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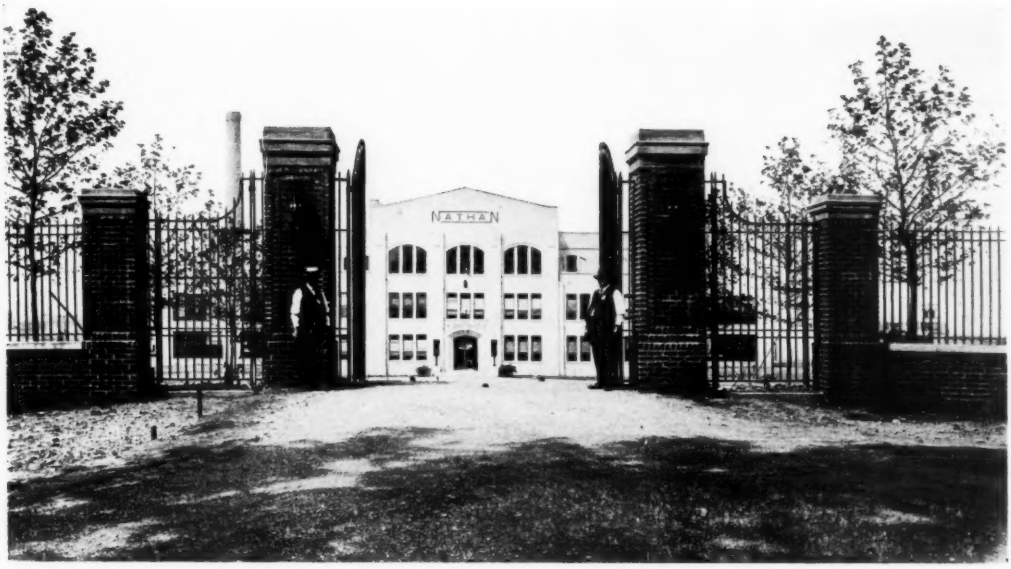

ENTRANCE DRIVEWAY TO ADMINISTRATION BUILDING

The Modern Industrial Building

BY EUGENE SCHOEN, *Architect*

FACTORY designing, like almost any other special work with which the architect is confronted, differs very little from any of the problems he has to solve; and yet when first called upon, he is bewildered by a mass of technical details that require time to digest.

Primarily, good factory design must have all the elements of good planning; planning for the present and the future. There are essentials, owing to the special uses to which the building is to be put, that must be carefully observed. Among these are economy of construction, routing of the manufactured product, changes in manufacturing efficiency, and comfort of the working people, to which must also be added low cost of maintenance.

As factories are larger than usual types of buildings, and lend themselves more readily to the use of a unit system of construction, the selection of a proper system should be the first consideration after the general plan has been adopted. As a rule, a factory outside the city limits should not be over two stories in height.

That there will be an assembling of units under one central distributing corridor is obvious. The distributing corridor is the spinal column of the entire system, and can be used as a craneway or for manufacturing purposes, by the introduction of a large glass roof, enabling light to be distributed on all four sides of the unit.

The proper spacing of the units for light should include room enough between each two wings for the staircases, toilets and locker rooms. This concentrates supervision of employees during noon and other rest hours, and brings all the important plumb-

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ing fixtures outside of the shops proper, which is very desirable. Should the plumbing get deranged and need repairing, the isolation of toilet wings keeps the shops free from annoyance. Units, or parts of units, requiring extra height, like foundries and boiler rooms, can be extended through two stories.

DIRECTORS' ROOM

The natural place for the administration building is at the head of the group, and thus a plan is evolved which permits the addition or reduction of a number of pairs of wings, each carrying the required adjunct to locker and toilets, the number limited only by the requirements on the size of the lot. Each wing can also be extended several bays in length. The flexibility of this type of plan is such that before construction began at the Nathan Manufacturing Company's plant, the number of pairs of units was reduced from four to three, and the length of the units extended from 100 to 150 feet. By this method, additions may be later built without interfering in any way with the original building, and, what is most important, without interfering with the operation of the plant.

In the Nathan plant, transportation of products is by electric mules arranged to operate freely anywhere.

Entirely separate buildings are provided for the garage, warehouse, pump house, etc.

The approach to the factory is through a simple but well-designed entrance, leading directly to the administration building. This building is three stories in height. The first story is devoted to the general offices and work room, the second to the offices of the executives and the directors' room, while the third floor is occupied by dining rooms, both for officers and office employees.

From previous experience it has been found that units of about 20 feet by 25 feet give the best results for all types of general factory construction. Automobiles if necessary can be driven anywhere in a factory having these units, and there is hardly any large or small machinery, except large printing presses, that cannot be economically accommodated in this space. The buildings should not be over 60 feet wide if daylight is considered, and the courts between wings should not be less than 40 feet. Obviously, large glass surfaces should be introduced wherever possible. Reinforced concrete in large plants is most adaptable for economic construction, but care should be exercised in using a beam type of construction, so that shafting is not interfered with.

A few of the specialties that are most important in good work are the following:

Shaft hanger inserts. These are slotted metal sections about 4 feet long with the flanges cut out at the bottom, either on the ends or in the center, to permit the insertion of bolts. They should be placed about 8 feet on centers and about 2 feet end to end. They should be introduced into all the ceiling panels, whether immediately necessary or not, for no one can tell when a shop that has been used for one purpose will be used for another. Of course, manufacturers who use individual drive machines

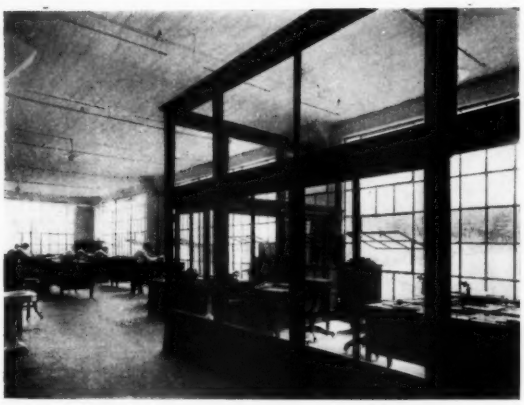
PRESIDENT'S OFFICE

do not need so much shafting space, but the initial cost of this excellent type of equipment is so great that owners rarely care to spend the money. In group driving, say of 10 horsepower motors overhead, shafting is absolutely necessary. It is also a good idea to install vertical hanger inserts in the columns and wall spaces, so that motors may be easily attached or removed. A bracket to hold a

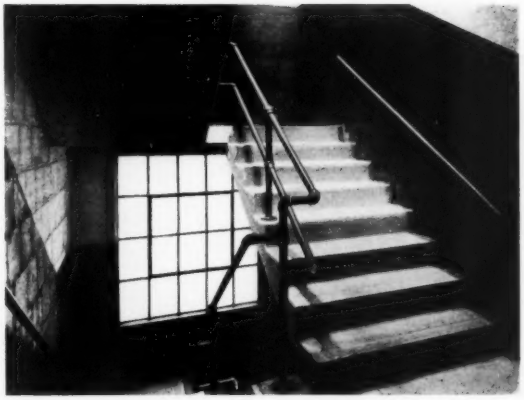
ACCOUNTING DEPARTMENT
A maximum of light

motor can quickly be inserted in the slots, and the shifting of machinery easily and quickly accomplished.

Two one-circuit outlets for general lighting should be placed in every panel of each bay. No special provision, however, should be made for power wiring except in the feeds and in the panel boards. Wire is shifted so often with the rearrangement of machines that it is better left unprovided for. The shaft hanger inserts besides holding the shafting can be utilized to hold power feeders, air



DRAFTING ROOM



TYPICAL STAIRWAY

piping, sprinklers, etc., and this makes changes easily possible.

There should also be provided vertical and horizontal ducts into each shop, so that pipes may be drawn or removed without difficulty. All these

INTERIOR, ADMINISTRATION BUILDING

matters are important from the question of maintenance. Shop millwright work is very expensive, but more costly still is the delay in shifting machinery, which is bound to occur where provision for this is not made in advance. There is no one who so often changes his working units as an alert factory manager, and every convenience to do this must be at his disposal.

Of great importance is the comfort and convenience of the factory workers. The floor on which they stand for their work must be carefully considered. A plain concrete floor will not do at all; not even for workers who move about. It is hard on the feet, tires them easily and reduces their

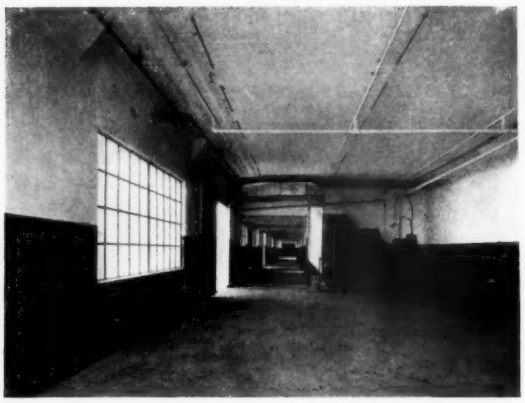
efficiency. Plank flooring is excellent, but on account of its poor wearing qualities is not the best material to use. There are processes for treating planking against dry rot, and if these are effective it is then well to use planks. They are cheaper

FIRST FLOOR, MACHINE SHOP

than all other floors, and if laid double without sleepers, and properly treated, they work well. The planks should be at least 2 inches thick. This requires an allowance of at least 4 inches from the concrete to the finished floor. An excellent material is a magnesium chloride composition floor. This requires not more than 1 inch from the concrete to the finished floor, and it has the added advantage that it can be laid with very few joints, and can have portions that wear out readily, replaced and reincorporated without much trouble. This floor, however, is somewhat more costly than the plank floor. Another excellent flooring consists of 2½ to 3 inches creosoted wood block laid in 1 inch of dry sand. After such a floor has been used for some time it makes an excellent surface. Care must be taken that these blocks are well pitched with asphalt while they are being laid, and a shove joint should be used if one can get the mechanics to do it. The Nathan Plant has all these floors in various departments, and also has a paving block floor laid in the same manner as the wood block floor in the shipping room. It will be interesting to discover which gives the best service.

It is important to have plenty of light. Make your shops like glass-covered "out-of-doors," and you will get the best results from your labor. Conveniences should also be taken carefully into account. Toilets should be near at hand, and plenty of drinking fountains scattered about the premises, so that the workers do not have to leave their work for too long a time. This interrupts their work and irritates a conscientious shop foreman.

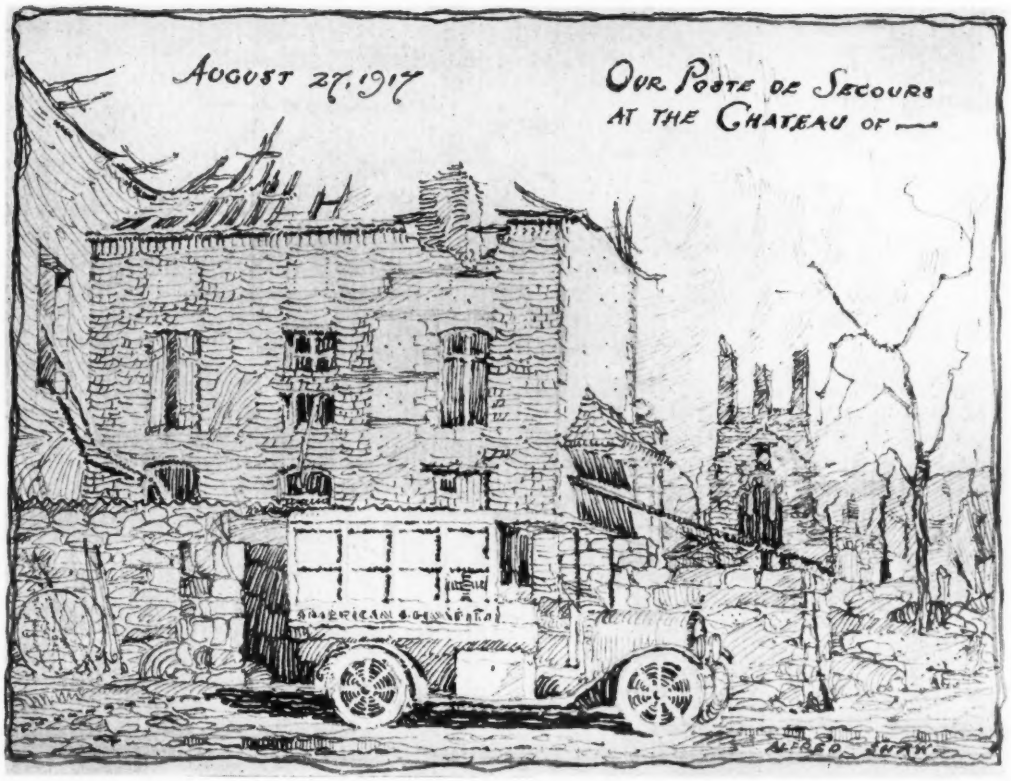
In conclusion, it may be added that before an architect touches his pencil to lay out final sketches he should route the product of the factory from the raw material to the shipping platform. If this



CORRIDOR

The light through windows comes from the skylight over craneway

product can be made to have only a forward movement in the process of manufacture, and does not have to pass through the same shop twice, an excellent and economic start has been made. If some of the equipment hints above mentioned are then incorporated, a good workable and permanent plant will have been obtained.



