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LA VIEILLE RUE, MENTON, FRANCE

A paved way to the cathedral, with houses on the left bordering the sea.

FROM PHOTOGRAPH BY J. GILETTA

The
ARCHITECTURAL
FORUM

VOLUME XXXIX | JULY 1923 | NUMBER 1

Some Alluring Cities of Old France

By GEORGES BENOIT-LEVY
Director, Garden City Association of France, and Author of Books on City Planning

WEST of Paris, nearly on the coast of Brittany, out of an immense forest and rosy heath moors, halfway between the famous Mont Saint Michel and the mediæval borough of Vitre, stands a feudal castle, full of mystery and famed in thrilling legends. Razed to the ground in 1166 by the English, ransacked by them in 1449 with a pillage of over a quarter-million worth of actual dollars, rebuilt anew during the twelfth, the thirteenth and the fourteenth centuries—from generation to generation it has been whispered that a treasure was buried in the undermost depths of the first ruins. That stronghold, together with the industrious city which commands it from the other side of the vale, is Fougeres.

Fougeres is named from the many ferns which adorn its adjoining 3,000-acre forest. Fougeres, with its 20,000 inhabitants, notwithstanding its manufactures of shoes, glass, linen cloth and dye, has retained all the quietness of the times gone by and will always remain a precious thing, bearing in its faded hues "the tenderest memories of the past, like a sweet and lingering perfume of dead flowers." The essential beauty of this and others of these towns of another age is that from far away they appear as perfect and harmonious ensembles, and the peculiarity of Fougeres is that both the castle and the city have their own enclosures, high walled, rising from a brook streaming among shrubs, trees and greens of every description. That brook is called *Nancon*. Into the walls of the city, houses are built; the entrances are on the back street called *rue Pinterie*.

Photo. A. Durand

La Porte Notre Dame, Fougeres

I climbed that *rue Pinterie* and by the *place Gambetta* I arrived at *rue de la Foret*. When I had reached No. 56 of that street I stopped and knocked at a strong door, waiting for M. Albert Durand. A charming man indeed, M. Durand, a photographer, a lover of his country, and altogether an erudite. Go to him; you need not bother about books, scripts or papers concerning the place. He, the mayor, and M. Pautrel, president of the archæological society, are living encyclopedias of all information touching what they are pleased to call the *tryptique*, Vitre, Mont Saint Michel, and Fougeres.

"I am in a rush," said I. "I'll take my hat and my camera, and I am yours," said he. And then, wandering up and down, we passed through crooked streets, with zigzagging houses and quaint names. Here is the public garden, called *place aux arbres*, from which we had an extended view; there is the eleventh century church of St. Sulpice; on one of its doors is carved the fairy Melusine combing her hair in front of her looking glass, just as she appears in the arms of the lord of the manor, "the Lusignan." Farther on, we passed the belfry, the *rue du Fos-*

keraly, the *rue Porte-Roger*, the *rue des Feuteries*, the *rue des Vallees* leading to the monumental staircase of "The Duchess Ann," by which we were nearing the *place Raoul II*—and now we enter *le chateau*.

We jogged among the ruins, the three enclosures of the castle, the gardens and the grounds; we ascended the watch walls and the towers; we bowed to the remains of the dungeon and of the lordly hall. How happy was I not to be bothered by the dithyrambs and the recitals of the regular guide! M. Albert Durand spoke slowly, carefully. As we went along, he named for me the 13 towers, some in a bad state, some others well preserved. "There they are," he said, "*La Tour Carree de la Haye St. Hilaire, La Tour de la Tremoille, La Tour du Hallay, La Tour de Guemadeuc, La Tour de Coetlogon, La Tour de Cligny, La Tour Carree du Cadran, La Tourelle de Guibe, La Tour du Gobelin, La Tour Melusine, La Tour d'Amboise, La Tour Raoul.* Our ancestors took centuries," said M. Durand, "for building such marvels as these, and centuries will vanish before they disappear from the earth."

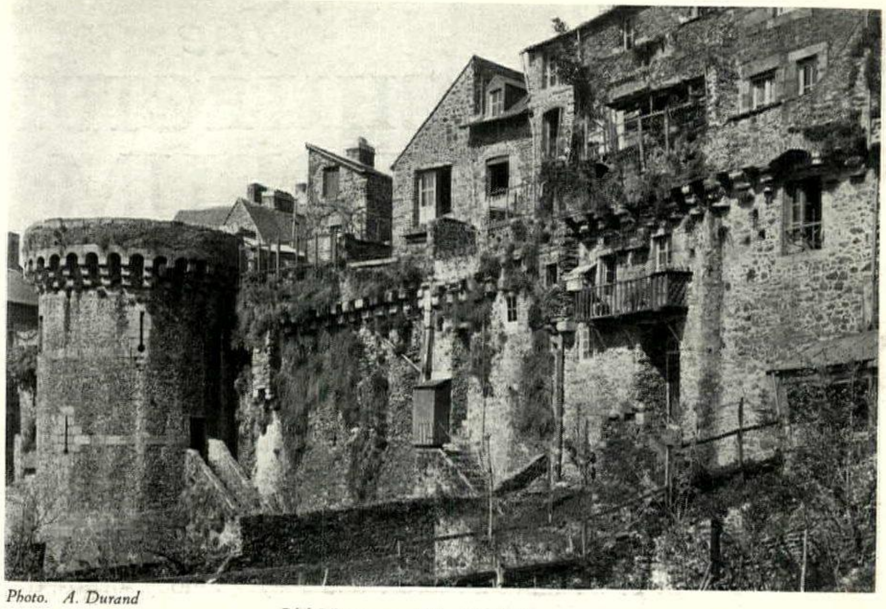


Photo. A. Durand

Old Houses on City Wall, Fougeres

Let us leave the magic and enchantment of Brittany and reach, full speed, the smiling borders of Provence. Here we are now, on *La Cote d'Azur*, flying from steeple to steeple,—Vence, La Roquette, Breil, Aspremont, all of you, old cities so near the blue coast, you seem all taken by an aerial photographer! And yet every rambler on the mountains of Les Alpes Maritimes can see you, at a distance, as you appear in these illustrations, a composite picture of the city beautiful.

Blue, white, red, like the flag of France, are your skies, your houses, and your roofs;—every kind of blue, from the ever-changing hues of the Mediterranean to the light green of the lemon foliage and the darker leaves of the olive trees;—every kind of white, from that of the immaculate sea foam to the gray rocks of the garden walls, which climb, terrace by terrace, like a flowered garland toward and around the houses which are built in the city walls, which are made and often dug out of the same rocks;—every kind of red, from that of the crimson roses to the pink sunsets and the reddish tiles.

Indeed, it would be a real trick to ascribe a style to these cities. They grew out of the necessities of life; their conformity to their geographical and historical developments is their one and only merit; they are a living demonstration of Ruskin's saying, "Nothing is beautiful which is not useful," and of the Latin motto, "*et nos in Gallia, utiles et dulces;*"—"we, in France, we like things both useful and beautiful." First, they are mountain towns, originally

Photo. A. Durand

The XII Century Tour de la Haye St. Hilaire, Chateau, Fougeres

Photo. A. Durand

North Wall of Chateau, Fougeres, XIII Century

speak to its very learned curator, or to the curator of Menton, and interview M. Magaglyo, a son of the land. We might have a chat at the Nice tourist syndicate with Mr. Farraut, or knock at the Menton residence of M. le Marquis de Montleon; here, I have been handling the ten-kilos, calfskin bound "Historical Lexicon" of Gioffredo, the Durandy's splendid books,—"My Country" and "The Garland of Venus," the Charles Morice "Blue Land" and so many others!

In the meantime we will make a choice of only a few instances among the many:

Aspremont, seven miles north of Nice, 1,600 feet altitude, on the slope of the Mont Chauve, the *Castrum Aspermontis* of the Romans, is thus named from the asperity of the place. On the high crest, ruins of the homes built by the Vediantii tribes may still be found. Later on the inhabitants went down

out of easy access, and therefore obliged to use materials available on the spot;—ashlar for the walls, flagstones for the floors, heavy timber for the posts and the roofs. Face walls and partitions are sturdy, sometimes 3 feet thick, and such as they were erected eight centuries ago. Quite different is that seven-story apartment house which the other day I saw in the *boulevard Gustave Desplaces*, at Nice, entirely walled up with 5-inch hollow tiles! Our ancestors knew how to build! Necessity was their best master!

These old cities are parts of the landscape; they are features of it; they are bound to it. At Peille the church is at the summit of the village, and its floor is the crag itself. There are no sidewalks in the streets; they are too narrow for that, but they are paved with blue and gray cobblestones, and when it rains they are flushed from top to bottom in such a manner as to render envious the most clever municipal engineer, provided with the most elaborate devices. When the ground is level, you find sometimes red flagstones on cement pavements. It is worth going to the *place* of Menton's cathedral from where you have a framed vista plunging into the sea toward the peninsula of Bordighera. If you allow your eyes to look down, you then notice that you stand on a marvelous mosaic of black and white pebbles, embossed upon the ground some two centuries ago.

Another reason for these towns' being highly perched was the necessity of self-defense. I will not retrace the history of the 159 communes of the Maritime Alps, although I know most of them. I do not forget that we are today wandering and not professing *ex cathedra*. If you want to know more about them, call at my Menton studio and we will tramp around. We will go to the municipal library at Nice and

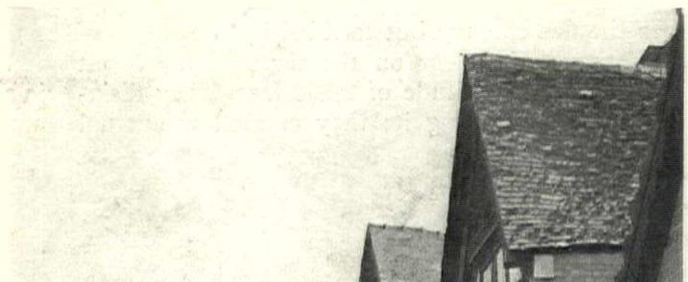


Photo. A. Durand

Half Timber Houses in Fougeres

Photo. J. Giletta

View of La Roquette from Approach to the Town

into the flat country, but terrified by the plague of 1327 they built anew on the slope of the Mont Chauve, at an altitude of 2,500 feet. They disinfected it by burning it; they created the actual Aspremont in 1327. The city is thus six centuries old.

Vence, eight miles northwest of Nice, is the city in a garden. Violets, roses, geraniums, all the flowers and all the fruits, give to the soft winds which caress Vence a rare perfume. The old borough was successively a Roman camp, a mediæval stronghold, a glorious bishopric. The town is surrounded by a former watchway, and then rises in a labyrinth of narrow streets which are often tunnels. The cathedral dates from the twelfth century, and its choir from the sixteenth. Here and there you find on the walls *graphiti* and inscriptions in Latin or Merovingian, in Italian or in French, in Arabic or in dialects. There are Roman arched doors and houses of every century. Some of them, the *maisons Fouques* and *Serraires* of the sixteenth century, have beautiful carvings inside and possess splendid fireplaces with ornamental designs in stucco.

La Roquette is another out-of-the-way place, set out as a gem among forests of olive trees and gardens which you see from far away as you walk along the road running at its base.

