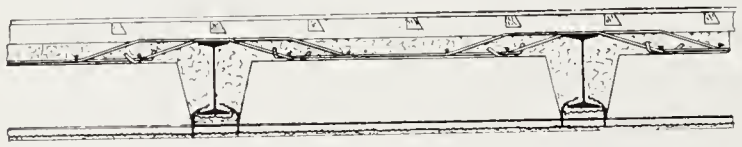
A concrete steel beam or floor slab is nothing less than a truss, and it may be treated in exactly the same manner. A truss may have its tension web members on the vertical or diagonal. It is equally good either way, but the efficiency of these members is absolutely limited by the strength of their connections at either the bottom or the top chord.

The same thing is true of the concrete-steel truss. It should be laid out with an effective depth of 0.85 of the total depth, and calculated in the same manner as a truss of any ordinary type. The concrete will fulfill the requirements of compression in the top chord and web, and steel should be placed to take the tension in the lower chord and web. Steel web members as in the ordinary truss should be proportioned to the stress in them and they should be provided with a method of connection to each chord of sufficient strength to develop this stress.

Attention is called to the beams of The Brayton System in which the tension web members are connected to tension and compression chords by completely encircling them, and also to the floor slab, in which the web members are continuous with the chords, thus having no possible point of weakness by depending upon adhesion for their connection to the compression chord.

THE TEE SECTION.

In the construction of buildings, beams and girders are almost invariably combined with a slab which they in turn support. A diagram is here given showing a section



THE BRAYTON SYSTEM FLOOR SLAB.
AS APPLIED TO ORDINARY STEEL CONSTRUCTION

of a floor slab in connection with a beam and forming a T section.

As far as the compression flange is concerned this section will act exactly like the flange of an I-beam.

There is a source for argument as to how far out into the slab it may be considered that the T section extends, the slab acting with and as a part of the compression area of the beam. A comparison may serve to throw some light on the subject.

A plate girder is increased in strength by plates being added to the chords at the point of the maximum bending moment. The plates in the upper chord transmit their compression to the web by means of rivets and the web in turn carries it to a point where it is resisted by tension similarly transmitted from the lower chord through the flange rivets to the web. Clearly the strength of the girder is limited by the strength of the rivets transmitting the stress from the chords to the web.

The same conditions hold true in the concrete-steel T section. The limit of its strength is the value of the shear along the vertical lines V and the horizontal line H extending from the point of maximum bending moment to the end of the beam. It is very evident that any compressive strain developed in the slab must be opposed by an equal tension strain in the steel and in order to neutralize each other they must pass the shear planes H and V.

Nearly every system contains enough steel passing through the plane V to develop shear far in excess of the amount required, but few make proper provisions against shearinng along the plane H. Recent tests made to develop this point have proven it to be the weak feature of the T section. The Brayton System is particularly well adapted to resist this shear, it having loops extending from the bottom of the beam up into the floor slab. With this provision there is no limit to the width which may be used.

Since the co-efficient of elasticity of neither material is changed by the form of the section the neutral axis would remain as in the plain beam and the compression area can be considered triangular as before.

As may be seen from the diagram, the influence of the slab will be to raise the center of gravity of the compression area much higher than the usual two-thirds of the height of the triangle. As a matter of fact the real center of gravity of compression comes so close to the center of the slab that it is not necessary to calculate it.

The effective depth, then, which is the distance from the center of the slab to the center of tension, multiplied by the tension, will give the moment of resistance of the T section.

CONCRETE-STEEL CONSTRUCTION AS TREATED IN THE BRAYTON SYSTEM.

At present nearly every system of concrete-steel supplies the tension and compression reinforcement in a concrete beam or column, in the form of rods, cables, expanded metal, wire netting or steel in some other form, which is not self-supporting. The reinforcement which after completion of the building is to be the real strength of the structure, during erection, is in such form that it, in itself, must be supported by the wooden centers which hold it and the concrete in the proper form until the latter has set about the reinforcement.

As a rule the rods must be bent or twisted, tied, clamped or wired to each other, or to the forms in such a complicated network that only the most competent engineers can be entrusted with the superintendence of erection, and the amount of time and labor expended becomes the important matter of consideration.