With the Ambulance Corps in France

By Alfred Shaw

Special Correspondent of The American Architect

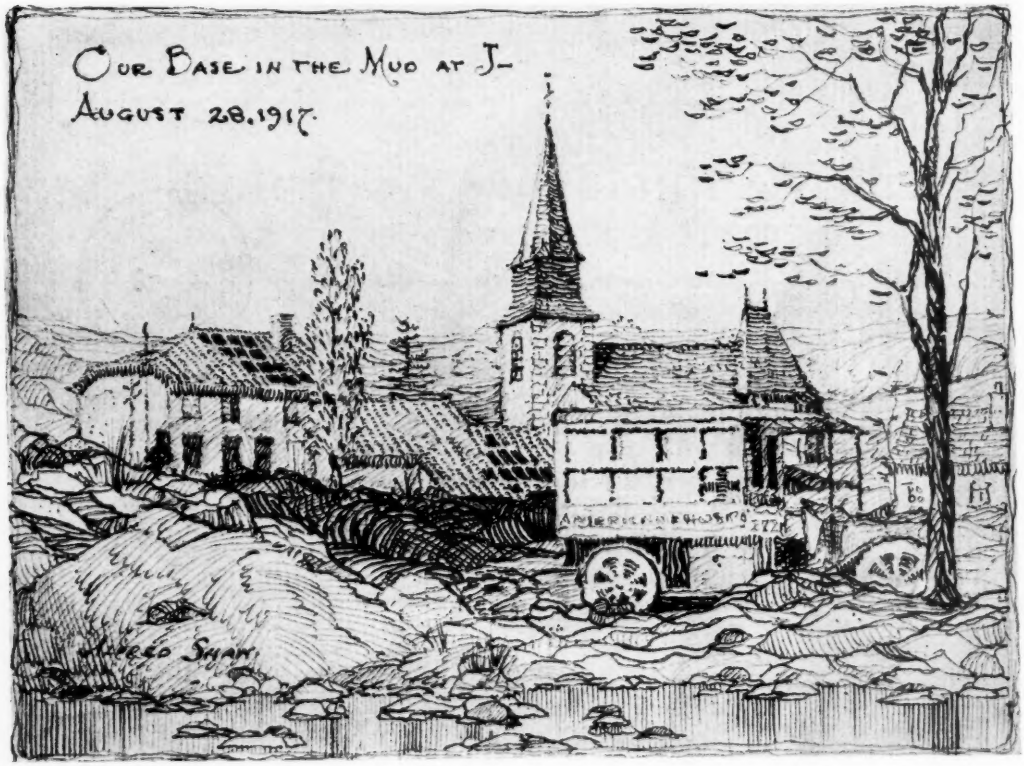
AUGUST 22. This is the first opportunity I've had to shoot any news to you since we have been at the front. The censor will not permit me to say which part of the front, but I'll say it is one of the warmest places. We came along as the French were beginning an attack, and this meant loud and heavy work. However, we expect *repos* in a couple of days and can rest up then.

We drove our cars out from Paris and had a good chance to see the "pays de France" as we passed, and to stop at ——— and ——— en route. I must be cautious about mentioning cities. We travel two men on a car and my mate has been painting for about five years. This means that we can talk about color and line and the "play of light and shade," and all that sort of thing, which, of course, helps. The Cathedral at ——— seemed to be "blushing unseen," and to appreciate our appreciation, and at ——— it was the same, no visitors. I almost felt guilty as I stood staring at the jewels in the ambulatory windows at Notre Dame. But only "almost!"

August 29. The attack seems to be over and to have been a grand success, but while it was on I must say we were busy. The different *postes* which we serve form a chain which hangs from our barracks at ——— and drops right down to the line. The link between the last two furnishes any amount of entertainment. Shell holes to dodge, breezes blown from off dead horses, "obus" and gas bombs, too, worry you, and at night more than in the day the old "soixante quinzes" whang a blast right into your face. The shells, as they start with our best wishes, pass about 8 or 10 feet over the car. The

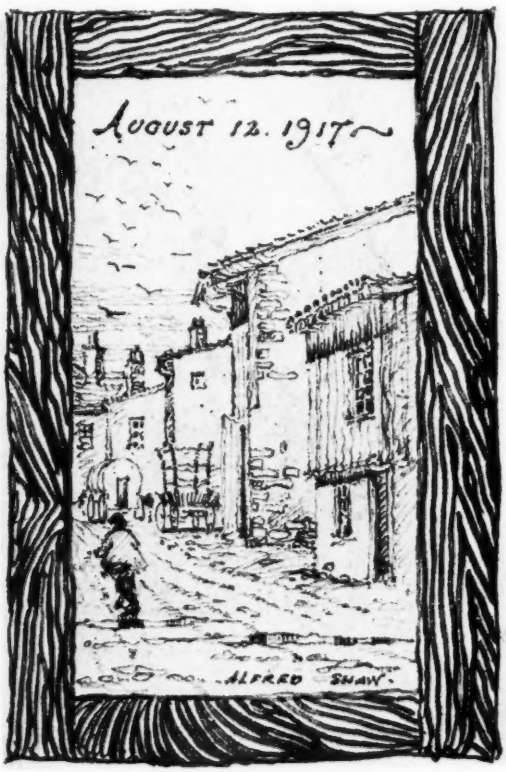
attack was supported by an overpowering *tir-de-barrage* and cannonade, almost unbelievable. The ground taken is all chewed to pieces and the towns near the *ligne* are nothing but loose piles of masonry; if you know of anyone who wants to invest in second-hand bricks, let them have my address. Present-day French architecture consists mostly of *abris*, which are of different types. On entering a town (?) the correct procedure is to stop the motor and become familiar with the location, merit and personnel of the *abris*. Some are made up of an arch of sheet steel, with large corrugations 6 inches deep and 6 inches wide. On these are piled stone or bags of earth. Others are framed up of crude and heavy timbers, with vertical supports never more than 6 feet in either direction and protected on the outside as are the first. In loose *abris* the principle of covering up a blast is simply applied in the opposite direction. Just now I am in a dugout built in the basement of a chateau. These workers in bomb-proof architecture sneer at stone vaults and build up under them an independent wooden frame, like tremendously heavy centering. This makes for lack of head room, and, with the added height of our "tin derbies," it is a luxury to be able to stand up straight. I'd like to be about 4 feet 8 inches tall.

Among the churches which have been ruined in our particular section there are no very ancient ones, but those which I did see are good for nothing but backing. In the village which is our base, the church lies in among battered houses and is not even scratched. Not far from here the other day, French anti-aircraft got a couple of Boche



planes, and for no apparent reason other than vengeance, we had some big ones dropped in on us. This being bombarded at your base is awfully uncomfortable, worse than all kinds of stuff out on the line.

To save myself some trouble, I'll give you a day or so from my diary, specimens like:—



August 18. Coffee and bread under the morning stars, and to M——, where it was fairly warm. Excellent lunch back at the hospital and out around Hell's Bend to E——. We jounced and jiggled along a barren hillside in full view of the enemy, who could have picked us if they had cared to shoot at an ambulance, and the *abri* looked pretty good to me. We got away with four *couches* at 1 a. m., when the road was crowded with *ravetaillement* and all the fireworks were on. In the dark between star shells we creaked in and out of shell holes, in one of which I broke a wheel, which did not, however, collapse completely until I got near the hospital, so that we could carry the *blesses*.

August 22. At 2 a. m. to the town of M——, where the *abri* was jammed with gas victims. A lieutenant here said that this morning's fire was the worst he has heard in his three years, and the boys went over the top at 4 o'clock. L—— fell in five minutes, as did most of T——. Here alone we saw over 1000 prisoners. They came running down the line, having given themselves up to guards; some of them become brancardiers.

We have comfortable quarters connected with a hospital which is actually twice as large as the town in which it is supposed to lie. The area covered is fully a square kilometer and the plan is as clever as that of any cemetery. There is, however, a large court formed by the buildings about it, and on a ground of chalky stone lies a great cross of red-leaved plants. This is, of course, a sign for enemy *avions*.

The Route Nationale from R—— to G—— races through the town, chiseling a sheer pathway, as though nothing mattered, between R——and G——, which happened to be the case. Scarcely any of the houses have windows in the wall adjacent to the "Route" and they are all exactly on the lot line or whatever they call it over here. The blank wall of the church has simply a door and a sundial, and while you'd never suspect it from the roof and cupola, it is the purest, simplest little Gothic affair imaginable. Upon inquiry I found that it was the chapel of a convent of which we found scant but interesting fragments nearby.

During the last few days in the hot corner we became accustomed to the business and used to scheme to get to our farthest and most dangerous *poste*, because the cuisine there happened to be fine, but my *sangfroid* and *wanderlust* were seen to evaporate when my "tin derby" was sprinkled during a visit to the ruins of a village church.

We have a little *repos* at T——, where there was one of the best flamboyant Gothic entrances I have seen. I'll try to send you a sketch of it. At this place we used to exchange visits with a friend of mine in the Lafayette Esquadrille, which was stationed nearby.

Near St. H—— there is the only attractive field hospital I have seen. The several small barracks of wood stained dark, form a background for the flowers which are around every building and nearly all of which are yellow. At a small concert given by the personnel here some fine artists contributed, including Boré, the violinist. Playing war isn't half as good as playing architecture.

As you may guess, there is not a great deal of time for sketching, but I am sending some, and hope you will take care of them, such as they are. And don't forget, "It's a gran' an' glorious feelin'" to hear "Shaw?" when they're calling out the mail.

The Government and the Industrial Housing Problem

By Our Special Washington Correspondent

THE question of dealing with the housing shortage in connection with the vast Government plants and industrial concerns for the manufacture of war material has reached an acute stage. So great has the question become that conferences are now being held here by committees of the Council of National Defense to see just what steps can be taken toward the adoption of some plan that will relieve the situation and at the same time give the army of workers homes that they are entitled to.

The house shortage and the congestion now existing in the areas of munition plants and other industrial plants are too well known to go into minute detail, yet it is a fact that at this time such shortage and such congestion are impairing our industrial production. There is grave danger that it will lead to real labor unrest. The British Government was made aware of just the same conditions that now confront the United States Government, and her "Defense of the Realm Act" came to her rescue. Of course no such condition of law exists here, yet our legislators in Congress can make just the laws necessary to relieve what promises to be a real problem.

A tentative legislative program has been prepared for the consideration of labor leaders and Council of Defense members. It provides first of all that the Government shall have the power to take land for housing purposes for the duration of the war. It calls for an appropriation of $100,000,000, of which $200,000 is to be set aside for administrative work, the appropriation to be used for the building or aiding in the construction of houses for workers engaged in making war necessaries. It is estimated that this appropriation would provide for 40,000 families, the cost per family unit being $2,500.

What is suggested that this nation do in the premises the British Government has undertaken under its law. It is proposed to take over any unoccupied property for housing purposes; to secure to the Government the right to prevent the raising of rentals; the right to adjust all prices for canteens or boarding houses. These suggestions are necessary for the proper enforcement of the legislation that is proposed.

As to the methods of administrating the funds of the act, it is suggested that funds be made available to all manufacturers who are making war materials and who can speedily arrange for a housing program of the kind that meets the localities' needs. It also is planned that funds be made available to stock companies generally known as housing associations, giving them all or part of the money required, with the provision for sale by the Government of its interest after the war at a residual value to be determined, and then having the Government build the houses on land purchased by the Government. It can be stated that this method was adopted by the British Government and applied on a huge scale as being indispensable to war production.

As to the types of houses required, it is suggested that they be single family dwellings, whether built in units of one, two, three or four; houses adapted to caring for boarders by a family or keeper; multi-family houses of the urban tenement type; temporary houses to be erected only where the emergency requires; and where temporary structures are erected their demolition should be made mandatory, since it is a fact that such structures develop into slums, as many of the large cities well demonstrate.