And what shall we say of Breil, Breglio, at the outside of the ravine of Saorgio, between the passes of Giou and Brouis, near the Italian boundaries! At an altitude of 900 feet it commands the refreshing valley of La Roya. Its name

Photo. J. Giletta

Street View in Aspremont

explains its history, as it comes from *praelium*, which means "fight." It was built in a predominant situation for securing for its inhabitants the safest defense. The height of Breil was called Cri-Bella, from where the first signal was given when the soldiers of Othon were seen entering the ravine; the lowest part was called Piazza-Rossa, where the bloody fighting was done. Over the torrent stands a three-arched stone bridge, built in 1546. At the foot of the old borough, built for defense, the gay and rustic hamlet of Giandola expands among orchards and meadows.

Photo. J. Giletta

A Street in Menton

Thus all the races of the world,—Roman, Moorish, Spanish, Italian and French,—have been fighting and fighting in these blessed spots, like men anxious to win a fair maiden; protection against attacks was one of the factors determining the architecture,—high buildings, narrow streets, girdles of stones. That much-regretted professor, Mulford Robinson, had a sensible view of that when he wrote: "To be sure, the town was a sturdy young fighter, against foes of its own kind. It was, in truth, a real child-city, playing well, and when tired, sleeping well."

Among the old towns of the Maritime Alps, Menton is the one which affords the best idea of the kind of historical conditions which underlie their architectural development. The primitive parish, one mile west and north from actual Menton, was designated under the name of Pepin or Puypin, from the Italian *Poipino* and from the Latin *Podium Pinum*, the "mount of the pines." When the attacks by the Moors became less frequent, in 1200, people migrated nearer the sea and occupied the mount, Othon belonging to Count Othon, wherefrom: Montone, Mentone, Menton. That name was mentioned for the first time in proceedings of 1250, when the then owner of the mount, Guillaume Vento, asserted his rights. The same lord built his castle on the height of the actual cemetery, and encircled the remaining heights in order to erect what is now *la vieille ville*, a maze of intricate

Photo. J. Giletta

The City of Breil in the Valley of La Roya

Photo. J. Giletta

Distant View of the Town of Vence

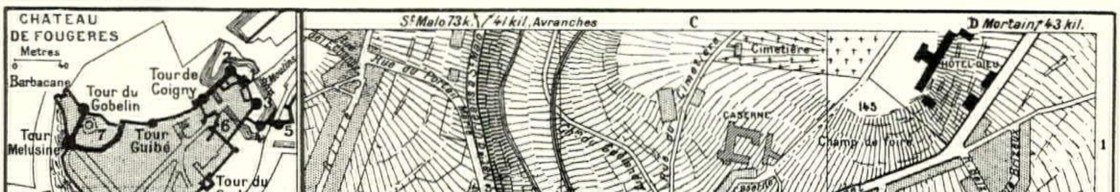
streets, deeply embanked between four - and five-story houses, plastered over their ashlar, painted in blue, in gray or in flaming red. As the conditions became safer, at the foot of *la vieille ville*, down the steps of the cathedral, was added *la rue longue*, a narrow thoroughfare, with houses four stories high on one side, and six or seven stories on the side of the sea. In that street the nobility took up their quarters, having one eye on the church and the other on the offing. Farther on, Menton extended along the sea, down the valleys and up the hills.

It is very curious to see, successively, the different houses which have outlived the centuries, in their state of dirt but of sturdiness, elbowing one another in brotherly fashion, and the modern villas, detached, inviting, cheerful, but very often built with thin walls and cheap materials. The features common to all kinds of houses are the green shutters, with their *portissols* cut out in the lower parts.

From my Garavan garden, where I dictate these lines, I am surrounded with fragrant gardens, with their olive groves, sloping down toward the sea,—while, westward, through the branches of rose bushes, of lemon groves, of peach blossoms, the spires of the churches emerge from the gray silhouette of *la vieille ville*, sluggishly lying under the yews of the cemetery. And then there come to my lips the verses of Magaglyo, that son of Menton:

M arvel of color, of vernal grace.
E nchantment. Splendid jewel. Blessed land.
N est of perfumes, of joy and of love.
T emple of Flora. Palace of light. . . .
O ther lands are not, with such an azure sky. . . .
N o country is so fair, no prospect is so clear.

What Magaglyo wrote of Menton would apply, to some extent, to most of these child-cities. When we build anew, let us not forget their "marvel of color and their vernal grace"



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Plan of Fougeres

Cape Cod Farm and Village Houses

By EDWARD SEARS READ

Illustrated from photographs by the author

THE earliest Cape Cod houses, most of which were built by settlers from the Pilgrim colony at Plymouth, were located along the "King's Highway," which was commenced in 1637 and ran along the north coast from Plymouth to Provincetown. Two types are prevalent: the early one-storied farmer's cottage, and the later and more expensive two-storied house as generally found along the main streets of the villages.

Fig. 1. House at Dennis, Mass.

The first farmhouses were very small and consisted of but a single room with a great brick chimney and fireplace. Later on, a duplication of this room, with the chimney on the partition, was added. As the settlers became more prosperous other rooms were added in a second story, and later still more room was obtained by building on across the back of the house a lean-to room, which continued the slope of the main roof. In the earliest type of plan the front door opens into a small entry, which contains a winding stairway against the central chimney up to the rooms above. When the later houses were elaborated and boasted chimneys in the end walls, this entry was extended from the front to the back of the house.

One of the most interesting features of the Cape Cod house is its interior. In the simpler farmhouses one may look for vertical boarded wainscoting, often matched and moulded in different ways, hand-hewn corner posts and chamfered summer beams, and also for extra wide, hand-split plank flooring. Even the doors may be unplaned planks, battened or dovetailed together with latches and catches of wood. In the more elaborate village houses of the later period one finds more plaster in evidence. Posts and girts are cased in, doors are paneled and hung with hand-wrought hinges, flush with the casings which were also set flush with the plaster. The fireplace walls are always of especial architectural interest. They are usually paneled with white pine, run in the customary bead and bevel moulding. Under the mantel one often finds, besides the main fireplace, a Dutch oven with iron door. In the fireplace hangs the crane with pot hooks and kettle.

Fig. 2. House at Dennis, Mass.

As good examples of the one-storied Cape Cod farmhouse with center chimney, we have selected two cottages at Dennis. Of particular interest are the pilastered doorways which are usual in this vicinity, as is also the dentil moulding below the cornice. The first illustration shows a rather unique type of corner quoining; the turned fence posts of the front yard are common in this part of the Cape. The second Dennis cottage has a very well proportioned facade; one of

Fig. 5. House at Chatham, Mass.

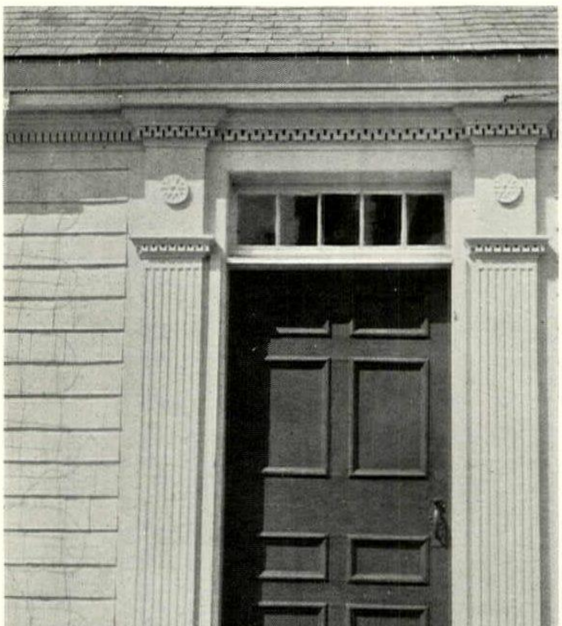
Fig. 6. House at Chatham, Mass.

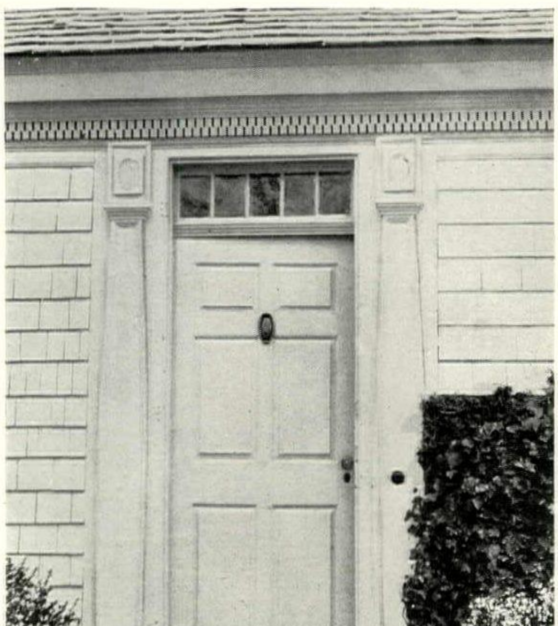
the front rooms boasts an unusually fine example of wood paneled chimney breast with built-in, glass-doored china cupboard, many of which may be found in this vicinity.

The two farmhouses at Chatham are of still different types of the one-storied cottage. Fig. 5, with the gambrel roof, is the oldest house in the town. Fig. 6 shows a "rainbow roof" cottage, a type originally plentiful on the Cape. The curved rafters were bowed out like ribs of a ship, and were possibly inspired by the local shipbuilding industry.

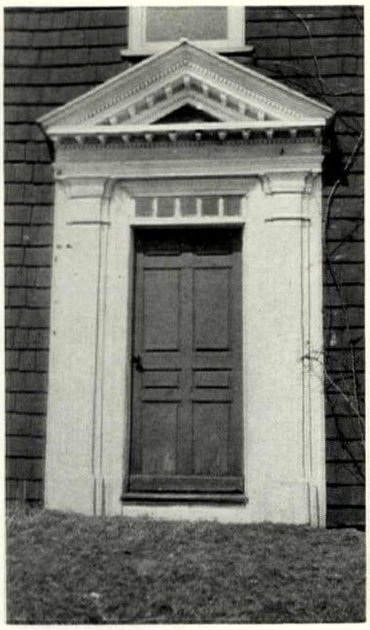
Our first example of a two-storied house is located at Santuit, on the state highway along the south shore of the Cape. The pedimented doorway with its delicate modillions and double row of dentils is unusually rich in detail. It will be interesting to compare this house and doorway with those illustrated in Figs. 9 and 10, the house at Yarmouth Port. Here the pediment is broken and enframes an arched transom with leaded glass of a later period than its 24-light windows. The houses at Marstons Mills and Yarmouth are good examples of the "lean-to" type with central chimney, the former having an unbalanced and the latter a balanced facade.

Owners of later houses of the two-storied type were not content with unprotected doorways, and porches of various types were added. The porch of the house at Yarmouth (Fig. 13) is enclosed and





Figs. 3 and 4. Doorways of Houses at Dennis, Mass.