Usually the forms are so built that the basement columns and the first floor beams, girders and floor slabs have the reinforcement in place and are all ready for the placing of the concrete at the same time. This involves the building of very strong wooden forms. They must be accurately aligned in order to get the beams true and the columns plumb; they must be accurate in height, or the floor when leveled on top will have a varying thickness of floor slab, either dangerous to the structure or costly to the contractor, and they must be thoroughly supported and rigidly braced from the basement floor in order to carry the heavy concrete and steel work until the structure becomes self-supporting.

THE BRAYTON SYSTEM.

The Brayton System contrasts with this method of construction in nearly every detail. All tension members are rigid self-supporting pieces. Columns are capable of carrying the dead load of the structure without assistance from the concrete and may be erected to any number of stories before the concrete is in place. Forms are all carried on and aligned by the steel reinforcement and not the reverse, as outlined above.

STRESSES IN THE BRAYTON SYSTEM.

In the preceding discussion the kinds of stresses in concrete-steel have been explained and reasons given why concrete should not be trusted to take anything but a pure compressive stress.

The Brayton System supplies an arrangement of steel which cares for all tension and shearing stresses and eliminates the necessity of the adhesion of the concrete to the steel as follows:

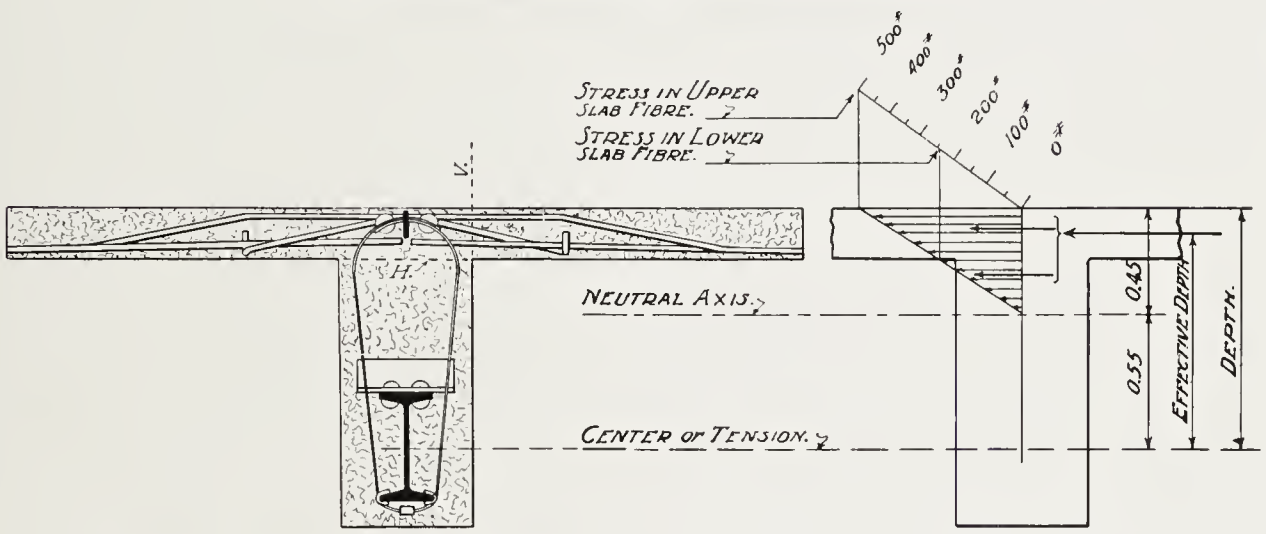
SHORT SPAN FLOOR SLABS.

The floor slab in The Brayton System is reduced in importance to a minimum by the close spacing of the supporting beams, at the same time great care has been exercised to place the steel where it will take all of the tension and shear in the slab, reduce the necessity of adhesion to a minimum, be easy to erect, and economical in cost.

ARRANGEMENT OF RODS.