As to the rentals, they should be calculated by taking into account the local conditions and without direct relation to the cost. The lowest rental consistent with conditions should be provided. It is believed by those interested in this project, that is, by the originators of the entire scheme, that at this time the best materials are the cement and clay products, such as brick, terra-cotta, hollow tile, cement block and concrete, but not reinforced. These materials are believed to be easier to obtain than wood and are more fireproof and sanitary and of a low cost.

This outlines in the rough what it is proposed to do, and only at this time the project is being discussed, yet it is possible that some sort of a plan will be inaugurated. There is no question as to the importance of the housing problem, and since the war began it has been a serious question for many centers, that of properly housing the armies of workers.

The conferences on the problem now being held here promise to become of great importance.

PLATE 178

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

XUM

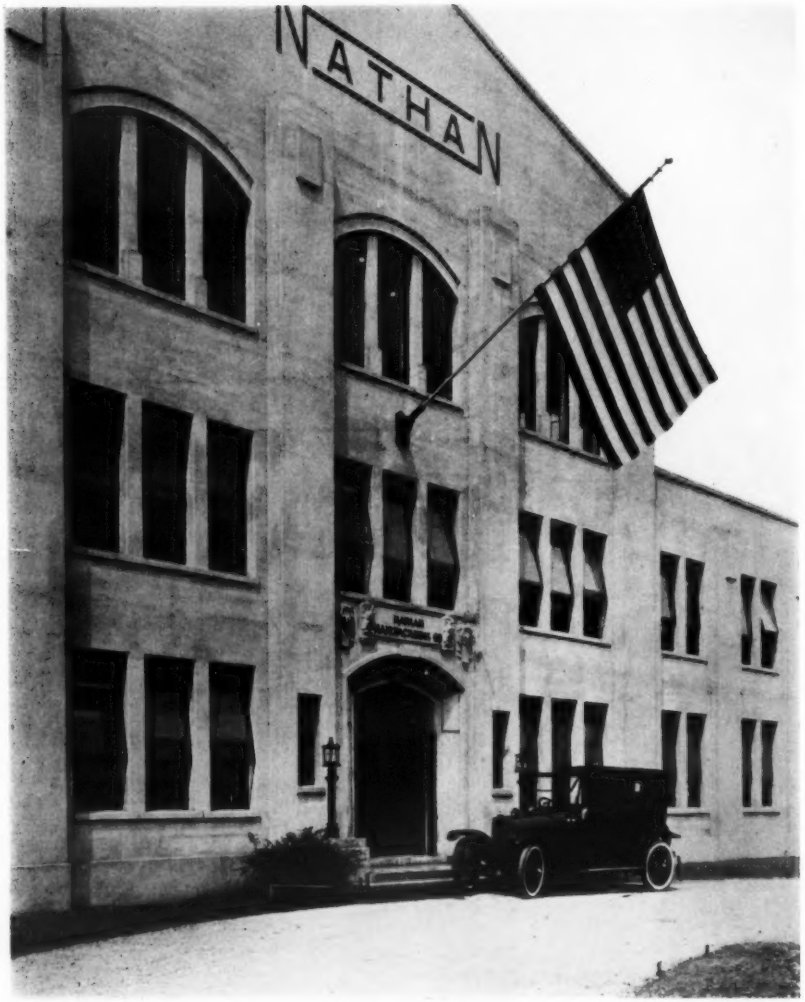
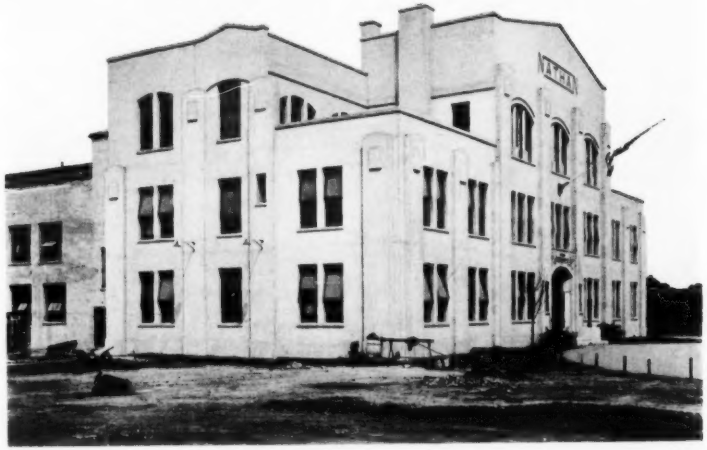


PLATE 179 MAIN ENTRANCE



GENERAL VIEW
ADMINISTRATION BUILDING

MANUFACTURING BUILDING
FOR NATHAN MANUFACTURING COMPANY
FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

XUM

HALLWAY—ADMINISTRATION BUILDING

PLATE 180 HALLWAY—LOOKING TOWARD CRANEWAY

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY
FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

VIEW OF ROOF

PLATE 181 LIGHT COURT BETWEEN SHOPS

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY
FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

CRANEWAY—FIRST FLOOR (HEAD ROOM 12 FEET)

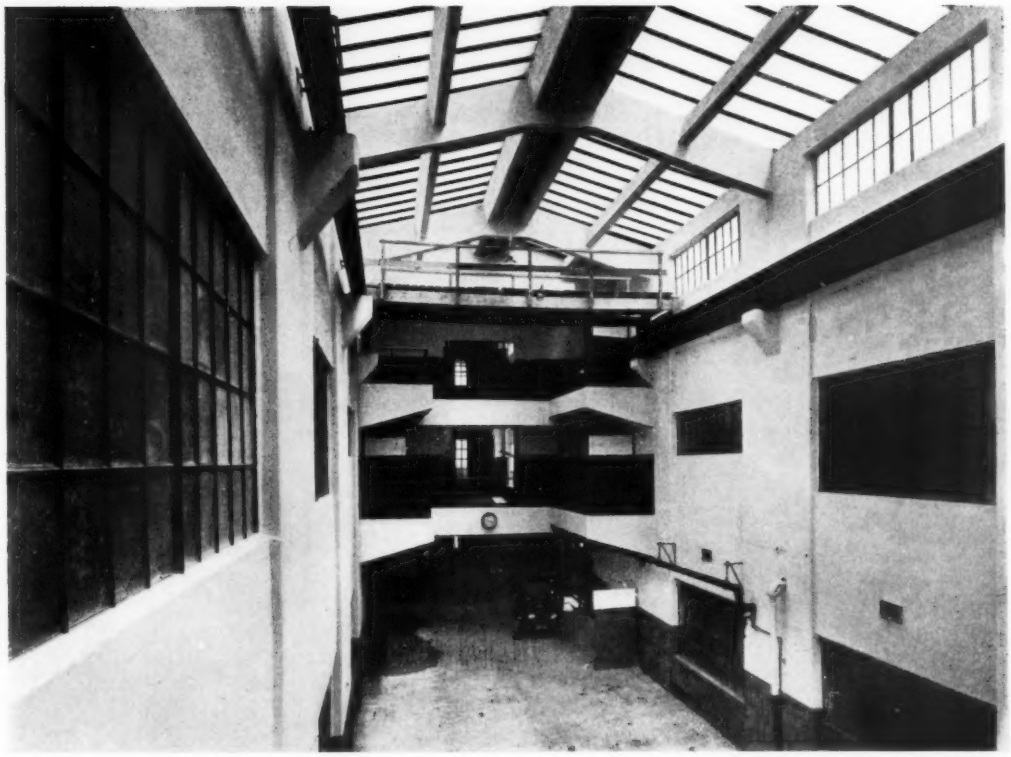


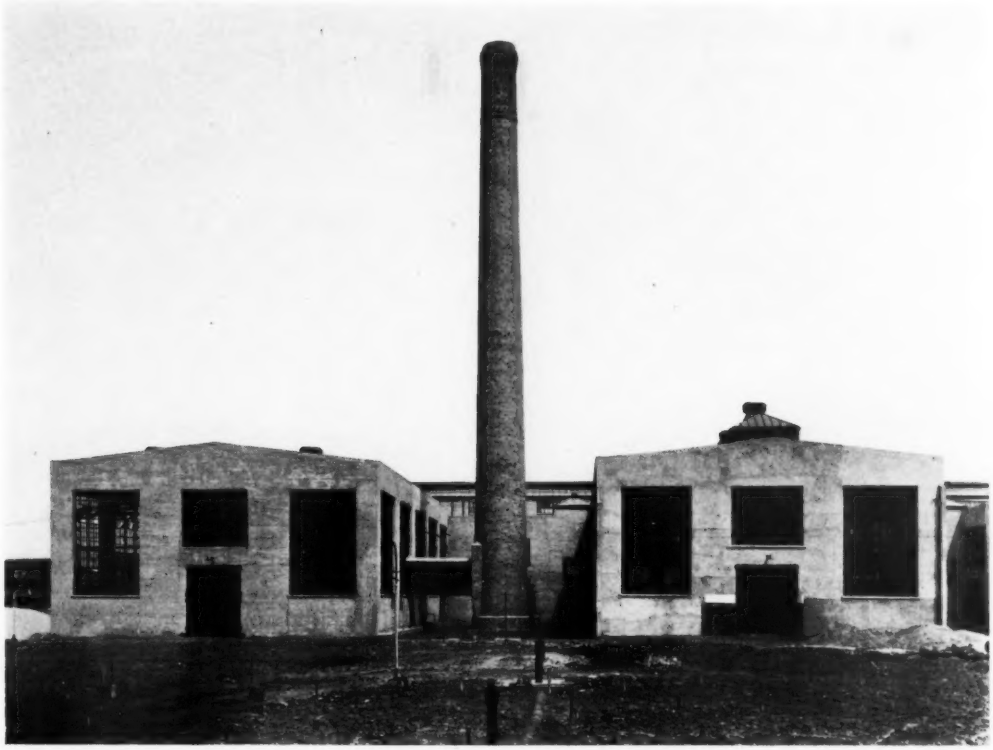
PLATE 182

CRANEWAY VIEW TOWARD ADMINISTRATION BUILDING
BALCONIES FROM VARIOUS FLOORS, RIGHT AND LEFT INTO FACTORY

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY
FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

XUM



POWER HOUSE AND FOUNDRY

PLATE 183 GARAGE

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

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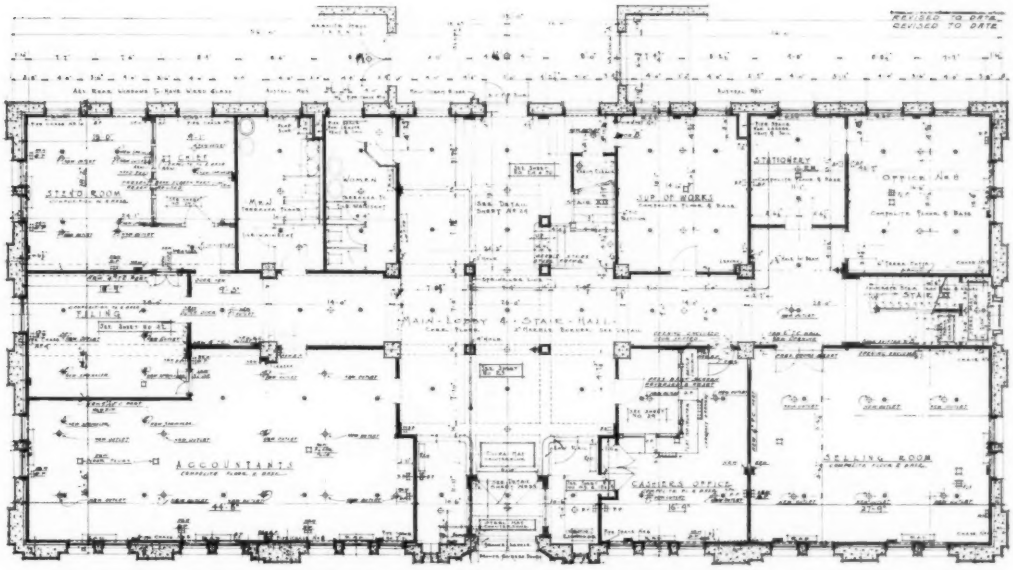