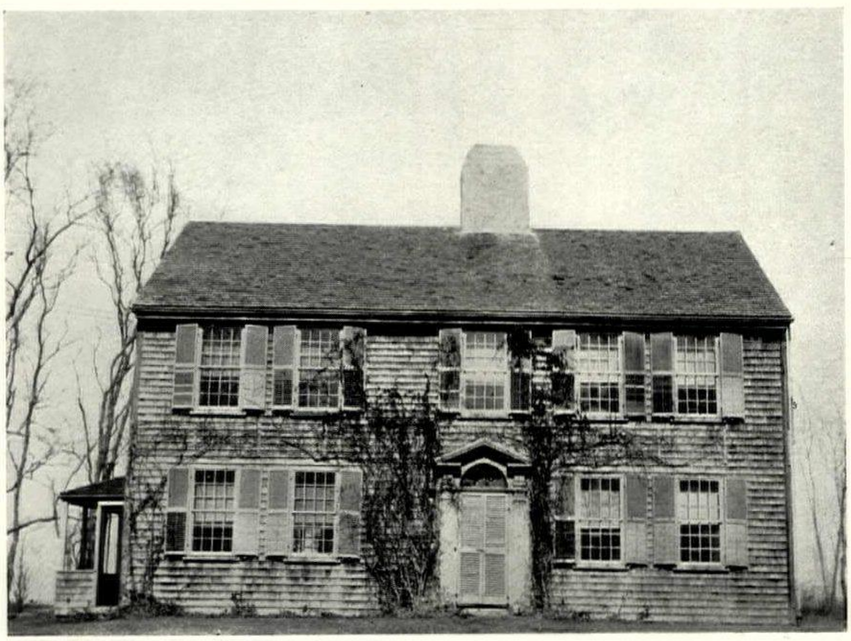


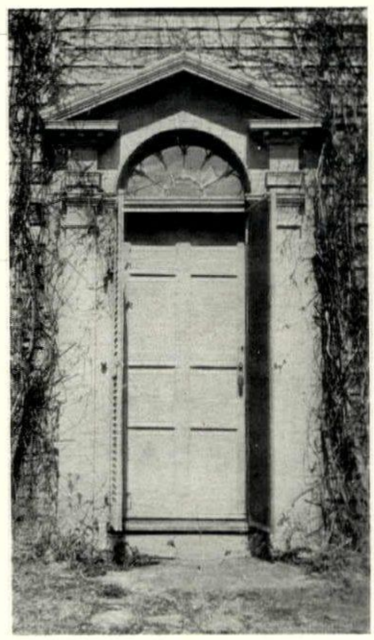
Figs. 7 and 8. Doorway and General View of House at Santuit, Mass.

forms an entrance vestibule. This house still retains its original blinds with heavy wood slats and no center rail, although the original sash have been removed. Here we find turned fence posts, as in a previous example. In connection with blinds, one of the charms of the Cape Cod house is the beautiful blue-green color with which the blinds and doors are painted. Few people realize that this color has been evolved by conditions of the local climate. In the salty ocean winds the original green has weathered down to an unusual shade which varies from turquoise to emerald, and is as brilliant as either.

During the days of the whaling industry many of the sea captains became very wealthy, and erected more elaborate houses than had been afforded up to that time. Instead of the usual shingled walls, clapboards now appear, also modillioned cornices and projecting, columned porches. Figs. 14 and 15 illustrate houses of this type. The first is on the main highway at Brewster, and was built by Captain Snow who was one of the original "committee of safety." This house is of the four-room type, each room with separate chimney on the outside wall, which in this case is of exposed brick, painted. A very delicate rope moulding forms the first member of the main cornice and also occurs in other parts of the finish.

The chimney of an old Cape Cod house is always an important affair; sometimes it becomes almost the most important part of a building, for where it takes the form of a "stack" chimney it may well occupy an area of considerable extent. A stack





Figs. 9 and 10. Doorway and General View of House at Yarmouth, Mass.

Fig. 11. House at Marstons Mills, Mass.

Fig. 12. House at Yarmouth, Mass.

chimney is one generally placed at the center of a house, and of so great a size that it often serves six or even more fireplaces which are themselves often of goodly proportions. The Cape Cod builders were almost always successful in constructing their flues so that they would "draw," and many ingenious methods were adopted for connecting into one huge chimney flues from so many different fireplaces. Sometimes the bulk of a stack chimney was so great that at its center there would be built a sort of secret storeroom called a "glory hole," the walls of course wholly of brick, and the vaulted roof also of brick. Cellars under the old Cape Cod houses are unusual. Instead of a cellar use was made of a circular well or pit about 6 or 8 feet deep.

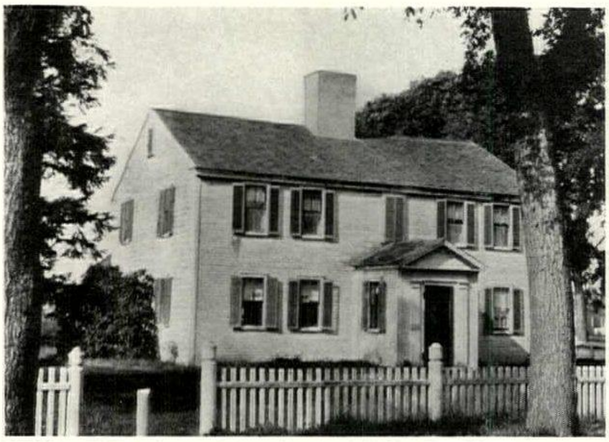


Fig. 13. House at Yarmouth Port, Mass.

Fig. 14. House at Brewster, Mass.

Fig. 15. House at Falmouth, Mass.

The Hotel Statler, Buffalo

GEORGE B. POST & SONS, ARCHITECTS

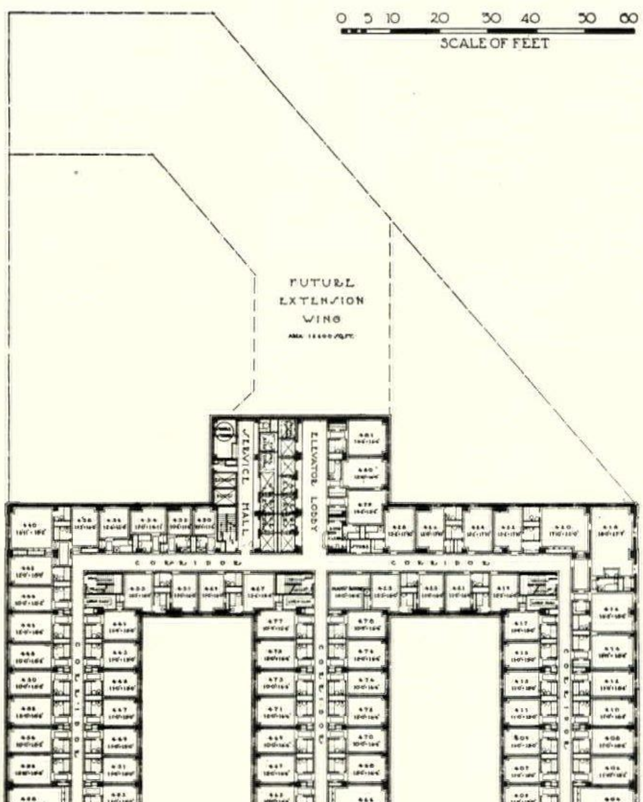
IN studying the plans of many recently completed buildings of institutional and investment types, it becomes obvious that a fundamental change is taking place in the procedure of the architect's office when such problems are undertaken. In the past there has been exhibited a strong tendency on the part of designers to think first in terms of the architectural design and general plan, with an ultimate moulding of the functional requirements of the building toward a compromise which tends to impair its efficiency of purpose. A long period of practical experience indicates that the more successful method in designing buildings for a specific purpose is to spend much more time on thoroughly establishing the functional requirements of the tenant, and to use this information as an arbitrary guide in so planning the building that it will meet these requirements.

One of the best examples of the working of this practical method of developing plans is to be found in the Hotel Statler recently completed in Buffalo, and replacing for that city the old Hotel Statler which was the first of the well established chain of Statler hotels. As might be expected, this building represents the results of experience in hotel planning, and while it presents no radical departures or theoretical experiments, it is a structure most efficiently planned through the co-ordinated efforts of one of the world's most successful hotel organizations and architects having many years of broad experience in this type of work.

The building is located in attractive surroundings, facing Niagara square, and built on a plot of irregular shape covering approximately 79,000 square feet. The exterior architecture is of modified Georgian type in reddish face brick trimmed with terra cotta. An examination of the plan will show that a 20-foot setback has been established above the second floor in order to preserve the general character and openness of Niagara square. The hotel faces on five streets, with its main entrance on Delaware avenue, which carries the important vehicular traffic of the district, and with another entrance on the opposite side of the building which faces the more important business section of the city.

Passing through the main entrance on Delaware avenue, a broad interior entrance stairway leads to the level of the main floor lobby which extends directly through the building to the entrance on Genesee street. It will be noted in the arrangement of the lobby plan that there is a practical separation of office and working quarters from the main elevator and lounge section. This eliminates much confusion and effects a natural division between those who have business to transact with the hotel and those who are making use of the lounge and general lobby facilities. The passenger elevators are well located in respect to the offices, and different sections of the business department are carefully interrelated in their locations to meet the specific requirements of administration. By a carefully studied variation of levels on the main floor it has been possible to introduce a series of stores on Delaware avenue and on the Franklin and Genesee street sides, all of which represent logical rentable space.

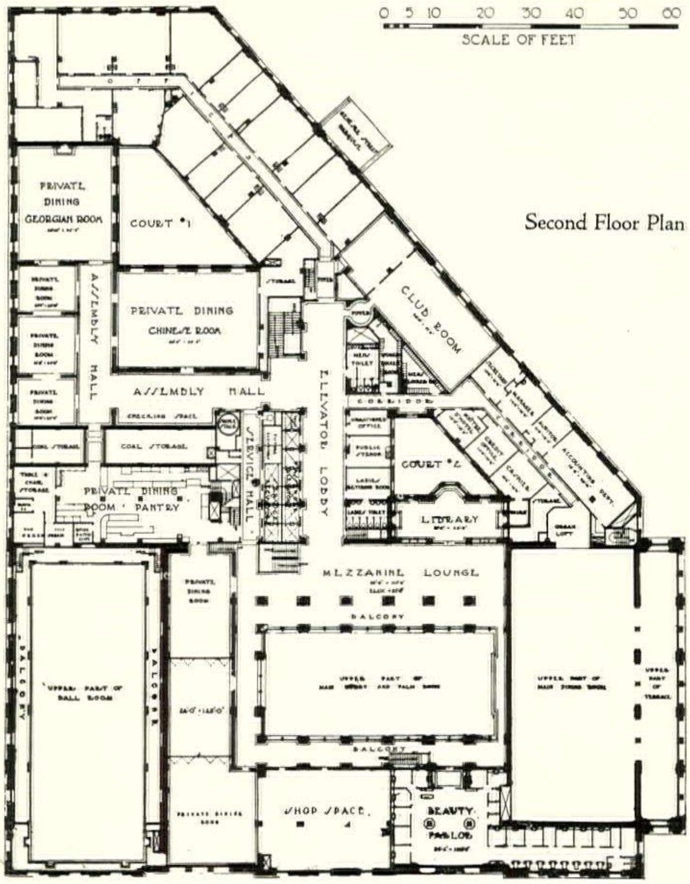
The ballroom and the main dining room are two full stories in height. The interior architecture and decorations of the main lobby and palm room are carried out in Italian renaissance style with walls of Botticino marble which establishes the general decorative color note. The ceilings are of simple, flat vaulted type with penetrations at arches and are finished in plaster with decorative ribs at each pier. The floors are of terrazzo with brass stripping, and the electric fixtures are of wrought iron and gold in designs of the period. Probably the most striking features in these rooms, from an architectural viewpoint, are the double arches around the mezzanine and the main room entrances. The furniture and draperies throughout are of sim-



Typical Floor Plan

ple types of the period; in fact, there is a welcome restraint in the interior decoration which is at once practical and satisfying. The interior of the main dining room is also carried out in the style of the Italian renaissance period with a beamed and polychromed ceiling. The two raised ends of the room are separated by Cipolino marble columns. The walls are of artificial stone, with wainscoting and door and window trim of travertine. Here again the floor is of terrazzo and brass stripping.