Notice the arrangement of bars shown in elevation. It looks complicated but it is simplicity in the extreme. By following up one rod it will be seen that it consists of

CALCULATION DIAGRAM OF TEE SECTION



The effective depth is equal to the distance from the center of tention to the center of the slab

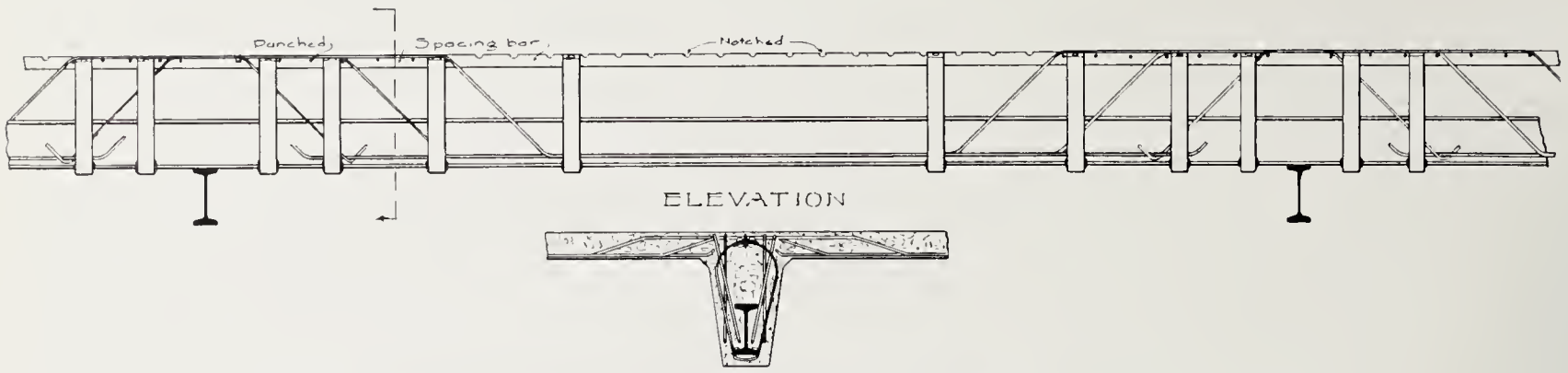
Following is a detailed description of the system:

The Brayton System is made to conform to the best principles of engineering as laid down in the preceding discussion, and at the same time eliminate the time consuming labor wasting methods heretofore used in concrete-steel structures.

First: It consists of the arrangement of steel within concrete in such a way that the latter is relied upon only in compression. The arrangement applies to the construction of foundation, base plates, columns, retaining walls, floor beams and girders, floor slabs, crane tracks, long span trusses and girders, exterior walls, roof construction, partitions, elevator enclosures, stairs, and in fact every structural part of the building, and

Second: It consists of the application of the above items to the construction of buildings of the skeleton type, the skeleton being of concrete-steel and the veneer of brick, terra cotta, or concrete built monolithic or independent of the skeleton as circumstances may require.

a crooked portion having four bends and a hook, with a long straight tail at the opposite end. Now, every rod throughout the slab is exactly like this and can be cold bent to the same pattern. The ideal arrangement in the final product is produced by alternating the tail to right and to the left and by shifting the rod so that the spacing bar touches the successive rods at the left, middle and right of their high portions. By this arrangement every sixth rod is a duplicate in position; the floor slab is made continuous over the beam, thus reducing the necessary thickness and decreasing vibration; the imbedding of rods at both the upper and lower surfaces of the floor slab forms a tension and shear property which will insure the slab acting as a part of the beam, just as the flanges of an I-beam act with the web; the full number of rods is retained at the center of the span and over the spacer and at the same time by means of the "tail" a lap is made at each end of the span which reinforces and helps bind together the compression flange; cross rods bind all others together