FIRST FLOOR—ADMINISTRATION BUILDING

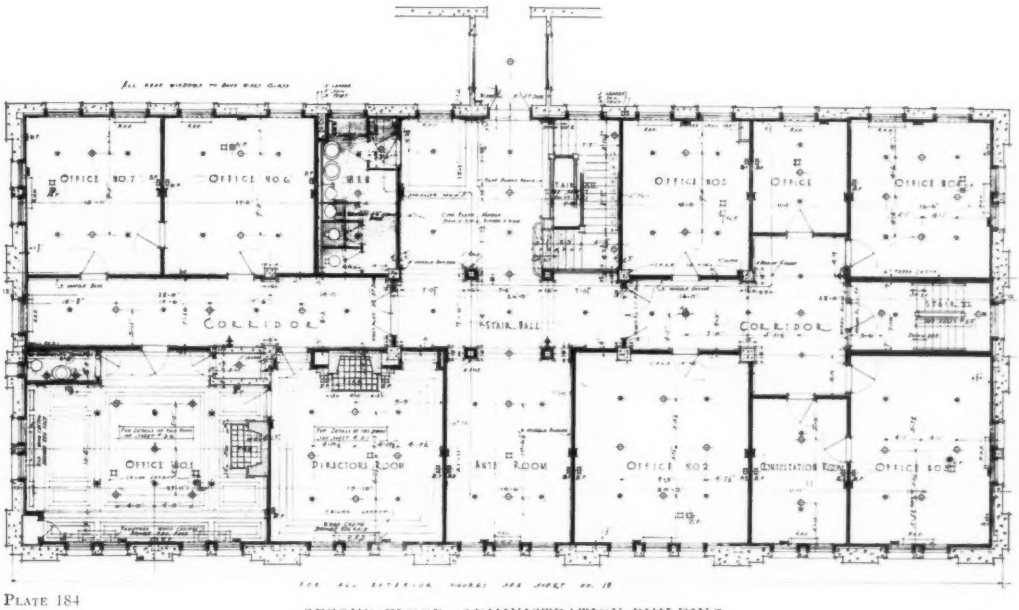

PLATE 184

SECOND FLOOR—ADMINISTRATION BUILDING

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

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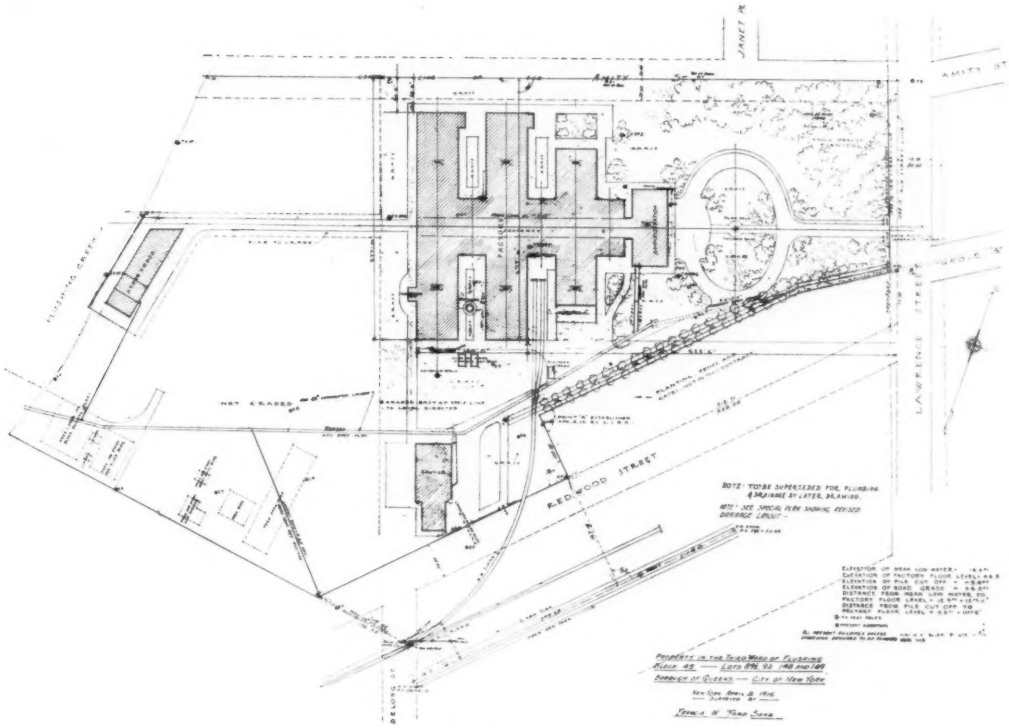

GENERAL BLOCK PLAN

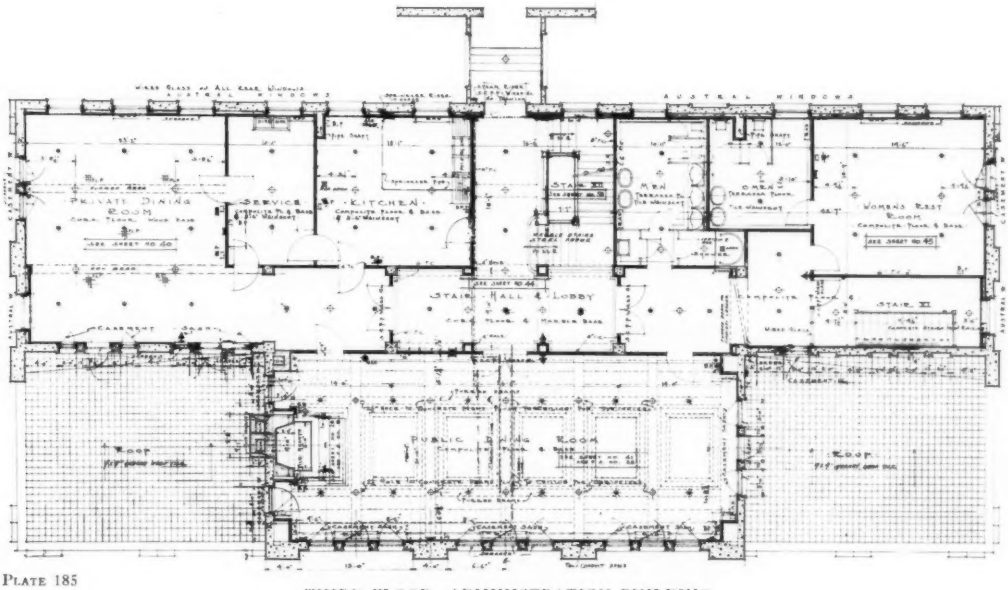

PLATE 185

THIRD FLOOR—ADMINISTRATION BUILDING

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

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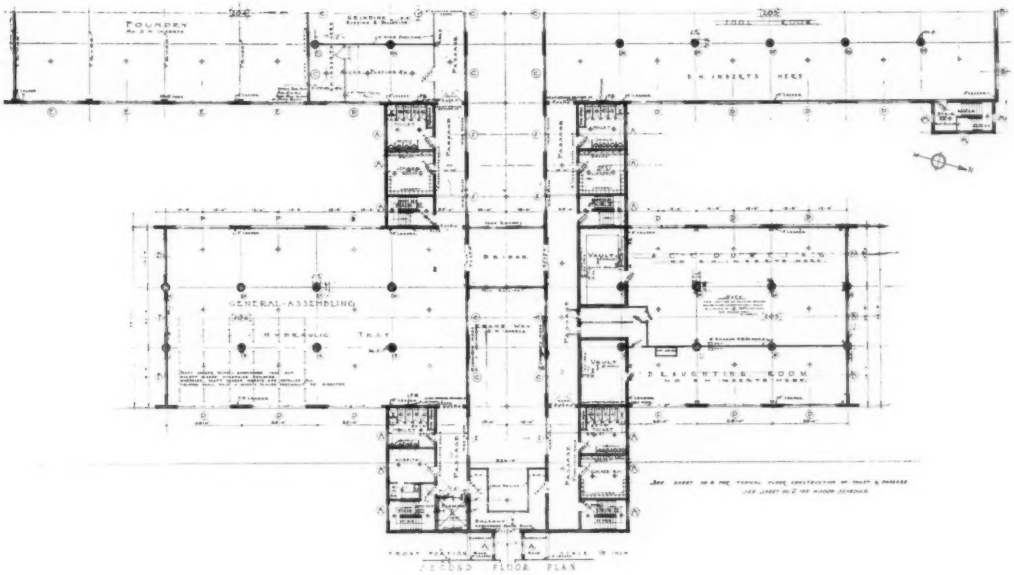