An interesting feature of this room is the attractive dining terrace which is thrown open practically as a part of the room and similarly decorated. This dining terrace represents a successful use on the part of the architects of the 20-foot setback that establishes it as revenue-earning space. The ceiling of the dining terrace is of vaulted type and plastered finish. The furniture and decorations for these rooms are in keeping with the general scheme, and the orchestra is supplemented by a large organ. A dining room smaller than this, on the main floor, known as the men's cafe, has been carried out as an interesting adaptation of a Spanish interior. The walls are of oak paneling, while window and door trim is of travertine. The ceiling is of the heavy beamed and polychromed type, with timbers decorated in scenes of the hunt. The floor is of terrazzo with brass stripping. The furniture for this room is of a simple design in keeping with its character.

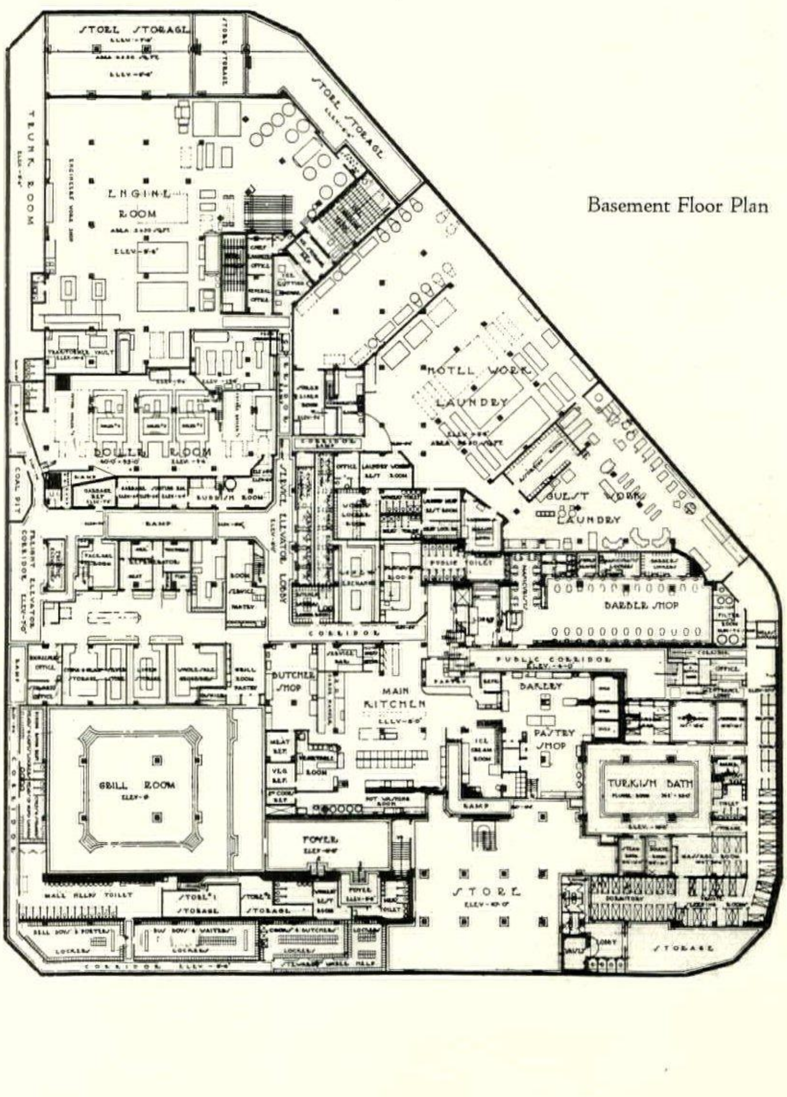


Second Floor Plan

The main ballroom is entered through a large foyer, and as already said is two stories in height. The interior architecture and decoration are Spanish in character, with gold and subdued colors predominating. The ceiling is of the flat, vaulted type painted in a clouded sky effect. The floor for dancing is of oak with a broad border of terrazzo. The walls are finished in stippled and antiqued gold. There is a balcony around three sides of this room, with a large organ at one end. Additional features include a moving picture booth and an elevated floor at one end of the room which can be used as a stage.

A number of interesting rooms are arranged on the mezzanine floor. These include a series of private dining rooms, each of which has been given a special architectural effect. The second floor is given over entirely to service features and quarters.

The third floor is entirely devoted to sample rooms, as the Hotels Statler specialize in service to commercial travelers requiring space of



Basement Floor Plan

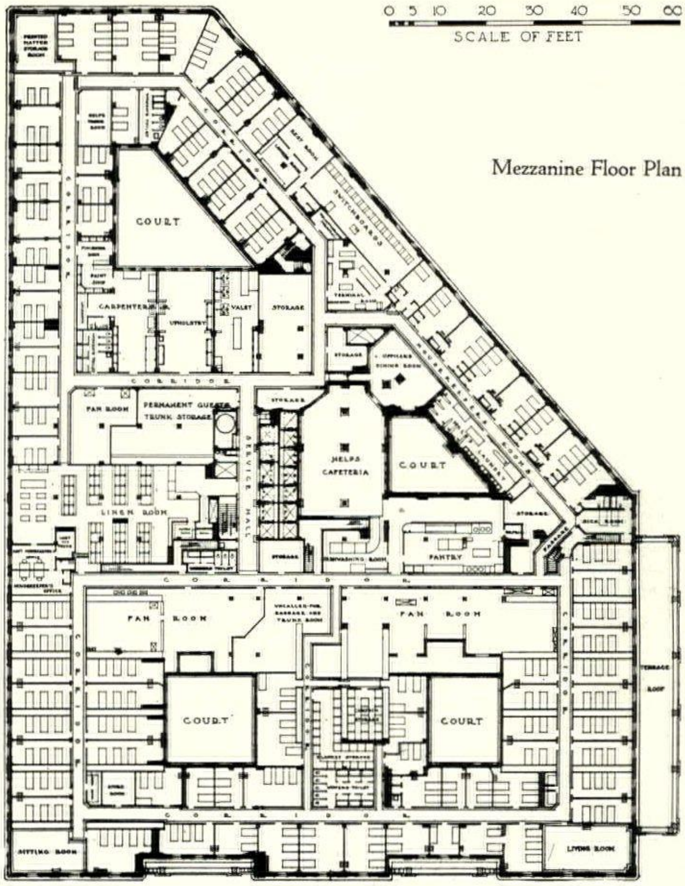
this type. General details of the planning of this floor are indicated in the accompanying plan, but an interesting note is the fact that each room is provided with a disappearing bed. This has been done to make possible the full use of the room for business purposes during the day, and to eliminate any suggestion of its use as a bedroom. In addition to the disappearing bed feature there is also a small dressing room. All floors from the 4th to the 16th inclusive contain the regulation guest rooms and are similar in plan. The arrangement of the upper part of the building in wings provides the maximum of light and ventilation for every room.

Bathrooms are grouped on the double stack interior plan, providing the double bath unit with pipe space between and accessible by opening the back of the built-in medicine closets. All the bathrooms are ventilated by a positive enforced system. The bedrooms are equipped with special doors of service type, built with receiving spaces so that deliveries may be made to guests from the outside without opening the inner section of the door, and without in any way disturbing the occupant of the room. Interiors of all guest rooms are of simple painted paneled walls with carpeted floors. The furnishing of the guest rooms is that of usual hotel room of the better class.

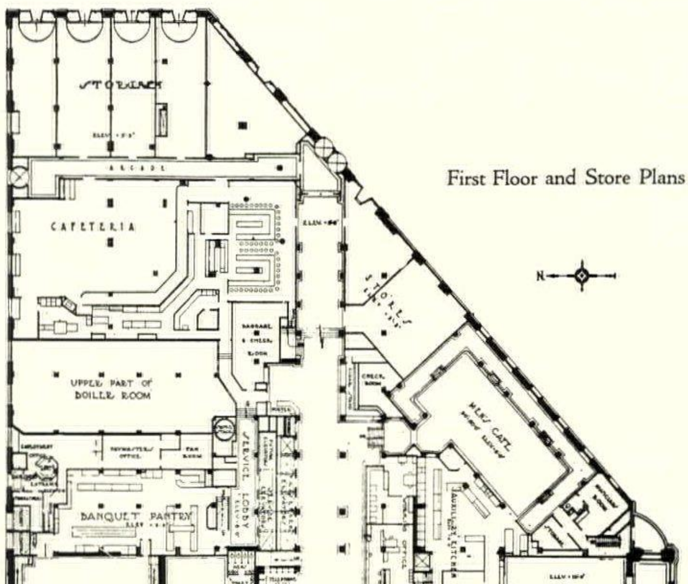
The area of the lot has not been built on to the full height of the building, but plans are prepared for extension wings containing 500 more guest rooms. At the present time the hotel contains approximately 1,200 rooms, but in designing the service sections, public spaces and mechanical installations the building has been considered as a 1,600-room unit so that future extension has been cared for in a most practical manner. As evidenced by the plan of the 18th floor, it will be seen that the important element of elasticity has not been neglected in the planning of this building. This and the 17th floor are subdivided into reasonable office spaces, and will be carried as such unless requirements should make necessary their use for specific hotel purposes. The executive offices of the Statler organization are now located in this space.

From a structural viewpoint there have been no interesting deviations from ordinary practice, but it is interesting to note that the Statler organization carried out the construction work without a general contractor. The building is of the usual steel frame construction, with concrete floors. It is built on steel-cased, concrete piles approximately 45 feet in depth. The roof is of the ordinary flat deck type, and has no service or public space features except a wireless broadcasting station.

The kitchen and service section are quite



Mezzanine Floor Plan



First Floor and Store Plans

Library

clearly shown on the plan, but may require some explanation. The interesting feature of the layout is to be found on the main floor plan, where a large auxiliary kitchen is located adjoining the two dining rooms. In this kitchen most of the cooking for these dining rooms is done, and all service for these rooms is maintained. A larger kitchen is indicated on the basement floor plan. All room service, the cafeteria service and much of the preparation for the auxiliary kitchen are maintained directly from the basement kitchen.

Coal is delivered at sidewalk level into a receiving bin from which it is hoisted into a coal bin located over the boilers from which it drops to the stoker hoppers. Ashes are removed from a receiving bin provided with a clean-off valve above the sidewalk, and into trucks to be carted away. Steam is generated for heating and power purposes in three 500-h.p. boilers arranged with stokers with considerable overload to care for peak conditions. Use is made of low pressure, steam vacuum return system; there are some 3,000 radiators and a total of about 65,000 square feet of heating surface. A highly elaborate ventilating system has been provided for all underground rooms, and the ballroom, banqueting room and lobby are ventilated by means of air supply and exhaust. Interior bathrooms are exhausted by means of three

Main Dining Room, Hotel Statler, Buffalo
George B. Post & Sons, Architects

exhausters placed in the penthouse. All air ventilators are located in the main court in order to secure the best possible fresh air throughout the ventilating system.