TYPE OF CONTINUOUS REINFORCEMENT FOR BEAMS AND GIRDERS

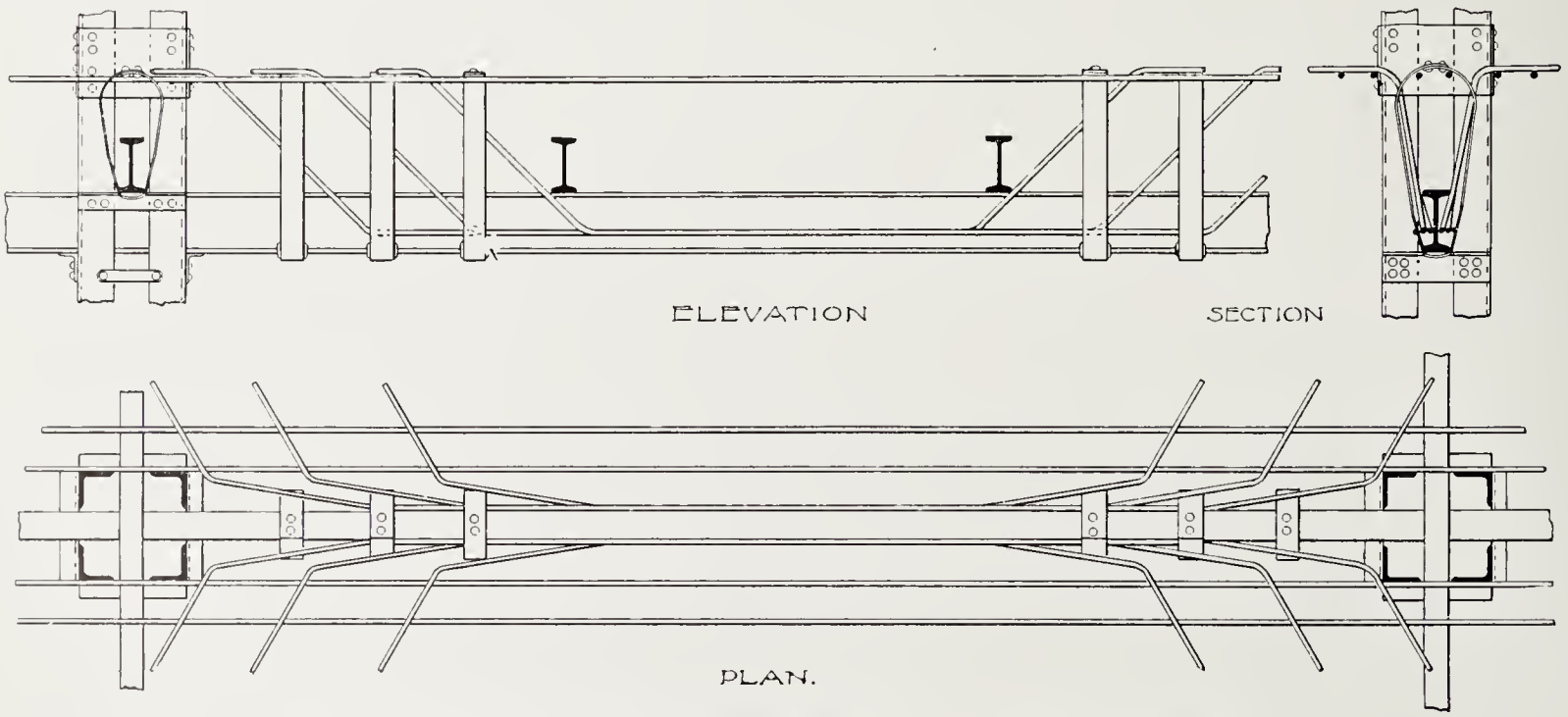
laterally, as does the bridging in a joist floor; the points of contraflexure, which in a continuous beam vary in their distance from the points of support, according to the loading, and the total shear in the slab, are amply provided for by the alternate arrangement in which the rods run from the lower to the upper surfaces of the slab. Adhesion, which we have decided is an unsafe property in concrete, is given every advantage by the use of small diameter rods and a proportionately large surface of contact, and the evil effects of a failure by adhesion is reduced to a minimum by close spacing of rods and short span of the slab.

BEAMS AND GIRDERS.