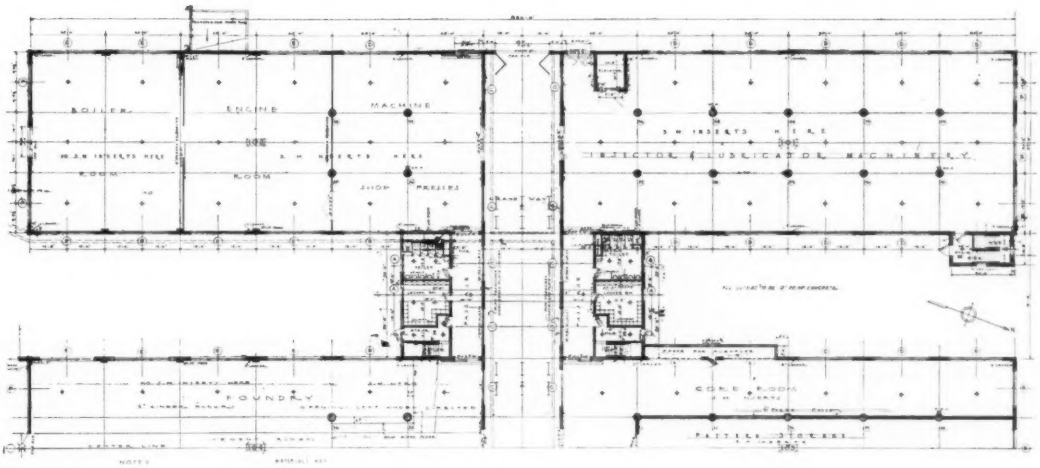

PLATE 186

HALF OF FIRST AND SECOND FLOOR PLANS OF FACTORY BUILDING

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

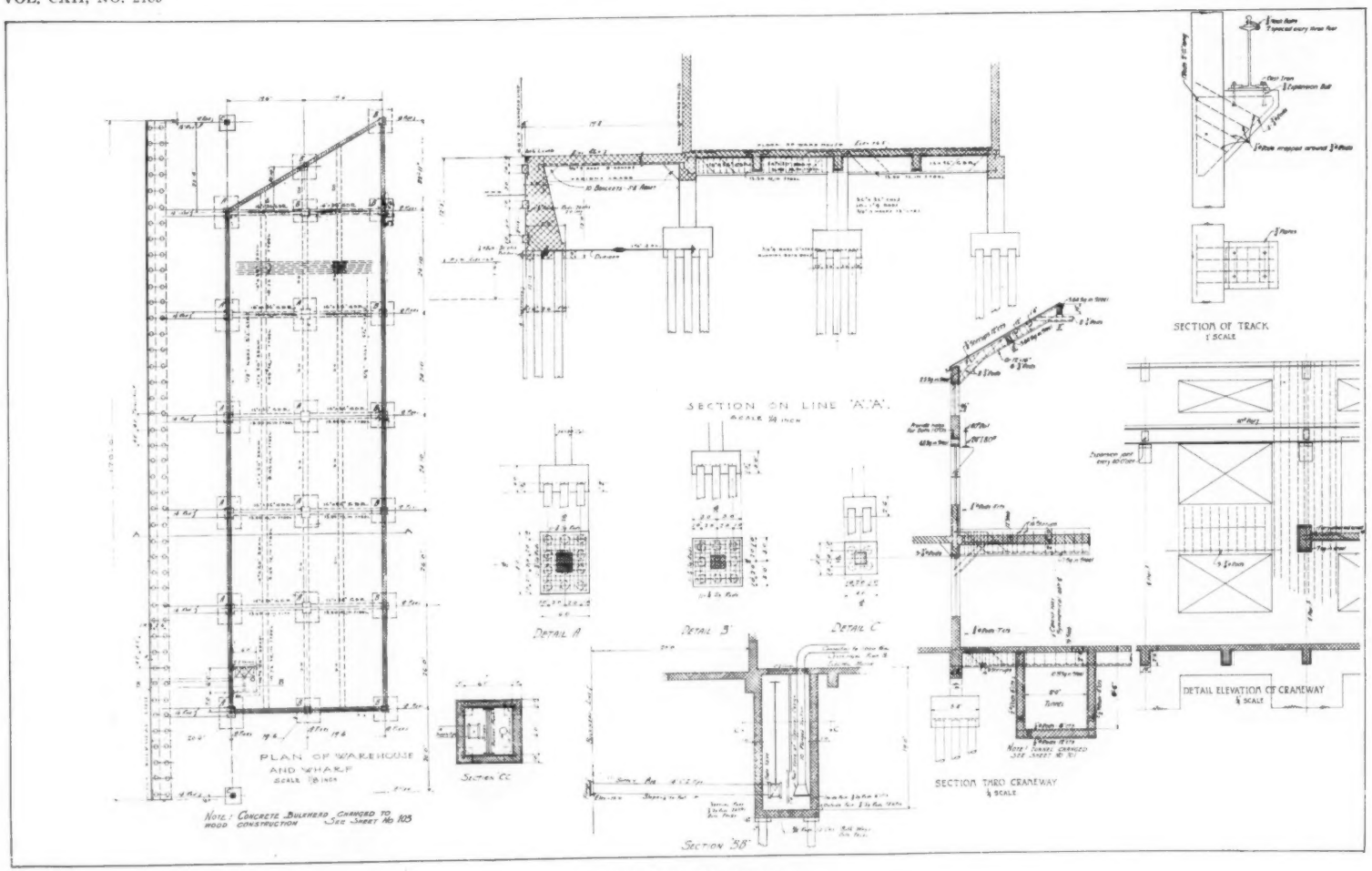

PLATE 187

CONSTRUCTION DETAILS

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

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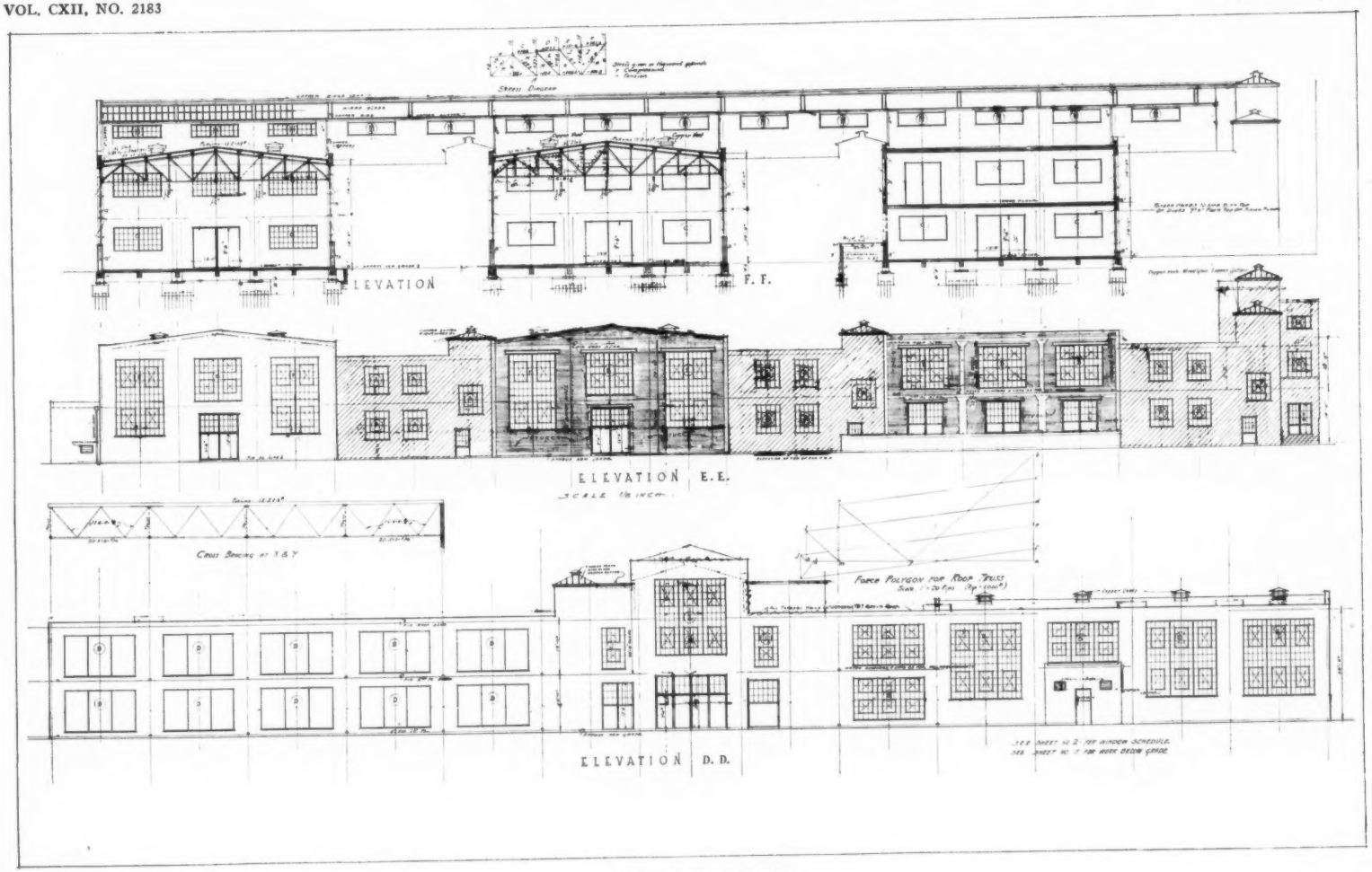

PLATE 188

GENERAL ELEVATIONS

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

XUM

PLATE 189

CRANEWAY ELEVATION AND SECTION

MANUFACTURING BUILDING FOR NATHAN MANUFACTURING COMPANY, FLUSHING, LONG ISLAND, NEW YORK

EUGENE SCHOEN, *ARCHITECT*

XUM

THE AMERICAN ARCHITECT

Founded 1876

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A Present Duty

THERE is a well-defined duty confronting every architect actively engaged in practice. He should acquire, as far as possible, a thorough knowledge of the many and diverse things that affect every phase of building activity at this time. It has now become a further duty of architectural practice to give co-operation in the investigations that are being undertaken in large cities into present conditions affecting factors of labor, material, transportation and substitution of cheaper, but thoroughly well approved materials, for those heretofore used but now not easily obtainable. It is incumbent on architects that they co-operate to the fullest extent of time and service with the committees being formed to inquire thoroughly into these matters. The situation can not be regarded as purely academic or theoretical; it is one of fact. The future will undoubtedly prove that the man who has kept abreast in these matters will be able to serve his clients and himself in the most valuable way, and it is equally true that the uninformed man will be distanced, not only during the war, but after its close, when conditions revert to the normal.

Borough President Marks of New York City has formed a committee of the building trades and all allied interests. It is proposed by this committee that in order to avoid an artificial stimulation of activity in building there be gathered facts affecting building interests, and a thorough exchange of information, so that action to prevent the retardance of building may be based on a foundation of unassailable information. Through a series of actively working committees these facts are being gathered and given the widest publicity.

A similar movement is afoot in Chicago. A circular issued by Mr. Charles H. Gagen of the Trussed Concrete Steel Co. urges that "We should find out by some definite means and through proper channels just what is the actual condition as to demand and supply." A permanent organization along similar lines to the one in New York is strongly urged.

Mr. Gagen advances the opinion that a general tendency to attribute the high cost of materials to war preparation has caused most of those engaged in building to lose sight of the actual facts as affecting business interests. The means of securing a remedy for present conditions are set forth in this circular.

It is further stated that by this development of all sources of information, a readjustment will be readily accomplished, and then the investor, on whom all building projects depend, will naturally act. All this means a great and a concerted effort on the part of all concerned.

In these councils and investigations architects should take a prominent part. They should refrain from aloofness or a disinclination to participate in conferences that they may regard as not directly within the field of architectural practice.

In fact it will be found that a commingling of all the building interests will demonstrate a certain temperamental compatibility, the existence of which has heretofore been questioned. Every man in the professions or trades, from the lowest to the highest, who has given his work careful study knows where and how the rim of his endeavor touches that of the other interests engaged on the building. A certain lack of freedom of approach, perhaps in a sense due to the aloofness of the architect, has served to lose many an opportunity for reduced costs and increased efficiency. Just as the man in the trenches serves with other men without regard to social or business status, just so must every man serve who desires to see the building interests survive the very serious menace that now confronts them. This will be no time for architects to assert a position as dominators of the work, but it will be a

time for architects to co-operate by service on the various committees and boards that will be formed to gather the facts, make them available and trustworthy, and by this means set us on the straight road to a readjustment of present unsettled conditions.

Resolutions passed during the recent convention at Atlantic City, N. J., of the Chamber of Commerce of the United States, have a direct bearing on this question of readjustment to meet present conditions. These resolutions, while setting forth the vital necessity that the vast requirements of the Government for material and labor be met in a manner to interfere as little as possible with essential industry, believe that these requirements should be met in a way to maintain as far as possible in these abnormal times the normal structure of business.

According to a bulletin issued by the Chamber of Commerce it is believed that the war service committees of the various industries might undertake the following:

1. To assemble accurate information with respect to the facilities of the industry, the possibilities of expansion or the readjustment of plants and equipment to meet the ever-increasing requirements of the Government.

2. To arrange for the gathering of figures as to cost of production in the industry, including conditions which were changing the cost of production. In this respect the committee would furnish to the Government information which would prevent avoidable hardship in the business by Government regulation of prices or distribution.

3. To act with the Priority Committee of the War Industries Board which is establishing principles governing the distribution of materials in transportation and the order in which various products are to be produced and distributed. The work of the Priorities Committee calls for an immense organization and the quick adjustment of industry to the demands of the priority system. A war service committee representing an entire industry can be of great value in dealing with priority questions with relation to that industry.

4. New facilities are being created and there is great shifting of labor from one section of the country to another. War service committees could offer suggestions regarding the use of existing facilities or the employment of labor in districts of the country where needed after the war.

5. These committees should be ready at all times to meet with any of the departments of the Government whenever their advice is desired, to discuss questions affecting the industry raised by the war needs of the Government. The committees might also, on their own initiative, present to the Government questions which call for consideration, and might from time to time suggest on behalf of the industry how orders and material can be distributed to the best advantage and with the least disturbance to existing or prospective conditions.

It will be noted that these recommendations are in every way along the lines now being followed by representatives of the building interests in New York and Chicago.

In selecting the war service committees the bulletin emphasizes the following:

A. All branches of the industry should be represented on the committee, whether members of a trade organization or not.

B. It is important that the committee should include representatives of some of the smaller units of the industry as well as the larger.

C. To be in a position to render efficient service, the committee should not necessarily be made up of the presidents of the largest units of the business or of the best known men, but should contain men of recognized ability who have a thorough knowledge of the important details of the industry, particularly costs, specifications and volume of production. Where the industry is widely scattered and different problems exist in different sections, it is important to have the different sections of the country represented, but effort should be made to appoint a committee which can be readily assembled for committee meetings.

D. Sub-committees of the important branches of the industry should be appointed to co-operate with the war service committee wherever possible.

As will be seen, emphasis is laid on the necessity for a complete representation of all branches of industry, labor, transportation, material and the technical elements that are engaged in building operations.

The benefits of such a representation will be twofold. It will cover every field of the building industry and serve its present needs, and it will also bring into intimate association groups of men, heretofore engaged in the building industry of the country, but never co-operating to the fullest degree of efficiency.

While efforts along these lines have been made in the past by architectural organizations, notably the Illinois Society of Architects, a very active and practical body of men engaged in the profession of architecture, the movement has not been sufficiently widespread to insure the best results.

Department of Architectural Engineering

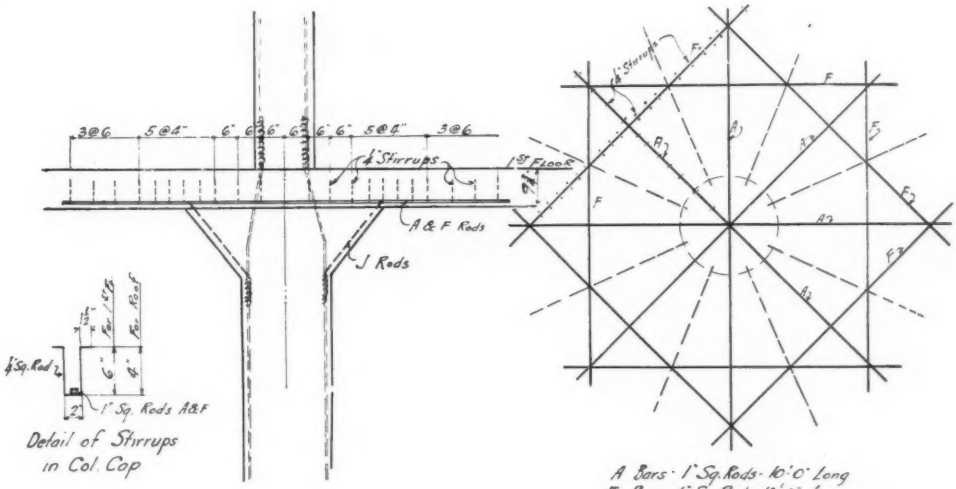
Features of Engineering Design of The Nathan Manufacturing Company's Plant, Flushing, L. I.