The electrical equipment of the Hotel Statler consists of two services, one alternating current service, which is taken at 2,300 volts, 25 cycles, 3 phase and stepped down by transformers within the building, and also a direct current breakdown service for use in case of emergency. The feeders for both power and light are taken from the main switchboard in the engine room to the various power and lighting panels throughout the building. The power feeders are two-wire, 220-volt direct current; the lighting feeders are three-wire, 110–220-volt direct current. The distribution of lighting in the various guest rooms is laid out according to the usual Statler arrangement, with one switch center light and several base receptacles in each room. In each bedroom the bed, chiffonier and dressing table are supplied with base receptacles. All the elevators are the high speed 1 to 1 type, equipped with microleveling machines to bring the car platforms to the floor landings. All the laundry equipment and pumps are electrically driven.

The Hotel Statler Garage. Quite as complete and well planned as the hotel building proper is the garage, now under construc-

Stairway from Lobby

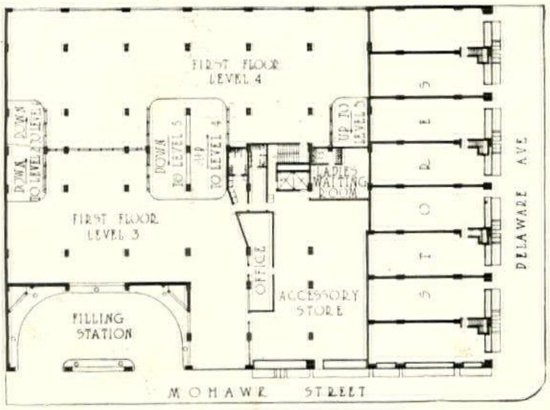
Grill Room, Hotel Statler, Buffalo
George B. Post & Sons, Architects

tion, intended for the hotel's service. It is opposite the hotel, with which it is in architectural agreement, and the ground floor of the frontage contains eight stores for rental. The garage entrance is upon a side street, and close by is an accessory shop and a gasolene filling station at which seven cars may be supplied at the same time.

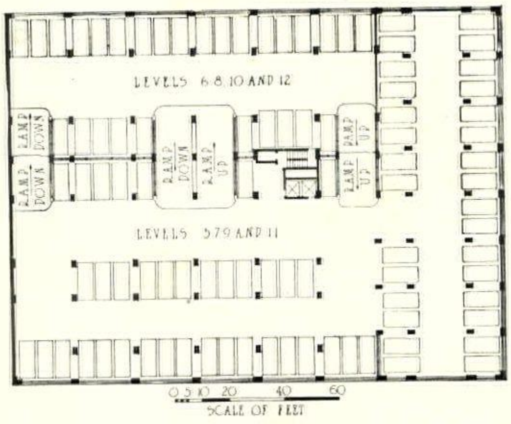
In laying out the plans for this building it was necessary that a dual problem be solved. It was important that the ramps be of sufficient capacity to handle several hundred cars per hour, since the traffic at certain times of the day will be extremely heavy, while at the same time the dictates of good business practice demanded that the greatest possible number of cars be accommodated. Examination of a typical floor plan will show that cars are arranged in lengthwise rows in the main section of the building, while at the end there are two crosswise rows. It will also be noted that one long row of cars faces on two aisles. This particular detail is due to the fact that the plot upon which the garage is built is of an odd size. Neither the 132-foot nor the 181-foot dimension is particularly satisfactory for a garage layout; some compromise was seen to be necessary, and after study of a number of possible plans it was found that the single row of cars facing an aisle front and rear offered the best solution.

The garage accommodates about 600 cars. It should be noted that the car spaces vary in sizes. The cars in the row at the Mohawk avenue side of a floor will be Fords or other small machines, while those at the Delaware avenue side will be larger. The remainder of the building is for cars of all sizes. The net frontage allowed per car is 7 feet in the main portion of the garage and 7½ feet at the Delaware avenue side; the depth allowed per car is from about 12 to about 15 feet, more than half being the larger size.

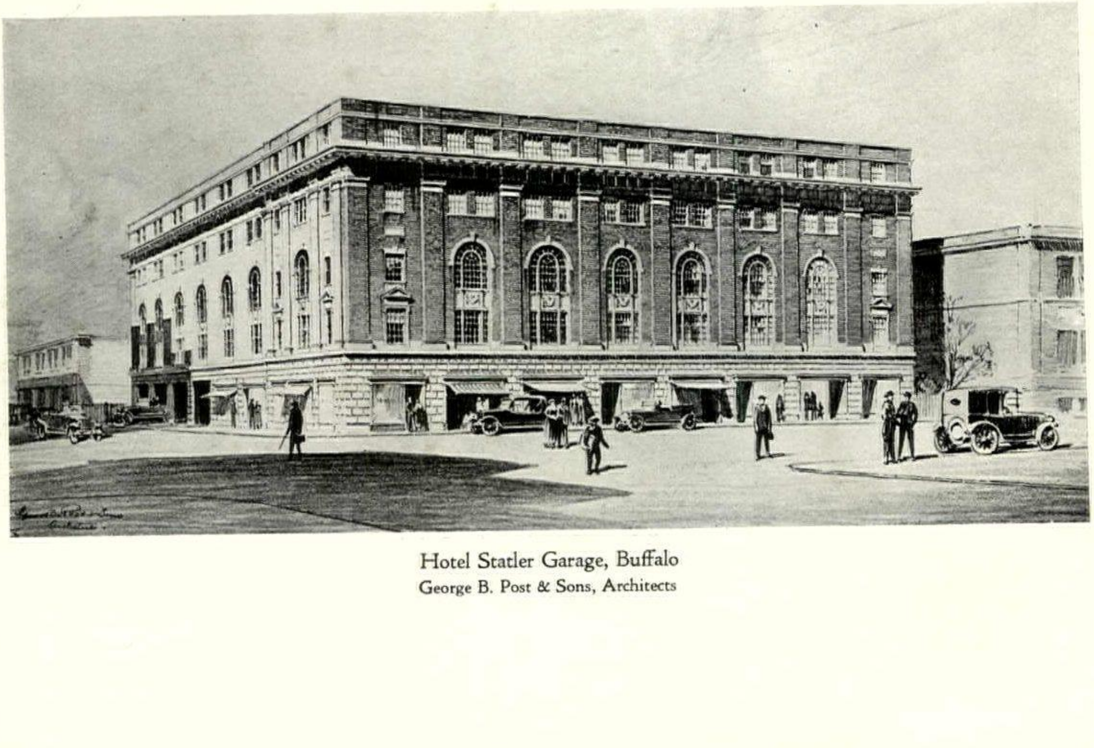
The width of the columns, measured along the aisles, was arbitrarily fixed at 18 inches, which considerably simplified the problem of securing an economical car layout; the depth of the column at right angles to the aisle was a matter of little importance, and the result is that some of the columns are 36 inches deep. It is thought that this method of limiting the column dimension *along* the aisle but placing no limit to the *depth* is new in garage design and worthy of close attention. Had circular columns been used, the actual reduction in car storage possible would have been about six cars to a floor, allowing for a net frontage of 7 feet to each. Entirely separate ramps are used for up and down traffic, and at no point does a car using the "up" path conflict with a car upon the "down."



First Floor Plan



Typical Floor Plan



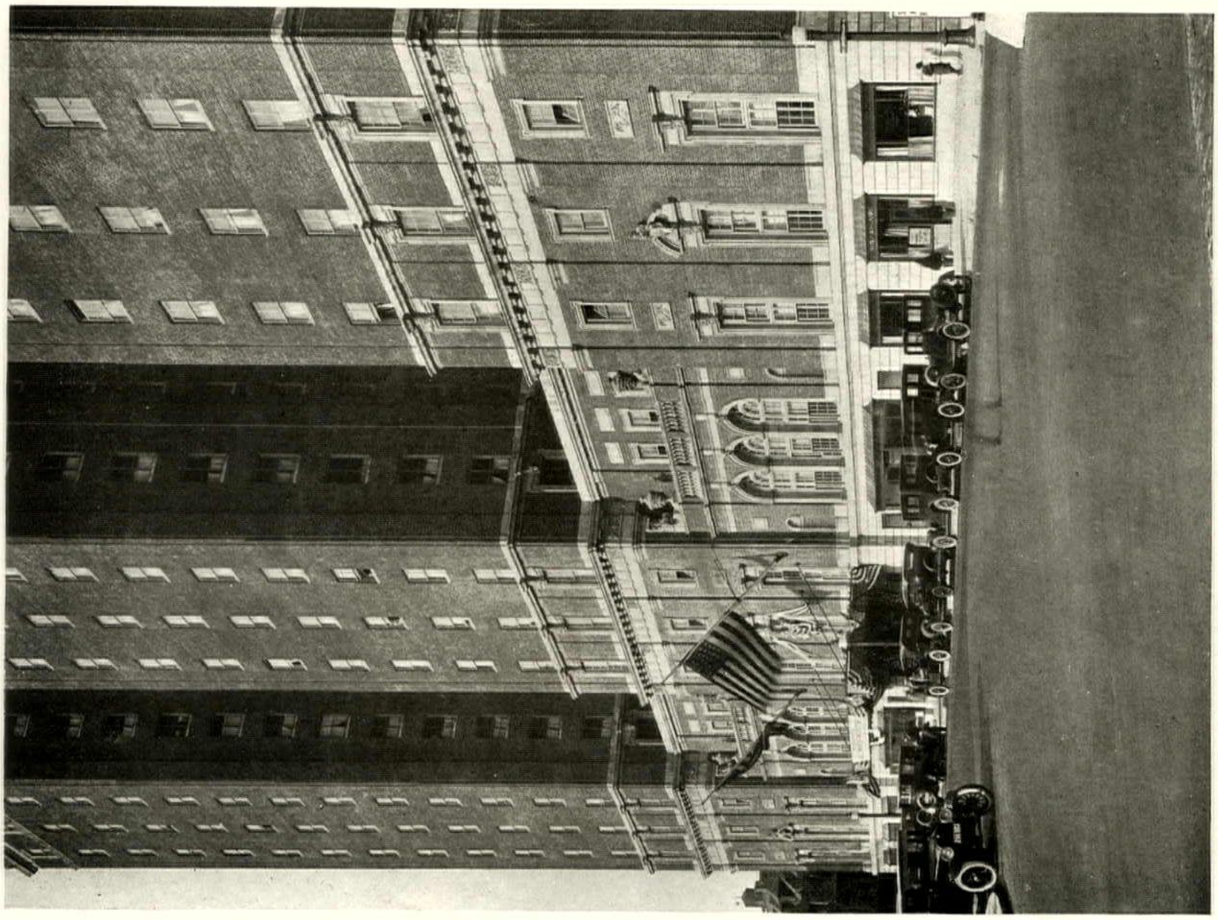
Hotel Statler Garage, Buffalo
George B. Post & Sons, Architects