Our standard detail sheets herewith submitted illustrate the method of construction of beams and girders in the Brayton System. The principle upon which they are calculated is that of a truss in which all tension and shear stresses are taken by the steel, and all compression stresses are taken by the concrete. As will be seen from the drawing, the tension member of the concrete-steel beam consists of a rigid rolled section in the form of an I-beam, but from its location in the concrete it does not act in the usual way, that is, instead of acting as a beam it acts purely as a tension member. This form of steel is more expensive than steel in the form of round or square rods, but it has advantages over the flexible reinforcements in that it is rigid for erection purposes. The columns, beams and girders for the entire building may be erected if necessary entirely independent of the concrete. The I-beams also are calculated with sufficient strength, acting independent of the concrete to support the forms for the moulding of the concrete. Thus it will be seen although we use a more expensive form of steel, we have a less expensive method of erection, which has a counterbalancing effect. The great point of interest, however, to the owner is the fact that in placing steel I-beams for the tension members the reinforcement is in such shape that collapse is almost impossible, for the beams acting independent of the concrete would more than carry the dead load of the structure.

It will be noticed from the drawings that the tension members of both the beams and girders pass entirely through the columns, and thus a continuous effect is attained. This continuous effect is increased up to the required strength for regular continuous construction by the use of round rods as shown in the accompanying cut. These rods are similar in every way to those used in the floor slab, being uniform in design and staggered in arrangement to produce the required results.

In most systems of construction where any shear is provided for at all, it is provided in the form of plain bars of some sort, extending from the lower chord to the