By Isador Fried, Consultant

THE location of this factory on marshy lowlands made the design and construction of the foundation difficult. After a study of the soil conditions, by means of borings covering the entire property, it was found that the top layer for about five or six feet consisted of a peaty material which could be removed in layers with a shovel. The lower course was a clayey silt, having practically no bearing value. A spread foundation was therefore out of the question. Wooden piles were decided upon as the quickest and most economical for the buildings. Mean high water being at such an elevation as to moisten the piles once every twenty-four hours rendered them acceptable for this foundation. The piles averaged thirty to sixty feet in length and were driven to sustain a load of fifteen tons.

Several thousand piles were driven for the main foundations. The soil being so muddy, much difficulty was experienced in pouring the footings over these piles. It was first found necessary to cap the piles with a twelve-inch concrete slab, embedding the entire footing poured on this capping.

So treacherous was the ground, that all the outside pipe lines for plumbing, sprinkler lines, gas lines, steam ducts and water pipes were supported on piles.

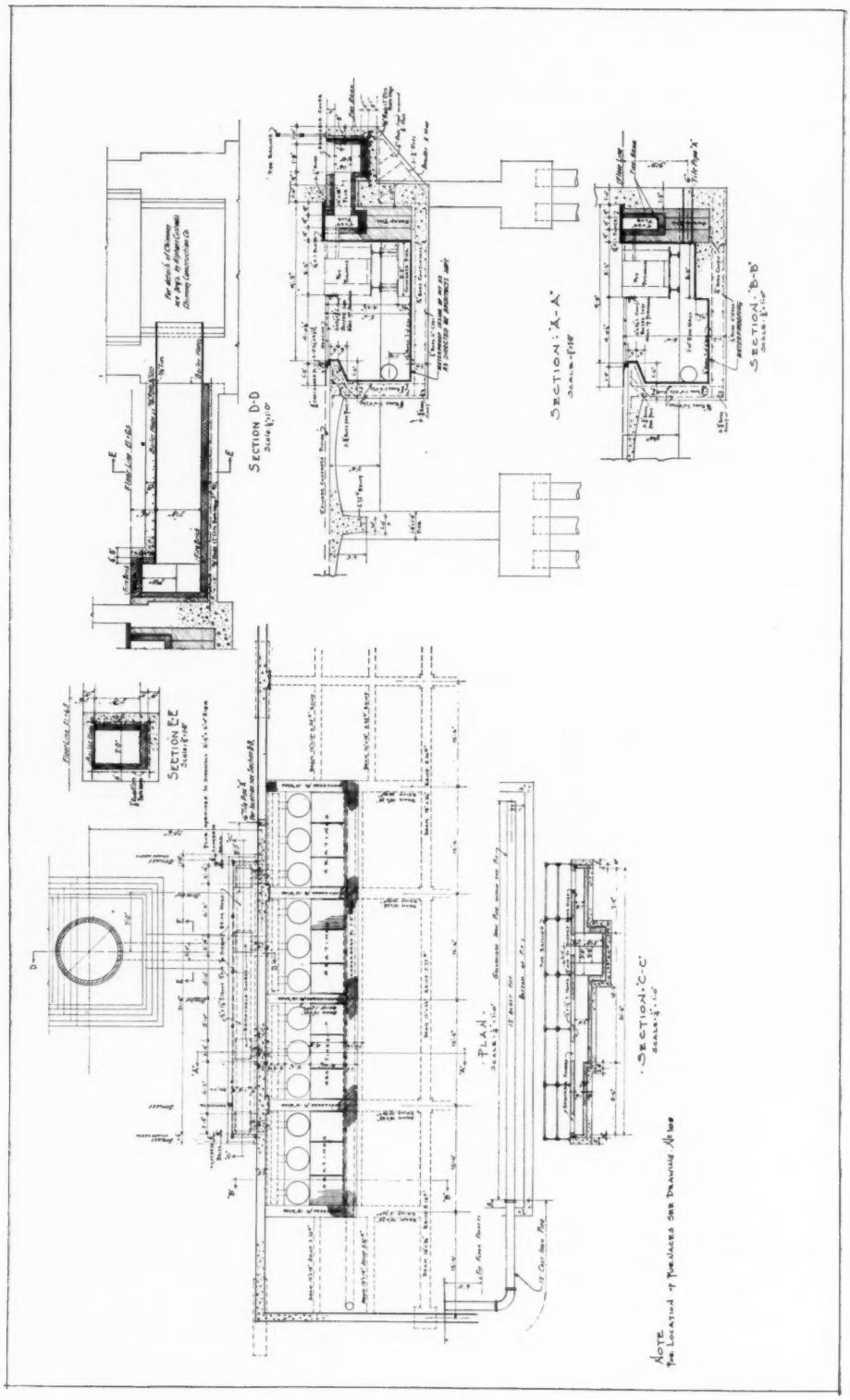


Detail at Column Cap
Similar detail at Roof Slab

Detail at Col. Cap at Bottom of Slab
All other details same as shown on T.C.S.Co's Drg. No. 9

A city sewer had its outlet on the property and emptied into an open ditch through the property, flowing into Flushing Creek. The city sewer was an egg-shaped one, and was diverted to a nearby street by a corrugated iron sewer 4′ 0″ in diameter, supported on piles. The length of sewer built was fifteen hundred feet.

The construction of the first floor also involved difficulties. The design for this floor consisted of beam and a concrete arch slab. The beams were first



FURNACE ROOM DETAILS

poured, leaving a notch to take the concrete arch. The "hy-rib" was then placed between the beams, and arches poured to finished concrete line. All plumbing pipes and water pipes were hung from

FOUNDRY

Note large windows and ventilating skylight

these beams by means of hangers, which were installed before the arch was poured.

The second floor and roof slab consisted of a flat slab mushroom system. The panels were approximately 20′ x 25′, thus affording the best arrangement for working spaces.

In the Foundry and Power House, the intermediate interior columns were omitted, and the roof, being 28′ from the floor, gives a clear height of practically 25′. Steel trusses spanning full width of building, supported on reinforced concrete piers, with steel purlins and reinforced concrete slab, were used for this construction. The steel trusses came from the fabricating plant spliced at the center, and were riveted together in the field and raised to their proper place.

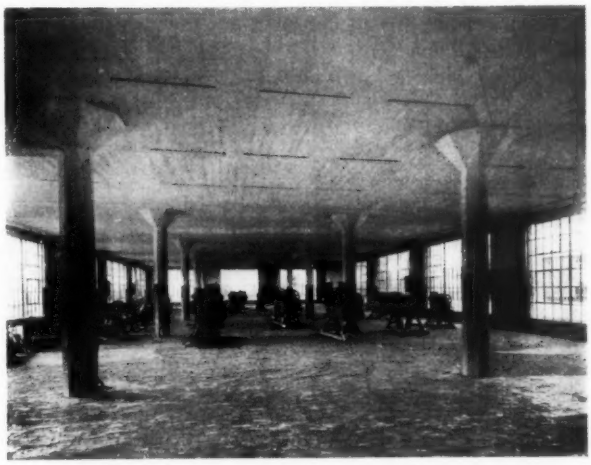
Provision was made in the craneway for two traveling cranes of seven-ton capacity, pipe trenches and three communicating bridges for use of second floor. The entire craneway is covered with wire glass.

The construction of the Administration Building consists of reinforced concrete walls, columns and steel floor construction. Above the main dining room is a tank room for housing a forty-five-thousand-gallon tank. From each floor of the administration building is a passageway to balconies at the end of the craneway. From these balconies, observations may be taken of the factory operations.

A store house was built about three hundred feet west of the main factory buildings in connection with a new wharf. This building, 40′ x 150′, has reinforced concrete walls with roof slab supported on steel roof trusses and purlins.

Just south of the main factory buildings is the garage, 50′ x 120′, and the type of construction used was similar to that of the store house. A portion of the garage is two stories in height, and the upper floor arranged for an apartment.

The concrete was mixed and distributed by means of a central concrete plant near the craneway. The materials were brought to the site by water and rail, a railroad having been built prior to the construction work. By means of a tower 130′ high, the concrete was distributed to the different parts of the plant through long chutes. For certain parts, buggies were used to carry concrete, the concrete mixture being first poured into a hopper



MACHINE SHOP ON SECOND FLOOR

Large unencumbered space between columns

from the chute. The concrete plant was placed on piles for one of the toilet wings, and the wing built after the pouring for all factories had been accomplished.

Pneumatic Water Supply for School House Installations

By J. Albert Deyo

SELECTING the water system for a school building, which cannot be served by a municipal system, is among the important things architects are called upon to plan because it is a permanent fixture and must give reliable, dependable service every school year for many years. From the fact that an abundance of water must be available summer and winter, school service is one of the hardest tests of any water system, and to be successful in a school the system must be simply constructed and so well built that the ordinary school janitor can give it all the attention it needs, in addition to his other duties.

Therefore, the architect who has installed equipment which he knows to have given satisfaction is to be envied. He is in touch with equipment which he can specify and insist upon having installed. If there is any doubt in his mind as to the right size of equipment to be used he does not hesitate to call upon the representative of the manufacturer and ask for information.

MARSH SCHOOL, MONTE VISTA, COL.

The pneumatic tank should be of sufficient size so that it will not be necessary for the pump to be operated more than twice each day, once before school begins in the morning and once during the noon recess. If the system is to be operated by a gasoline or gas engine, this gives the janitor an opportunity to take care of the water system when he is at work around the heating plant or other work in the building. If an electric motor is used, the pump will, of course, be equipped with automatic control, so that it will start when the pressure gets low, without attention from the janitor, and will automatically stop when the correct pressure is reached.

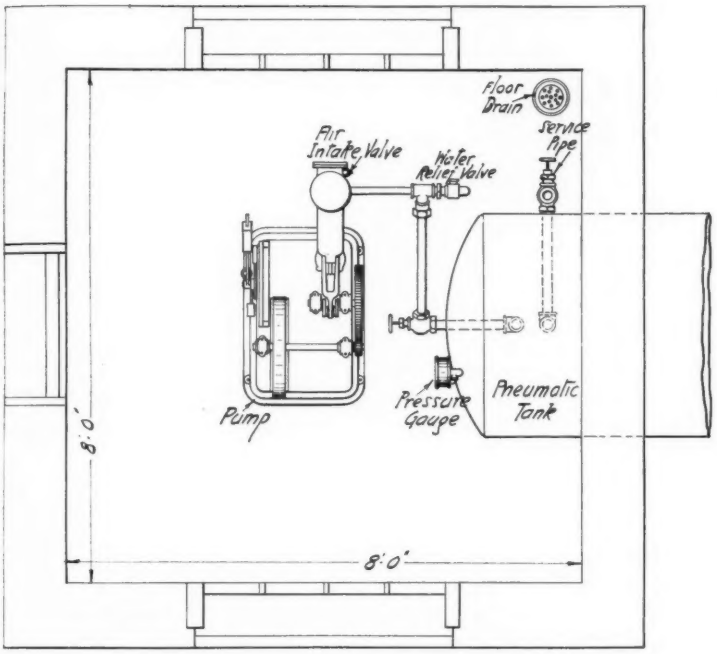
Whether engine or motor is used, the pump capacity should be sufficient so that it will not exceed one hour to pump the tank full of water. The size of the tank itself depends upon the number of pupils and, equally as much, upon the number of plumbing fixtures. In the consolidated rural schools now being erected, there are usually provided shower baths and drinking fountains, in addition to the regular toilet facilities.

Under ordinary conditions, where there are not to exceed three hundred pupils and electric current with automatic control is available for operating the pump, a pressure tank 4 feet in diameter by 16 feet in length is sufficient. This tank may be placed entirely in the basement or may be buried outside the basement wall with the head extending into the basement through the wall.

The pump installation will depend upon the depth of the well and the vertical distance to the water. If the vertical lift, from the surface of the water to the pump, does not exceed 20 feet, then the suction type of pump may be used and the pump may be placed in the basement, whether the well is located inside the wall or not. If the lift is greater than 20 feet it is always advisable, and usually necessary, to install the pump directly over the well. If the well is in the basement the installation is very simple. If the well is located some distance from the building, then the pump must be placed at the well and the tank may be located at the well or in the basement of the building, as conditions warrant.