GENERAL VIEW FROM NIAGARA SQUARE

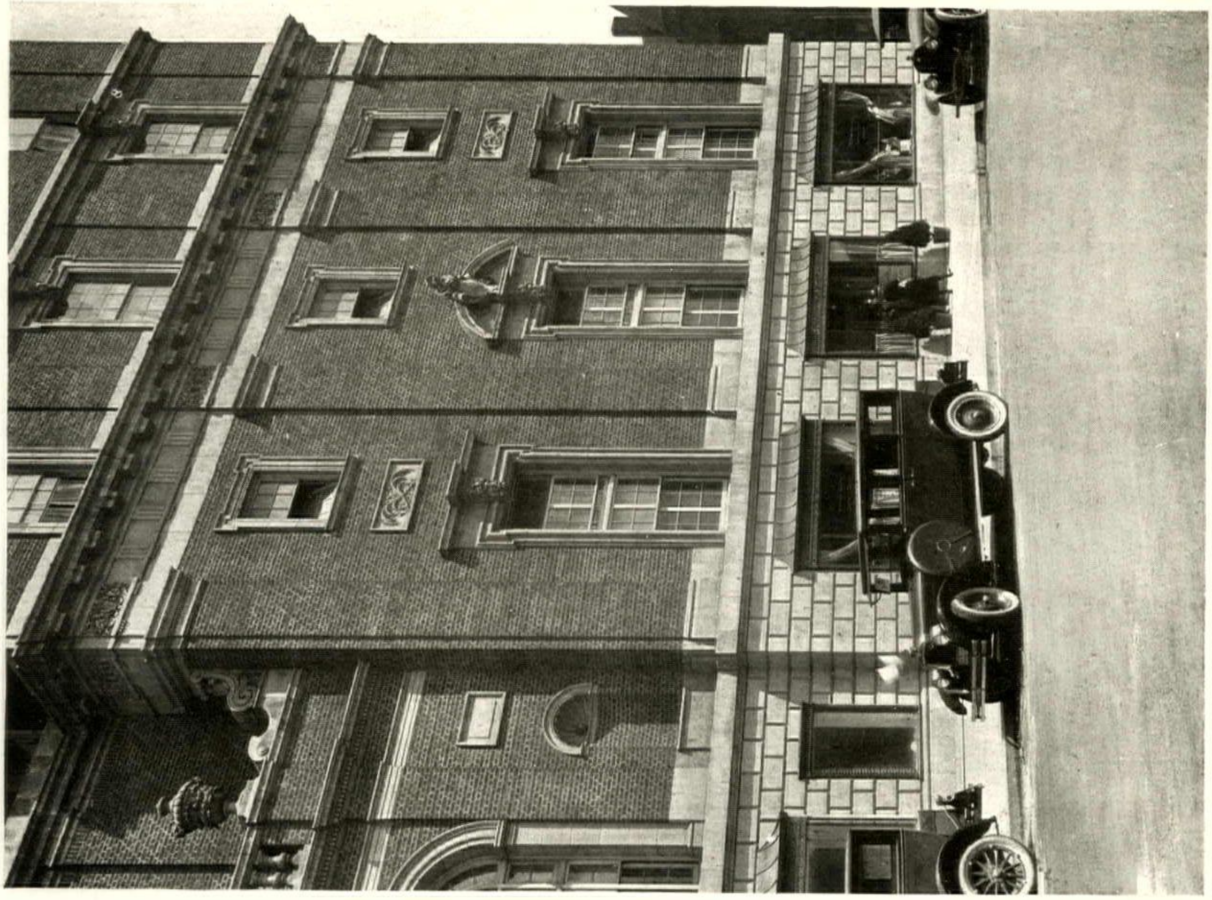
HOTEL STATLER, BUFFALO

GEORGE B. POST & SONS, ARCHITECTS

Photos by Schuyler Carteret Lee



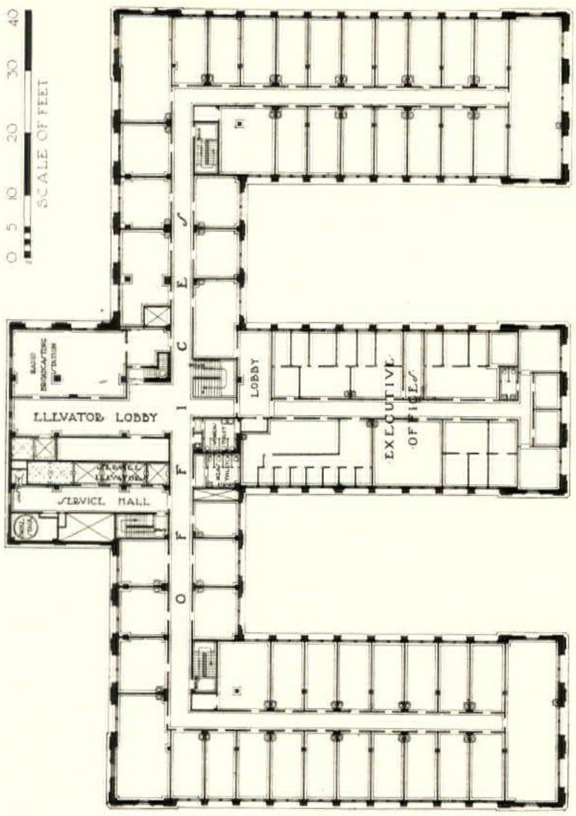
DETAIL OF ENTRANCE FRONT



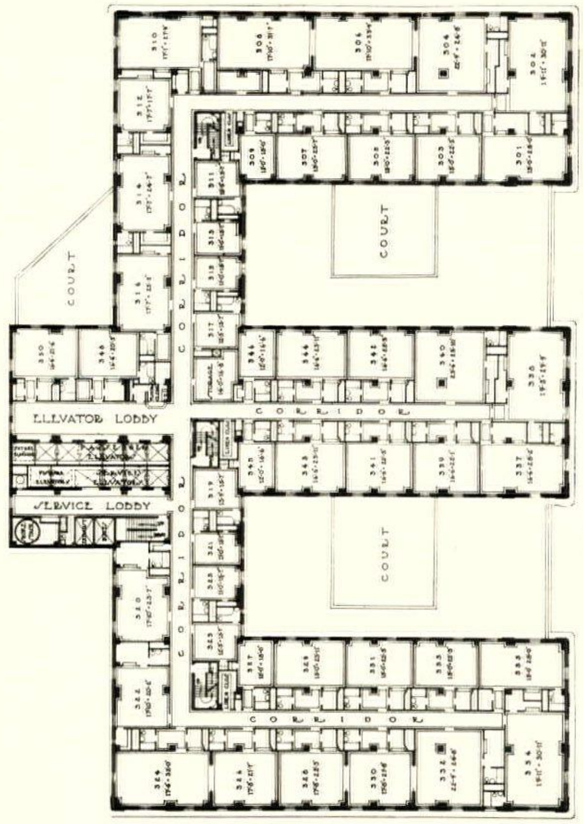
DETAIL OF END BAY

HOTEL STATLER, BUFFALO

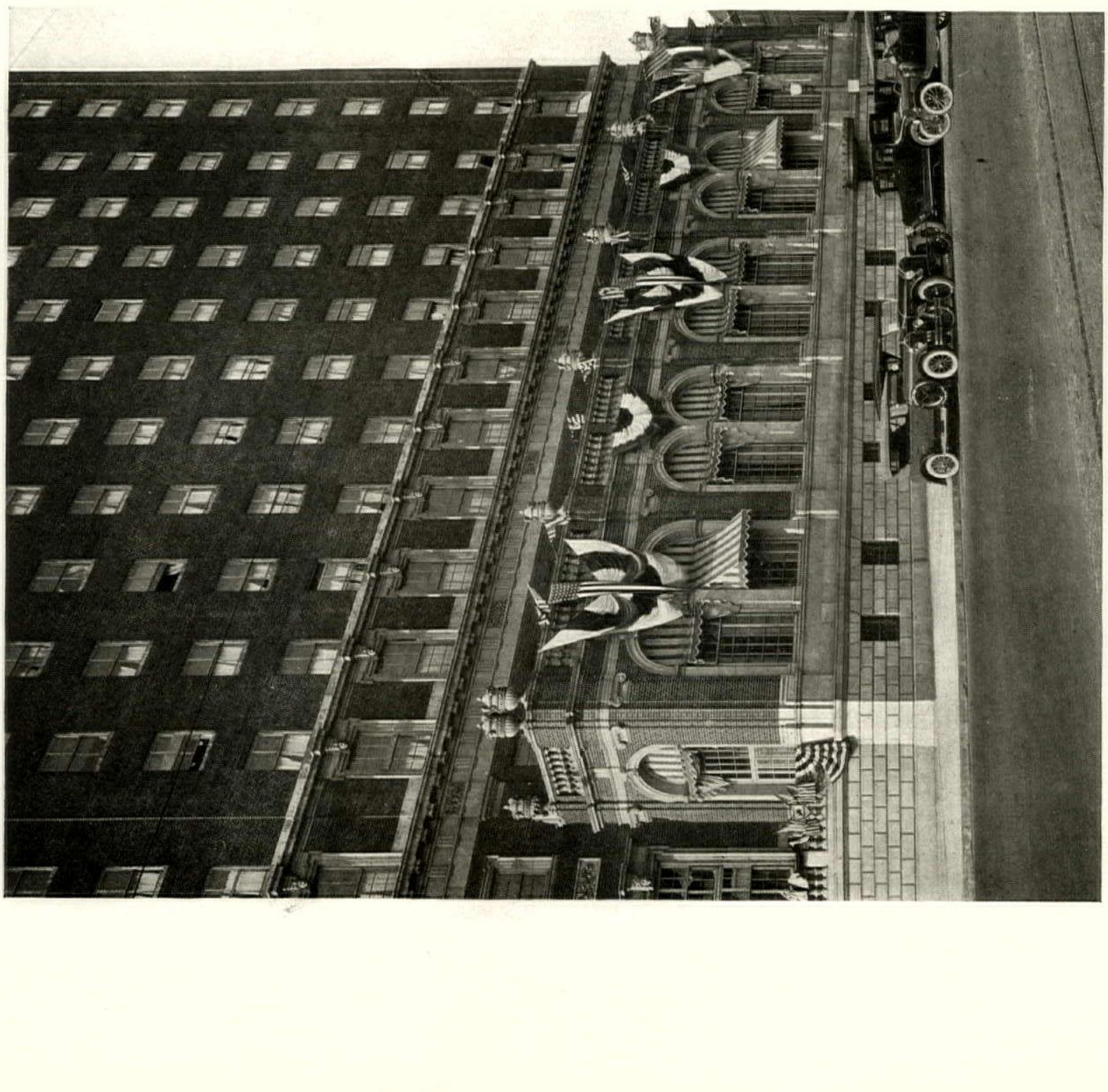
GEORGE B. POST & SONS, ARCHITECTS



EIGHTEENTH FLOOR PLAN



SAMPLE ROOM FLOOR PLAN



DETAIL OF NIAGARA SQUARE TERRACE

HOTEL STATLER, BUFFALO

GEORGE B. POST & SONS, ARCHITECTS

VIEW ACROSS LOBBY FROM BALLROOM

HOTEL STATLER, BUFFALO

GEORGE B. POST & SONS, ARCHITECTS

INTERIOR OF DINING TERRACE

HOTEL STATLER, BUFFALO

GEORGE B. POST & SONS, ARCHITECTS

FIREPLACE END OF PRIVATE DINING ROOM

HOTEL STATLER, BUFFALO

GEORGE B. POST & SONS, ARCHITECTS

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Wood as a Structural Material

By C. J. HOGUE, *Forest Products Engineer*

TIMBER framing is the most easily attainable form of construction and will probably be used as long as timber is available, yet it is taken largely as a matter of course and dealt with by "rule of thumb" methods.