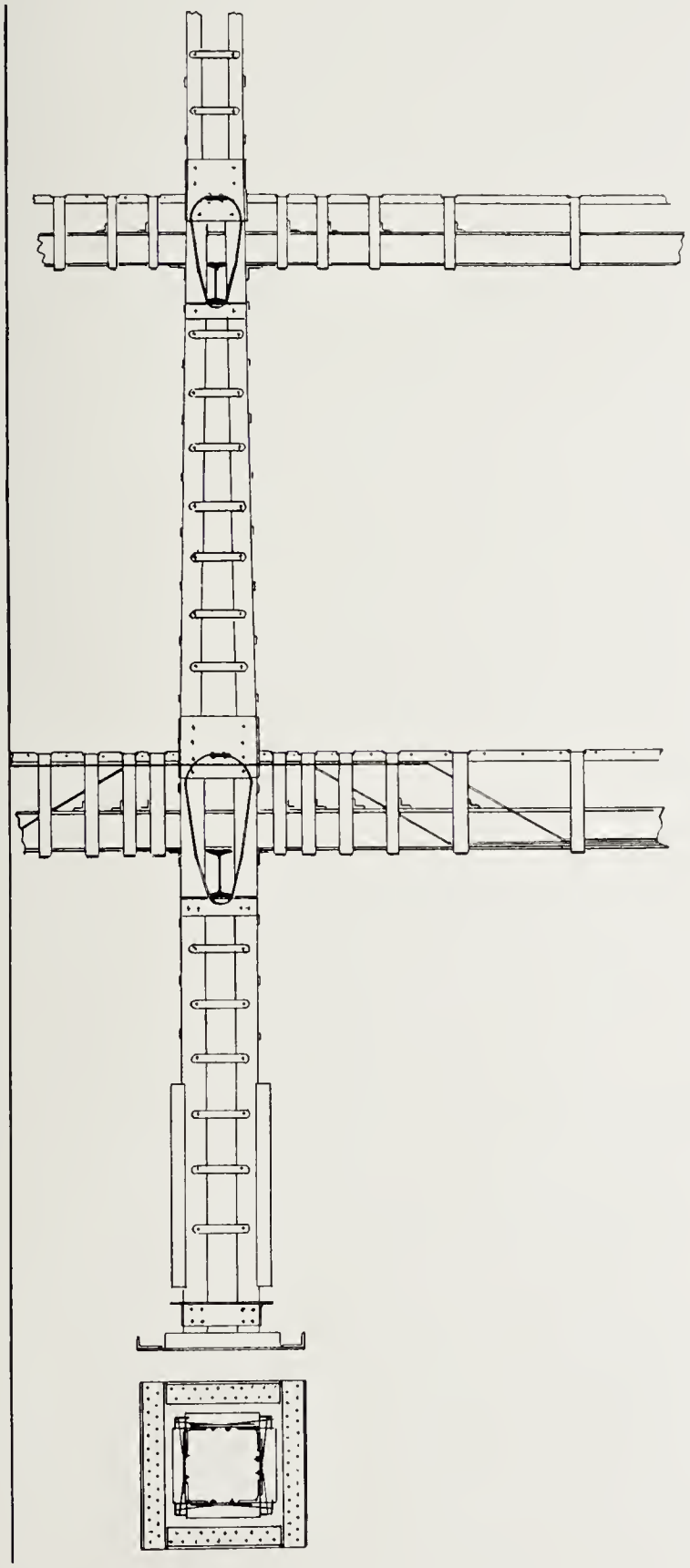


TYPE OF DOUBLE CONTINUOUS REINFORCEMENT FOR BEAMS AND GIRDERS

chord of compression, either vertically or diagonally, but in nearly all systems, depending upon the adhesion of the concrete to the surface of the steel, to secure them to the compression chord.

In the Brayton system the dependence upon adhesion is not required, for the shear members consist of steel bands in the form of loops entirely encircling the tension and compression chords, and of diagonal rods extending from the lower to the upper chords and thence, *continuously*, back to the lower chord where they are interlocked as shown.

The calculations required for shear in these beams are the same as in a truss, it being understood that the concrete acts in the capacity of compression members.



For special cases which often occur in a building, such as extra loads or spans, in certain bays, the increased strength is provided for by the increasing of the size or number of the rods, the I-beam remaining of a constant size. This has a great advantage in the uniformity of the structural steel design and consequent uniformity of floor depth.

In the case of either beams or girders, where the concrete is not of sufficient capacity to carry the load in the top chord, reinforcement in the form of straight rods imbedded in the top chord is supplied. The accompanying cut shows the method of placing these straight rods in the top chord extending continuously from the points of support, thus adding an additional strength to the beam from the fact that they are capable of taking tension over the points of support. The tension rods extend from the lower chord to the top chord, having their ends open out over the reinforcement of the compression chord, thus giving ample shear in the plane of the lower side of the floor slab and in the planes of the two sides of the beam. In both the regular and the double reinforced types of construction the loops are maintained in order that they may have the hooping effect on the concrete, increasing it in compressive value by eliminating its possibility of failure by tension.

COLUMNS.

The Brayton System, in the design of columns, employs the principle of a hydraulic press where water is made to act as a column by confining it within a steel jacket. This is necessary because of the lack of tension properties in water. Concrete must be treated somewhat in the same manner except that it will not "leak" through a small opening in the jacket as water would. Further than the fact that it is not necessary to build a tight jacket, it is theoretically not as good engineering to do so, for, if the jacket were complete, the load would be carried on the jacket as a column and its own tendency to bulge would have to be added to the stresses caused by the bulging effect of the concrete. Fireproofing would also be more difficult. If the jacket is complete there is no bonding between the concrete inside and that protecting the outside of the steel, and a wrapper of some metallic form is required to hold the fireproofing in place.

Any of the ordinary styles of steel box columns or cast iron columns would no doubt be greatly increased in capacity by being filled with concrete but they are open to the two objections mentioned above.

In the Brayton system both objections are overcome by the placing of the steel ties in such a way as to take the pure tension strains due to bulging to best advantage, and at the same time not be influenced by any longitudinal stresses in the columns.

Attention is called to the placing of the ties at right angles to the axis of the column. If placed diagonally as in the ordinary latticed columns they would not serve their purpose, for the angles between the ties would simply decrease, allowing the concrete to bulge laterally and throwing the entire column load on to the four corner angles.

The vertical corner angles used in the columns of the Brayton system are not required for strictly concentrically loaded columns, but they are exceedingly practical for erection purposes. All columns and details are designed to carry the actual dead load in them at the time of erection so that in a building of many stories there need be no waiting for concrete to set, in order that the workmen may proceed with the upper stories.

Attention is called to the illustration of a typical detail where a floor system or other beam construction connects with the column. Both the beam and the girder pass entirely through the column, at the same time the column is as absolutely continuous as at any other point in its length. This is a very valuable feature in the Brayton System, as it reduces the original cost to a very considerable extent, increases the capacity of the floor and reduces vibration to about one-third what it would otherwise be, insures in every case a concentric column load where otherwise the cost of column would be materially increased by eccentricity, and above all, in itself, provides a most admirable system of wind-bracing.