In a climate where the winters are cold it will, of course, be necessary to protect the pump, especially if the well is not in the basement. Many pump companies produce their pumps with frostproof equipment, so that connections can be made from the pump to the tank entirely underground. In other cases it is necessary to erect a frostproof building over the machinery.

The accompanying drawings indicate the proper method of installing a suction pump with a pneumatic tank. The tank is buried underground with the head extending into the pump room, which in this case is dug out below the ground level. The



upper design shows the floor plan and gives the dimensions necessary for a pump having a capacity of approximately 1,000 gallons of water per hour and a tank holding 1,000 gallons of water.

The illustration on the preceding page shows the school building where this system was installed.

The following specifications are suitable for a water system of this kind and may be used for any school where there are not more than three hundred pupils and where the power is furnished by electric motor. It will be necessary to make slight alterations in them to meet local conditions, but these will readily suggest themselves.

Specifications

The plumbing contractor to furnish and install complete, where shown on plans, and in accordance with these specifications, and following the details and instructions furnished by the manufacturer, one complete water system.

Equipment

One 48-inch by 16-foot pneumatic plain tank; total capacity 1,500 gallons; water capacity 1,000 gallons; ¼-inch shell and ⅜-inch heads. Tank to be tested to 125 pounds, guaranteed under a continuous working pressure of 75 pounds.

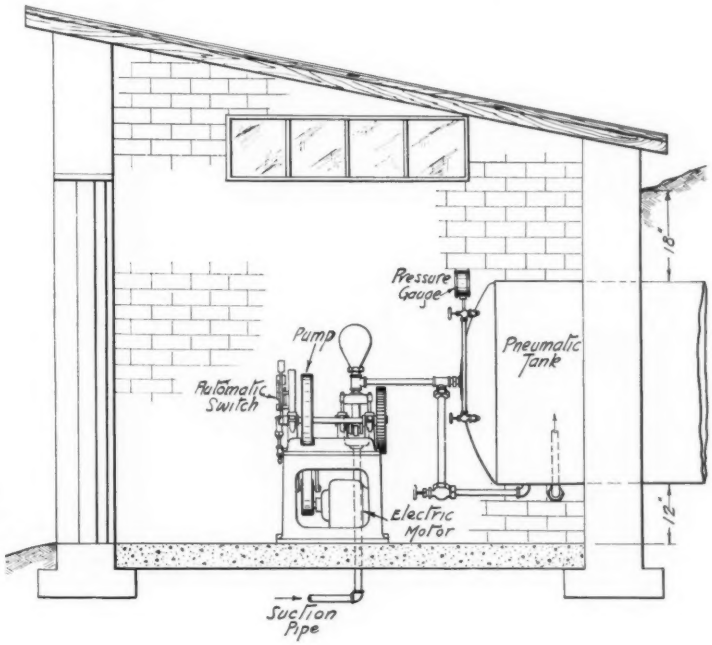
One set (3) wood bases for tank supports.

One set (1) 18-inch water gage and one 5-inch standard pressure gage.

One set 2-inch standard service connections with one 2-inch all brass angle valve.

One automatic starting and stopping device for electric motor for regulation on 25-pound variation.

One double-acting horizontal suction pump having capacity of 1,000 gallons per hour against maximum pressure of 90 pounds, belt driven by 2 hp. motor mounted in base of pump. Suction connections, 1½ inches; discharge connections 1¼ inches. Pump to be equipped with device for furnishing air and water at the same time, so that no auxiliary air compressor will be necessary; pump to have combined air chamber and check valve; valve to be hard rubber disc on bronze seat. Motor to be 110



volt, 60 cycle, single phase, a.c., of approved type. All bearings in the pump and motor to be fitted with removable bronze bushings. All pins, shafts and plunger to be ground to a perfect circle and mirror finish. Unit to be furnished complete with sight feed oiler, hard oil cups and full set of wrenches.

Setting

Pressure Tank and Pumping Unit.—Tank to be buried under ground with head extending 18 inches inside basement wall. The tank to be carefully set in place and not to be dropped or allowed to fall. After the tank has been set and all connections made, the outside surface shall be cleaned free of all dirt and rust spots, using a steel brush. After this surface has been cleaned two coats of asphaltum varnish shall be applied, allowing the first coat to dry before the second coat is applied.

The pumping unit shall be installed as shown on blueprints and secured in place by anchor bolts set in the concrete floor. Sheet lead cushions to be used in making the pumping unit set perfectly level. These lead cushions to be placed under the four corners of the frame with the anchor bolts extending up through cushions.

Connections

Pressure Tank and Pumping Unit.—Connect pumping unit with source of water supply by 1½-inch galvanized pipe, using as few ells as possible, and place foot valve with brass seat and hard rubber valve on the end of the pipe which is submerged in the water. Install 1¼-inch discharge pipe from pump to pressure tank. On this discharge pipe install 1¼-inch all-brass gate valve.

Install and connect automatic starting and stopping device for electric motor in accordance with details furnished by the manufacturer.

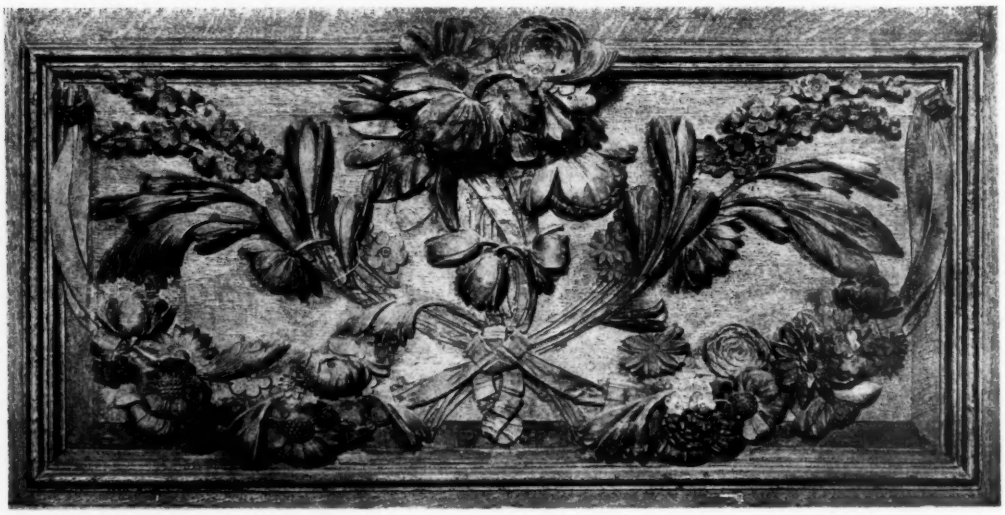
Install a 2-inch service pipe from the pressure tank. On this service pipe install one 2-inch all-brass angle valve. Install the water and pressure gages on the pressure tank in accordance with details furnished.

Workmanship and Material

All work in connection with the installation of the water supply system to be done in a neat and careful manner by competent mechanics. All pipe and fittings to be of merchant stock and to be of full internal diameter through entire length. All pipe ends to be reamed after cutting.

Test

A test of 75 pounds pressure per square inch shall be applied to the discharge and service pipes and the pressure tank. The pressure tank shall be filled two-thirds full of water and the service and discharge pipes to be filled full of cold water. This test to be applied for a period of three hours in the presence of the architect, or his representatives, without loss of pressure. Should any leaks appear in the discharge or service pipes, these leaks shall be made perfectly tight in the usual manner. Any leaks appearing in the pressure tank shall be made perfectly tight in accordance with instructions furnished by tank manufacturers.



Government Needs Clerical Help

The following communication has been received from the United States Civil Service Commission, Washington:

The Editor:

Sir: The commission requests, on behalf of the American people, that you publish in your journal as frequently as you can, as an item of news, a notice of the war need of the Government for stenographers and typewriters. The difficulty in securing a sufficient number of stenographers and typewriters for the unusual demands of the Government is giving the commission great concern.

The commission takes this opportunity to thank you for the assistance you have already given it in meeting the war demands of the civil service.

By direction of the commission.

Very respectfully,

JOHN A. MCILHENNY,
President.

Sees No Decline in Building Costs

At a meeting of the committee to determine the actual demand for building construction, which is working in conjunction with Borough President Marks' Committee on the Alleviation of Building Stagnation, held October 12th at the Building Material Exchange in the Woolworth Building, New York, it was decided that the members of the sub-committee should begin at once an investigation into the existing demand for various classes of buildings.

Arthur K. Mack presided, other members of the committee present being Henry Atterbury Smith, H. H. Murdock, Walter Smith, Roy Wingate, and John J. Radley. Mr. Mack made the suggestion, which was adopted, that a survey be made of the need for new construction in the following classes of buildings: Warehouses, elevator apartments, non-elevator apartments, offices, lofts, hotels, garages, and factories. A report on the results of this investigation will probably be made to the general committee at a meeting next Tuesday. The opinion of members of the sub-committee was that a detailed inquiry dealing with the respective classes of structures would reveal actual conditions.

Following the meeting of this committee, the committee to consider the condition of supply and price of building materials met. The discussion covered the range of building materials and supply, the consensus of opinion being that with the exception of steel, other materials were to be had in sufficient quantity, barring railroad delays.

An apartment house operator said he believed the most serious situation confronting the building trades related to the inability to get loans to finance new operations. He also said there was not a scarcity of steel for structural purposes, but a delay in its fabrication, and pointed out that at the recent Business Men's War Convention at Atlantic City, James A. Farrell, President of the United States Steel Corporation, stated that the steel companies could meet all industrial demands, provided they were given proper time in which to fill orders.

Elliott Smith, President of the Building Material Exchange, said one of the big difficulties at the present time was in getting the railroads to deliver material. He further asserted that the public should be educated to the belief that prices for materials would not be lower in the next year or two. Michael Cohen said there was enough structural stone available to build 1000 buildings. The labor shortage was touched upon as one of the controlling factors in the situation, it being brought out, however, that the labor unions were willing to cooperate with the producers by giving temporary union cards to workers.

Washington State Chapter, A. I. A.

The first regular meeting of the season of the Washington State Chapter, A.I.A., was held October 4th. A report from Captain Charles Alden, chairman of the Civic Planning Committee, was of particular interest. Early in the summer the committee called for suggestive sketches from chapter members for the town site of Cedar Falls. The present town is located within the new Cedar River watershed reserve and has to be moved. The sketches submitted were of great assistance to the committee in working out their solution of the problem. The plan has been approved by the authorities and will be proceeded with shortly.

Carl F. Gould made a report of conditions in the Architectural Department of the University of Washington. This department, of which Mr. Gould is the head, has fallen off considerably in student registration for the coming year, many of those in the classes last year having entered the Government service.

W. R. B. Willcox gave an interesting account of the meeting of the Board of Directors of the Institute held in Cleveland in September, which he attended.

A copy of new chapter constitution and by-laws were referred to a committee for action, their adoption at an early date being advisable.

Two volumes of old chapter records from its

formation in 1894 to 1914 were presented for inspection. Two more volumes containing committee reports, addresses, etc., will be prepared.

A monthly news service for members in the Government service has been prepared and the first edition sent out.

Joseph Pennell's American War Pictures

Joseph Pennell is making with the authority of the Government a series of lithographs of war work in this country, similar to those made by him under the direction of the British Government, and others he is to make in France. The series, when completed, will be first shown here in the National Gallery in Washington.

The Architect in the War—San Francisco Chapter A. I. A.

Following is a list of members of the San Francisco Chapter of the American Institute of Architects who have joined the colors:

Harris C. Allen—Lieutenant, Engineer Reserve Corps.

John A. Baur—Officers' Training Camp, Presidio, San Francisco.

John Davis Hatch—Lieutenant, Coast Artillery.

James T. Narbett—Captain, Engineers' Reserve Corps.

Ernest L. Norberg—Lieutenant, Engineers' Reserve Corps.

Sidney B. Newsom—Corporal, Engineers' Reserve Corps.

Walter D. Reed—Captain, Engineers' Reserve Corps.

To Insure Future Preparedness

That the United States Government is planning to establish universal military training after the war, so that never again will war find America unprepared to defend herself, is the belief of Atlanta architects and contractors who have examined the buildings at Camp Gordon and other cantonments where divisions of the national army are being trained.

The buildings will last for fifty years, these men declare. They are built of a selected Southern pine. Floors, walls and roof consist of heavy sheeting, then a heavy layer of tar paper, then another heavy sheeting. With proper care and a coat of paint from time to time, the buildings should last for more than fifty years. Each cantonment has a waterworks and a sewerage system and paved streets. Each barrack has plumbing, baths and heating plant.