Architects and engineers who are thoroughly informed as to the composition and methods of manufacture of steel and cement, and require that these materials be tested before use in their work, either have not used wood at all under analytical design or have designed structures of it without considering the underlying factors of its structural properties, have specified it with inadequate knowledge of classifications, and have accepted it on visual and not always expert inspection.

It is only within recent years that the Forest Products Laboratory of the United States Forest Service has undertaken research work in forest products on a scientific basis, and has analyzed the factors which should govern the selection of wood for engineering uses. Previously, test data came from miscellaneous sources; all the factors necessary for accurate deductions were not observed, nor were tests at different institutions made according to the same methods. Of late years, with dependable wood properties available and with a realization that incombustible materials are not fireproof, and that fire prevention and not fire resistance is true economy, many engineers are giving their attention to the technical development of the use of forest products until wood bids fair to take its place as one of the primary materials of construction and not as a secondary or assisting material that we have always at hand and can use without having to know much about it.

Relation of Weight to Strength

A fact of fundamental interest that the Forest Products Laboratory has developed is that there is a variation of less than 5 per cent in the density of wood substances or materials of which the cell walls are composed, whether of hardwoods or softwoods; that specific gravity, therefore, is a measure of the amount of wood substance contained in a unit volume of a given piece of wood, and that there are fairly definite mathematical relations between specific gravity and the various strength properties. Specific gravity, or dry weight, is a fairly good measure of the relative strengths of various species and a very good measure of relative strengths within a species. Some woods contain substances such as resin which are not of the wood substance and add weight without increasing strength.

The specific gravity of wood substance proper is about 1.55; if wood were solid it would weigh nearly 100 pounds per cubic foot. Its dry weight is therefore a measure of its air content, and its air content is a measure of its buoyancy, the length of continuance of which depends on its penetrability or the length of time within which the air content is replaced with water and the wood becomes heavier than water or "water logged."

Effect of Moisture Content

A second factor, which is of primary importance in comparing test data and relative strengths, is moisture content. Wood structure is much like a honeycomb, composed of hollow cells, the cell walls forming "party walls" between the open spaces.

When green, both cell walls and spaces between contain moisture. As the wood dries out, the moisture evaporates first from the open spaces of the cells and then from the cell walls. When the free water from the cells has evaporated and the cell walls are still fully saturated, the wood is said to be at the fiber saturation point. This, in the commonly used structural woods, is at a moisture content of approximately 25 per cent, moisture content being the percentage of moisture by weight of the dry weight of the wood, wood being considered "dry" when there is no further loss in weight in a temperature maintained at 212° Fahr. or 100° centigrade.

Below the fiber saturation point shrinkage begins, and as the cell walls dry out their strength increases. The increase in values in the mechanical properties of woods as they approach an air dry condition is quite material, the values of some properties almost doubling; the changes are in different proportions with various properties, however, and unit values for structural design should be based on properties of green wood, as in large timbers the increased values are often offset by the development of checks and other defects in seasoning, while at the same time in exposed positions timbers are likely to be alternately wet and dry, and so at times to have the mechanical properties of the extreme fibers reduced in strength to those of a green condition; it is, in fact, wise to use lower values in timbers in exposed positions for those properties which are subject to material change under varying conditions of moisture, among which are tension and compression.

"Air dry" is an extremely indefinite condition, ranging from a moisture content of 5 or 6 per cent to fiber saturation; to be air dry is commonly understood to have a moisture content of from 10 to 15 per cent. Uniform drying is difficult to obtain, particularly in large timbers, and season checking will begin at the surface while the moisture content near the center is still far above the fiber saturation point, so that the determination of moisture content on an entire cross section is misleading and is dependable only when determined for various portions of the cross section. These two points, specific gravity and moisture content, should always be observed in any tests which are made, as otherwise they will not be logically comparable.

Rate of Shrinkage

Shrinkage would still cause checking in structural timbers if uniform drying were obtained, because of the difference in rate of shrinkage in radial and circumferential or tangential directions. The radial shrinkage in various species of the woods commonly used for structural purposes is from 3 to 5 per cent, while the tangential shrinkage is from 6 to 8 per cent; the radial shrinkage in any particular species being, however, approximately 60 per cent of the tangential shrinkage; the resultant shrinkage in volume is 10 to 12 per cent.

Shrinkage to an air dry condition would, of course, be materially less than these percentages, and thin boards or planks are usually so predominantly of vertical or flat grain as to largely avoid shrinkage checks, although the shrinkage of a board or plank in which the grain is nearly vertical, that is, at a right angle to the wide face, would still be approximately 60 per cent of that of a board or plank in which the grain was nearly flat, or parallel with the wide face.

Wood Structure

Wood is made up of cells, the arrangement of which appears, under a microscope, to be similar to a honeycomb, although the wood cells are very small. Trees are commonly divided into hardwood and conifer groups; in general the hardwoods have broad leaves and the conifers needlelike leaves; the hardwoods are deciduous and the conifers are evergreen; the hardwoods are porous and the conifers are non-porous; the conifers are often known as softwoods, although some conifers are harder than some hardwoods. The cells are, comparatively, long and slender and enclosed at both ends. The hardwoods are composed of cells or wood fibers and larger pores, the conifers of cells which in general are larger than the cells of the hardwoods and smaller than the pores. The conifers are the principal structural woods, hardwoods being seldom used now for that purpose. The cells of the conifers are approximately 1/12 of an inch long and 1/1000 of an inch in diameter. This applies to practically all the conifers.

Each year a new layer of wood or annual "ring" is added to the circumference of a tree. The cells divide in a direction radial from the center of the tree, and from each cell a new one is formed during the annual period of growth, thus forming the width of the annual ring. The cells or fibers are therefore arranged in definite radial rows, the cells in each row being of practically the same length vertically, and the pointed ends of the vertical radial rows interlocking.

In "plan" the cells in adjacent radial rows "break joints" with each other, and vertically the radial rows do the same, the interlocked ends of two adjacent vertical rows coming at any point in the length of the adjoining vertical rows. In the conifers the cells first formed each year are nearly square, and the cell walls are very thin compared to the diameter of the cells; in the latter part of the growing season the tangential diameter of the cells remains about the same, but the radial diameter becomes much less and the thickness of the cell walls increases materially. The earlier, lighter growth is called "springwood," while the later, heavier growth is called "summerwood." The change from spring growth to summer growth is quite abrupt, and the contrast is usually quite marked, the summerwood being darker because of its density.

Sapwood and Heartwood

In the cross section of a tree a certain number of annual rings nearer the bark are lighter in color than those nearer the pith and are called "sapwood," the inner, darker rings being called "heartwood," the sap rising through the sapwood while it has ceased to rise through the heartwood. The controlling factors which cause sapwood to become heartwood are not definitely known, the same annual ring sometimes being sapwood in one part of a tree and heartwood in another. In some species there is a decided difference in color between heartwood and sapwood, while in others there is little difference. The color of the heartwood is due to the deposit of gums and other coloring matter, the exact nature of which is not yet known. In some species the sap ring is very narrow, while in others it is very wide; in Douglas fir it is approximately 2 inches wide in a 48-inch tree, while in a pine it may extend nearly halfway to the pith or center of the tree.

Sapwood is equally as strong as heartwood, but is much less resistant to decay. Sapwood is frequently discolored with sap stain, but this does not weaken it and is not decay. As the strength of sapwood is frequently questioned, so is the strength of "fire killed" timber. Fire killed timber is, however, as strong as living timber, unless infected with decay, as all heartwood is essentially "dead" wood, the life of the tree being entirely in the sapwood.

Strength Factors

What is known as "strength" properly includes all the mechanical properties of wood which bear on its structural utility. Different kinds of strength vary relatively in different species; a wood which is stronger in one property than that of another species may be weaker in other properties. Pine is stronger in tension and compression than a hardwood like oak or maple, but oak or maple is tougher in shock-resisting utility and harder as expressed in resistance to wear.

Wood is quite variable as compared with other structural materials. If wood were not subject to inherent physical defects, like knots and twisted grain, nor to acquired mechanical defects, such as seasoning checks, shakes, etc., it could be used at unit values far higher than working unit stresses now advised. To use wood intelligently, therefore, it is necessary to consider the influence of physical properties and defects on strength values.

The Forest Products Laboratory has established five points which should be considered in the selection of structural timbers and values for them. They are: rate of growth; proportion of summerwood; size and position of knots; amount of shakes and checks, and angle of grain.

Rate of Growth. This refers to the width of the annual rings and is measured by the number of rings per inch. Rate of growth has no definite nor absolute relation to strength, although conifers of extremely rapid or exceptionally slow growth are likely to be brittle and below the average in strength. Six rings to the inch has been established as the minimum number of annual rings or maximum rate of growth, while pieces of such slow growth or of so many rings to the inch that the proportion of summerwood is not easily discernible should also be excluded.

Percentage of Summerwood. Proportion of summerwood is a very good measure of relative strength, particularly within a species. It is really a visual method of estimating specific gravity, there being quite a definite relation between strength, specific gravity and percentage of summerwood. It has been found that, other properties being satisfactory, a proportion of one-third summerwood will, in the southern pines and Douglas fir, give average ultimate strength with good factors of safety on commercially used unit stresses. Pieces with less than six rings per inch are acceptable when they have at least one-half summerwood.

Summerwood is a better criterion of strength in some species than in others, and in some the distinction is more definite than in others. In the butt logs of southern pine the rate of growth and percentage of summerwood are quite uniform, from an inch or two from the pith to quite well into the sapwood. In Douglas fir and upper cuts of southern pine the rate of growth is rapid near the pith and decreases quite uniformly toward the bark. In Douglas fir the percentage of summerwood increases for about 12 inches from the pith, after which it again decreases.

For these reasons rate of growth and percentage of summerwood in southern pines, for an average over 3 inches, may be measured over the third, fourth and fifth inches from the pith or center of the tree, while in Douglas fir the 3 inches should be located at a distance from the pith depending on the smallest dimension of the timber, the rule established by the Forest Products Laboratory being that the outside of the second inch shall be at a distance from the pith equal to half the smallest dimension of the timber. This somewhat complicated location of the 3 inches was the result of the determination of a rule which would pass the greatest proportion of timbers having a certain minimum strength value.

Specific gravity of dry wood substance is a better measure of strength than proportion of summerwood, but is difficult of ready determination, and in southern pines is often complicated by resin content which may be as high as 3 or 4 per cent and which adds weight without increasing strength. The change from springwood to summerwood is more abrupt in southern pines than in Douglas fir, and is a fairer measure of strength, there being a considerable strength value in the springwood of Douglas fir which is not taken into account when the proportion of summerwood is determined; this is somewhat compensated for, however, by the fact that with increase in proportion of summerwood there is a decrease in density, that is, the specific gravity does not increase as fast as the percentage of summerwood, so that on the whole summerwood rather underestimates than overestimates the relative strength of Douglas fir.

Douglas fir is the largest future source of structural timber, forming nearly one-fourth of the standing timber in the United States, and is an exceptionally strong wood for its weight. It has been shown that the strength of various species is largely proportional to their dry weight; Douglas fir is about 20 per cent lighter in weight than the southern pines and has proportional strength in toughness and shear, but in tension, compression and stiffness has equal values at the lighter weight.