It will be noticed that splices are made at each floor line in these columns with the four angles, regardless of the size of the columns, and are brought to a bearing to each other by means of the batter as shown in detail. The concrete exterior remains perpendicular, not showing the batter of the steel. Unlike most systems of concrete-steel, the steel in these columns are milled at their points of contact, thus giving the full capacity of the steel, instead of depending upon a hit-and-miss way of making a butt joint of miscellaneous rods distributed throughout the column.

"THE TWIN CITY ARCHITECTURAL CLUB."

By Cecil Bayless Chapman.

The present wave of interest along all branches of art has settled in upon the architectural circles in the Twin Cities. The need of an organization to advance the standard of architecture and the allied arts as well as good fellowship in the profession, has been felt for some time past.

In response to the earnest effort of Mr. Frank L. Lively, the younger men of the Twin Cities met to consider the advisability of organizing an Architectural Club.

The suggestion met with hearty approval and resulted in the organization of the Twin City Architectural Club, Jan. 22, 1904. The officers selected to serve one year were Mr. Hal H. Eads, of Minneapolis, president; Mr. Geo. A. Blewett, of St. Paul, first vice president; Mr. A. R. Van Dyck, of Minneapolis, second vice president; Mr. Cecil Bayless Chapman, of Minneapolis, secretary; Mr. John H. Wheeler, of St. Paul, treasurer; Mr. F. G. Corser and Mr. T. A. Cresswell, of St. Paul, directors.

The Twin City Architectural Club thus launched under auspicious circumstances, with its charter members numbering twenty-three enthusiastic men, seemed to bid fair to be a safe and successful voyage.

The prime object of the club is the "Advancement of Architecture."

The meetings have been held monthly, alternating the place of meeting in the two cities. The Builders' and Traders' Exchange of both Minneapolis and St. Paul have been very generous in offering the free use of their club rooms as meeting places for the club.

In consequence of the club's infancy the year's work has been almost entirely confined to educational work.

The members have been entertained by informal talks upon numerous allied arts. The tradesmen have responded very willingly to the invitation of the club, to talk upon the subject of their special line of work. Mr. Gates of Chicago made a special trip to the Twin Cities to talk to the club on "Terra Cotta." By these lectures the members have been afforded a better idea of the production of the materials and their uses, which they so constantly employ in their work. Another line of educational work which has been entered in upon was that of creating friendly rivalry among the members by competitions. The problems were simple yet along practical architectural lines. There have been four competitions through the year, all of which have been entered into with enthusiasm. The club has invited the criticism of practicing architects and artists upon these drawings. These criticisms have been instructive as well as interesting to the club at large.

The Twin City Architectural Club has completed its first year with a good record. The membership has grown to forty-four, and has had an average attendance at the meeting of fifty per cent. A renewed effort will be made the coming year to interest many other architectural men of both cities, and enlist them in the cause of the club, that of the "Advancement of Architecture."

The most important move of the new year will be the club's affiliation with the Architectural League of America. The matter has been discussed and no doubt will be carried into effect in the near future, thus grafting renewed energy to further the cause and interest of the club and profession in the Twin Cities.

The annual business meeting of the club convened in Minneapolis, Jan. 13, 1905, at which time the following officers for the ensuing year were selected: Mr. Cecil Bayless Chapman, of Minneapolis, president; Mr. Alban, of St. Paul, first vice president; Mr. Jacob Stone, Jr., second vice president; Mr. T. A. Cresswell, of St. Paul, secretary; Mr. A. R. Van Dyck, of Minneapolis, treasurer; Mr. Alden, of St. Paul, and Mr. Hal H. Eads, directors.

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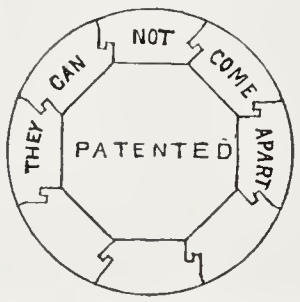

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