An Invitation to American Sculptors

An invitation is extended to enter into the competition for the monument to General Maximo Gomez, upon which the Government of Cuba is planning to spend $175,000. Proposals will be received up to noon of March 31, 1918. First prize, $10,000; second prize, $5,000; third prize, $2,000. Brochures giving complete details, illustrations, plans, etc., may be obtained by competitors at the Consulate General of Cuba, 44 Whitehall Street, New York.

Indiana Society of Architects

The Indiana Society of Architects held its quarterly meeting in Kokomo on September 23.

The officers of the society are as follows: A. Frank Wickes of Gary, president; Donald Graham of Indianapolis, first vice president; Professor D. L. Snader of Valparaiso, second vice president; Merritt Harrison of Indianapolis, secretary; George E. Bass of Indianapolis, treasurer.

The principal subject discussed during the meeting was the State laws referring to building. A new State Building Code is now under consideration, and the Indiana Society will take an active part in the formation of this code.

Boston's Joint Exhibition

The annual joint exhibition under the direction of the Boston Architectural Club, Boston Society of Landscape Architects, and the Society of Arts and Crafts, will this year, as last, be held in the Rogers Building of the Massachusetts Institute of Technology, Boylston Street, Boston.

This exhibition will mark the fifteenth anniversary of the founding of the Boston Society of Architects, and the twentieth anniversary of the Society of Arts and Crafts. It will be held Nov. 5 to 17.

A Call to Service for Those Not Able to Serve in Army or Navy

Practically every institution in the country which trains professional men has signed the call to those young men who are under military age, and to those who are unable for other reasons to serve their country in the Army or Navy, to consider the equally patriotic services in the field of applied science. Here architecture will play an important part, both now and when the war is over. Every

architectural school in the country should be filled to its capacity with young men fitting themselves for this service to their country.

R. CLIPSTON STURGIS, Chairman,
Committee on Education,
American Institute of Architects.

Patriotic Firms of Architects

The following communication is further evidence of the patriotic response of members of the profession to the "call to the colors."

Editor, THE AMERICAN ARCHITECT.

Sir:—I note with interest your commendable mention of a "Patriotic Firm of Architects," Gillespie, Porter & Scrieber, who have joined the colors and closed their office for the period of the war. It appears that architects are doing their bit nobly all over the country. In Minneapolis, Jackson & Stone have closed their office and gone into the Engineering Corps service; of Hewitt & Brown, Hewitt has gone to France in Y. M. C. A. work and Brown has gone into Red Cross work at Camp Deming; Roy Childs Jones, Assistant Professor of Design at the University of Minnesota, has obtained leave of absence and joined the "Camouflage" unit.

Yours very truly,
FREDERICK M. MANN.

Personals

John Knevan Peebles and Finlay F. Ferguson, architects, Norfolk, Va., have formed a partnership for the practice of their profession. Their offices will be in the Law building.

Mr. Frederic M. Mann, architect, Minneapolis, Minn., has removed his office to the Metropolitan Bank Building.

Matthew Maris, Painter, Dead

Matthew Maris, or, to give him the name under which his birth was registered at The Hague, Matthias Maris, died in London, 78 years old.

With him disappears the last of three Dutch artist brothers, who all became famous.

Theodore Starrett Dead

Theodore Starrett, widely known as the head of the Thompson-Starrett Company, building contractors, died at his home in Prospect Place, New York, on Oct. 10. He was 53 years old.

Salt Lake City Considers Zoning

Growing friction between residential and industrial improvements has forced upon Salt Lake City consideration of zoning as the only adequate means of relieving the situation.

The City Commission and the Civic Art and Planning Commission have called into consultation Charles H. Cheney, secretary of the California Conference on City Planning. He urges zoning as the most practical solution of the problem and advises calling in an expert to make a preliminary survey of the city, upon which details of the future plans shall be based.

A municipal housing committee has also been appointed in Salt Lake, with V. H. Richie as chairman.

Municipal Civil Service Commission

The following are the details of examinations held by the Municipal Civil Service Commission of New York for architectural draftsmen and plan examiners:

PLAN EXAMINER—SALARY $1,200 TO $1,800

Candidates must be at least 21 years of age, and have had one year's experience as a draftsman or equivalent work involving a knowledge of plan reading.

Subjects and Weights.—Experience, 3; Duties, 7.

Applications received at room 1400, Municipal Building,Manhattan, until Oct. 30, at 4 p. m. For further particulars see City Record or apply to the Municipal Civil Service Commission.

ARCHITECTURAL DRAFTSMAN—SALARY $1,800 TO $2,400

Candidates must be at least 21 years of age, and have had at least three years' experience in building construction as a draftsman or designer, or in similar work.

Subjects and Weights.—Experience, 3; Technical, 7.

Applications received at room 1400, Municipal Building, Manhattan, until Oct. 30, at 4 p. m. For further particulars see City Record or apply to the Municipal Civil Service Commission.

Recent Books

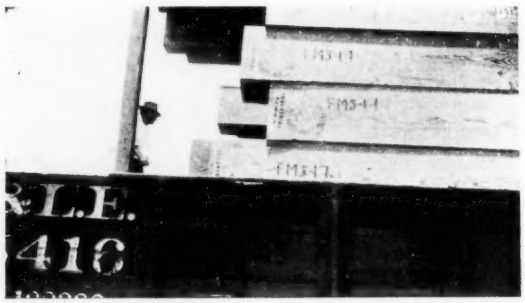
THE SUBSTANCE OF GOTHIC. Six Lectures on the Development of Architecture from Charlemagne to Henry VIII. By Ralph Adams Cram. Full cloth, 200 pages, size 5 x 7¾ inches. Price $1.50. Publishers, Marshall Jones Co.

The author of this work will need no introduction to the readers of THE AMERICAN ARCHITECT. As

an architect high in his profession, of long and successful practice, and as an educator of the younger generation of architects, Professor Cram's views on any subject relating to his profession will be received with the utmost respect. This series of lectures will be found not only a very valuable contribution to the subject of the development of Gothic architecture, but also will be found to contain a considerable amount of material that will induce the reader to serious thought on a very important phase of architecture.

"Factory Mutual Grade"

The accompanying illustration is of a carload of Southern pine structural timber branded with the "Factory Mutual" grade, promulgated by the Associated Factory Mutual Fire Insurance Companies.



Under the provision of this grade timber must be very dense, of slow growth and carry large percentage of resin. It must be branded with the letters "F. M.," the date of cutting and the producer's name and address. The grading rule is new and calls for the highest grade of timber produced.

Hendricks' Commercial Register for Buyers and Sellers

The twenty-sixth annual edition of Hendricks' Commercial Register for Buyers and Sellers has just been issued. This standard publication is devoted to the interests of the technical and mechanical industries and contains full lists of the reputable dealers throughout the country. It lists all products, from the raw material to the finished article, giving the names of manufacturers or dealers. There are more than 2200 pages of text, and the index to trade classifications, numbering 150 pages, covers more than 50,000 trade references. An alphabetical section is included for the first time and contains the name, trade description and address of every concern appearing in the book. This work is published by the S. E. Hendricks Co., Inc., 2 West Thirteenth Street, New York. It is bound substantially in imitation leather and is sold in the metropolitan district for $10.

Industrial Information

Specifications for Maintenance Painting

Complete information on the specification of paint and paint materials for manufacturing plants, storage buildings and power houses is contained in a booklet issued by the Detroit Graphite Company, Detroit, Mich. The data covers maintenance of concrete and wooden floors and walls, ceilings, roofs and exterior walls, structural steel, iron work, piping covered and uncovered, galvanized surfaces, steel or wood tanks, boilers and machinery and radiators. Photographic illustrations and color charts are distributed throughout the text. A convenient feature of the publication is the alternate blank pages left for the making of notes on the various questions treated in the reading matter.

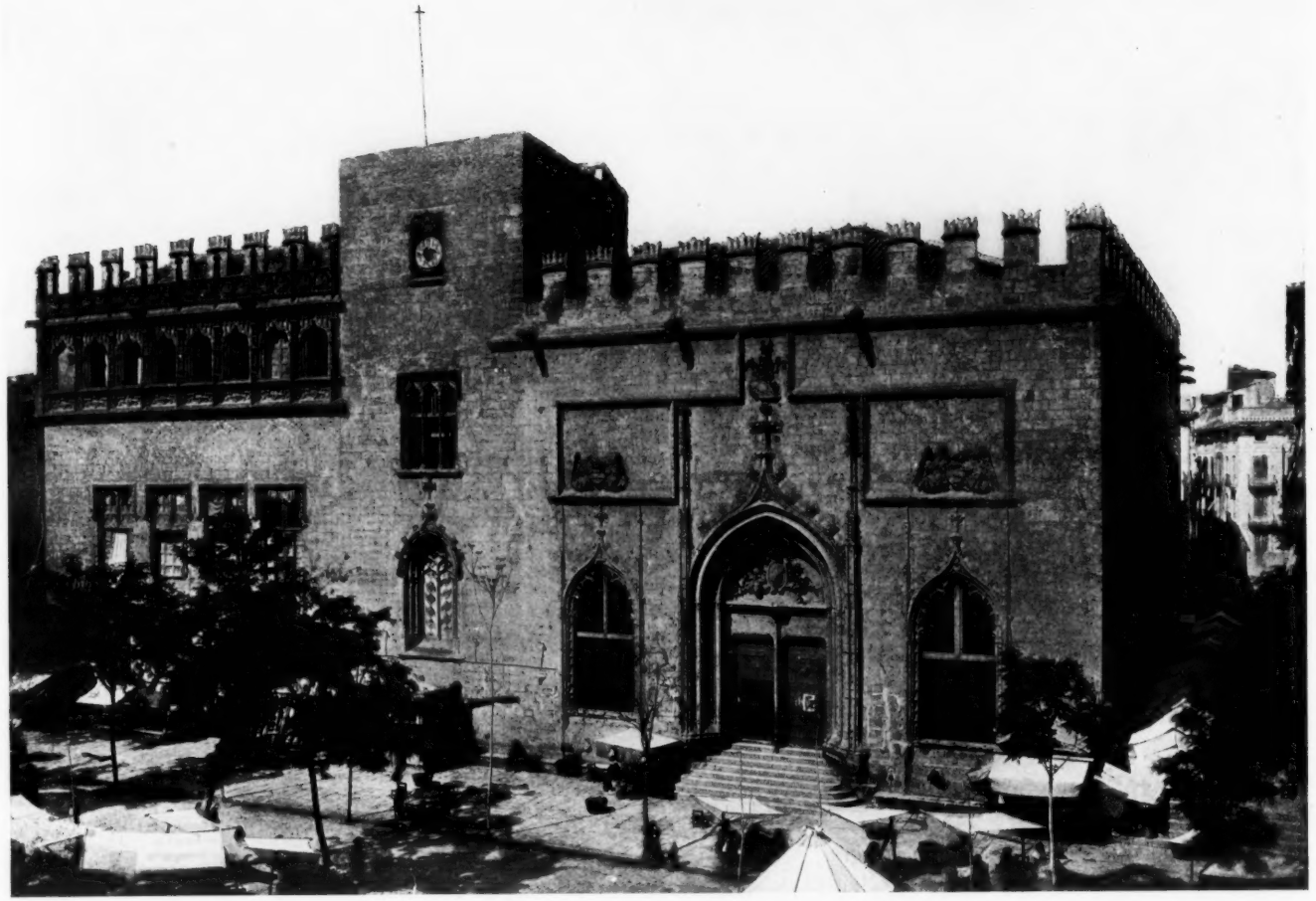
Drafting Room Tables

A table for every drafting room need, a table of the utmost utility but at a low cost, or the latest development in drafting room luxury, with every known improvement, and some of them only to be found in this line, marks the illustration and description in a pamphlet of drafting room equipment recently issued by Economy Drawing Table Company, Toledo, Ohio.

Every draftsman knows by experience that things that facilitate the physical side of his labors have a tendency to stimulate his imagination and give him freer opportunities to work out the problem on which he is engaged. While a good man may, and undoubtedly will do good work on any table, he certainly will do better if the accessories that are necessary to him are comfortable, convenient and dignified.

This line of tables would seem to answer every demand that could reasonably be made on them, and as the best is ever the most economical in the long run, it will we believe pay those who are about to equip drafting rooms, or to enlarge those already equipped, to send for this catalogue, which can be had on request, and investigate the merits of this line of tables.

XUM



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