Knots. The effect of knots on a timber depends on their character and locations. Sound and tight knots are, as a rule, harder than the surrounding wood fibers and do not weaken a beam in compression unless they so disturb the direction of grain as to cause it to be at a decided angle to the direction of stress. Knots do not seem to weaken a timber in shear, but rather tend to have the effect of pins in preventing the fibers from sliding on each other. Loose or unsound knots, except of very small size, should of course be avoided, and so should knots which break the continuity of fibers near the bottom and center of a beam; the latter are the knot defects which should be looked to most carefully.

Shakes and Checks decrease the shearing strength of beams; they are usually found near the ends where, if they are near mid-depth of the beam, they affect it most in shearing strength. There is, however, somewhat of a relation between shakes in green timber and checks in seasoned, shakes apparently acting as a sort of safety valve for seasoning checks, and so if shakes around the pith of the timber are limited to one-quarter the width of the piece in green timber or one-third the width in seasoned, or any combinations of shakes and checks are limited to these proportions, the ultimate checking will presumably not exceed the amount allowed for in determining recommended unit stresses.

Angle of Grain. Diagonal grain, due to cutting timbers across the grain, or spiral grain, due to twisting of a tree while growing, should not be permitted when the slope of the grain is more than 1 in 20; this is particularly important at the bottom of a beam near the center, where the greatest tension stresses occur.

Recommended Values

The working unit stresses for southern pines recommended by the Forest Products Laboratory are based on all five of the factors just described, with a note that Douglas fir, when the same factors are considered, shall have the same unit stresses except in shear. Other values given for Douglas fir and values given for all other woods are based on the restrictions on knots, shakes and checks and angle of grain, but not on summerwood or rate of growth requirements, although it is noted that pieces of very light weight should be excluded.

Decay

After suitability for use is determined, there are other facts which should be considered having to do with continuance of usefulness. One of them is resistance to decay, which is dependent on many factors. Decay is always the result of fungous growth, a low form of plant life, different varieties requiring varying proportions of light, air and moisture. Some kinds of fungous spores enter through injuries to a living tree, some of these progressing while the tree lives and dying when the tree is killed or felled, these kinds of fungi seldom causing continuing damage in timber after it is cut; others of the fungi enter the tree and remain dormant until the tree dies or is felled, when they become active. The air is constantly full of fungous spores ready to attach themselves to wood substances and to become active under favorable conditions.

Proper ventilation and opportunity to dry out are the greatest preventions. Practically all fungi to which structural timbers are subject are killed by not very high temperatures; a structure which can be heated to somewhat over 100° Fahr. once or twice a year will practically never be subject to decay, while incipient decay can usually be arrested by such means.

Resistance of various woods to decay is dependent somewhat on relative penetrability, and in more resistant woods, such as cypress, cedar and redwood, to certain agents or oils which are toxic to fungous spores. Sapwood is much less resistant to decay than heartwood because of its heavy moisture content, possibly also because of its immaturity and of the fact that gums, resins and other oils which may be more or less toxic or resistant to decay have not yet been deposited. Sapwood, although equally as strong as heartwood, should not be used in wet or exposed locations unless given a preservative treatment.

Preservation

Preservative treatment by injection of creosote or other toxic matter, or by dipping or brush treatment, is well worth the expense for many uses. Full pressure treatment, roughly speaking, doubles the cost and trebles the life. Brush or dipped treatment costs, of course, much less and is not as effective. Treatment as resistive to insects is usually imperative in salt water, where the life of untreated timber is frequently as short as from six months to two years, while treated timber will last until no longer useful, from obsolescence of the structure or other causes. The resistance of creosote to decay is toxic, to insects is due to the taste.

Ease of treatment varies with species. The southern pines are easily treated without loss of strength by ordinary pressure methods. Douglas fir is less penetrable than the pines and is harder to treat, although a method of seasoning in oil boiled under a vacuum in order that treatment may take place at a temperature below that which is injurious bids fair to provide a method of treatment without loss of strength. Seasoned wood is treated much more easily than green, and sapwood of any species is more easily treated than the heartwood.

Fire Resistance

Wood burns, but much less easily and with much less damage than is commonly thought. Steel and concrete are incombustible, but unprotected steel becomes plastic at a temperature about two-thirds that of the average fire; cast iron is more resistant, but still becomes plastic within or at about a conflagration temperature. Cement begins to de-hydrate at from one-third to one-half the temperature of an average fire, and the effect of fire on concrete and wood is very similar. De-hydration and charring progress at practically the same rate, the progress becoming increasingly slow as the calcined concrete and charred wood insulate the inner material; concrete is liable, however, to extensive damage if cold water is suddenly thrown on it.

Wood in small sections or on sharp edges is easily inflammable; that is why edges of beams or columns should be chamfered. Wood in masses and large areas is, on the other hand, very resistant to combustion. The chief damage to wood structures in fire is due to the iron column cap or joist hanger, and an investigation is now under way to develop such connections, or to so insulate them or the wood from them as to remove this handicap. Materials of construction may be incombustible but not fireproof; they are at best only fire resistant, and all, to prevent fire damage, should be insulated. Progress is being made in fire resistive treatment of wood, which will materially increase its fire resistance at comparatively little expense.

Analysis of "Two-Way" Flat Slabs

By E. F. ROCKWOOD, *M. Am. Soc. C. E.*

FLOOR slabs of reinforced concrete supported upon columns without beams or girders and extending two or more bays in each direction are commonly known as flat slabs. The columns may be, and usually are, provided with enlarged heads. In addition, the slab may be thickened on the under side in the vicinity of the columns, forming what is known as a "drop" or a "depression."

The sketches given here show the cracks that developed in four test panels of a flat slab floor in a building built in Chicago in 1921. These cracks indicate the regions of high tensile stress where reinforcing steel is needed. Such reinforcing steel can be at right angles to the cracks, taking the stresses directly, or by crossing the cracks at an angle can take components of these stresses. The writer knows of

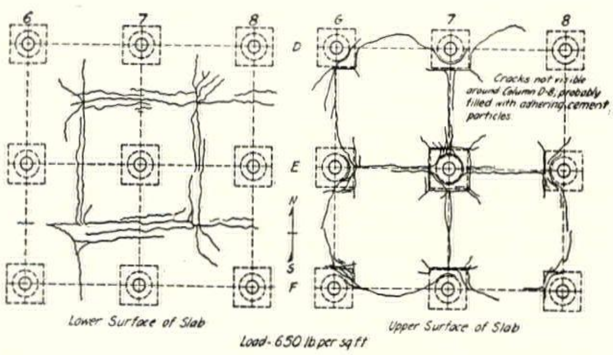


Fig. 1

three common systems of arranging such reinforcement,—the two-way system, the four-way system, and the S. M. I. system. The latter requires less steel than either of the others, but the steel in it is more complicated to design, bend and place, and if the system is used a royalty must be paid. The other two systems require approximately equal amounts of steel, but the two-way system is simpler to place and has only two layers of steel over the column heads, which allows the concrete to be more readily placed. The writer therefore favors the two-way system. In this system all the rods run parallel with the column lines in two directions, and where they do not cross a crack line at right angles the stress causing that crack is carried by components of two rods at right angles to each other.

Many theories have been advanced for the design of flat slabs, and engineers do not agree upon any one of these, but tests on floors that have been built furnish sufficient data for arbitrary methods of design, and one of the best of them is described by these specifications and is illustrated in Figs. 2 and 3.

Capital. Columns shall be provided with enlarged capitals, and the diameter (c) of this capital shall be the base diameter of the largest right circular cone which lies entirely within the column (including the capital) whose vertex angle is 90° and whose base is 2½" below the bottom of the slab or the bottom of the dropped panel. The diameter of the capital shall not be less than ⅕ the distance center to center of the columns, and shall be such that the unit stresses specified elsewhere are not exceeded.

Brackets. Brackets or haunches shall be provided on exterior columns when necessary to transmit the shear and bending from the slab to the column.

Interior columns. The smallest dimension of interior concrete columns supporting flat slabs shall be not less than 1/15 the span, center to center, of columns in the longer direction.

Dropped panel. A thickening of the slab on the under side in the vicinity of the columns is termed a dropped panel. Its width in any direction shall not be less than ⅓ the panel's length in that direction, and its thickening shall not be greater than 1.5 times the slab thickness.

Thickness of flat slabs and dropped panels. The minimum thickness of floor slabs shall not be less than 1/32 and of roof slabs 1/40 of the distance center to center of columns in the longer direction. The thickness shall be such as to withstand the shear around the column capital or around the dropped panel.

Shear. Shearing Stress. The shearing unit shearing stress shall not exceed the value of "v" in the formula,

$$v = 0.02f'_c\ (1 + r)$$

nor in any case shall it exceed 0.03 f'_c (f'_c=ultimate compressive strength of the concrete at 28 days).

The unit shearing stress shall be computed on:

(a) A vertical section which has a depth, in inches, of $\frac{7}{8}(t_1 - 1\frac{1}{2})$, and which lies at a distance, in inches, of $t_1 - 1\frac{1}{2}$ from the edge of the column capital; and

(b) A vertical section which has a depth, in inches, of $\frac{7}{8}(t_2 - 1\frac{1}{2})$, and which lies at a distance, in inches, of $t_2 - 1\frac{1}{2}$ from the edge of the dropped panel.

In no case shall "r" be less than 0.25. Where the shearing stress on section (a) is being considered, "r" shall be taken as the proportional amount of reinforcement crossing the column capital; where the shearing stress at section (b) is being considered, "r" shall be taken as the proportional amount of reinforcement crossing entirely over the dropped panel. (For typical flat slab and designation of principal design sections, see Figs. 2 and 3.)

Moments. In an interior panel the bending shall be taken thus:

(a) Negative moment in middle strip: Extending in a rectangular direction from a point on the edge of panel $\frac{l_1}{4}$ from column center a distance $\frac{l_1}{2}$ toward the center of adjacent column on the same panel edge.

(b) The maximum negative moment and the maximum positive moments in the middle strip and the sum of the maximum positive moments in the two column strips may each be greater or less than the values given in the table herewith by not more than $0.01M_o$.

Moments for Slabs with Two-Way Reinforcement

Strip	Flat Slabs without Dropped Panels		Flat Slabs with Dropped Panels	
	Negative	Positive	Negative	Positive
Column strip........	$0.25\ M_o$	$0.11\ M_o$	$0.25\ M_o$	$0.10\ M_o$
Two-column strips....	$0.46\ M_o$	$0.22\ M_o$	$0.50\ M_o$	$0.20\ M_o$
Middle strip.........	$0.16\ M_o$	$0.16\ M_o$	$0.15\ M_o$	$0.15\ M_o$

In flat slabs in which the ratio of reinforcement for negative moment in the column strip is not greater than 0.01, the numerical sum of the positive and negative moments in the direction of either side of the panel shall be taken as not less than:

$$M_o = 0.09\ Wl\ (1 - 2/3\ \frac{c}{l})^2$$

Where M_o = sum of positive and negative bending moments in either rectangular direction at the principal design sections of a panel of a flat slab;
c = base diameter of the largest right circular cone which lies entirely within the column (including the capital) whose vertex angle is 90° and whose base is 1½" below the bottom of the slab or the bottom of the dropped panel. (See Fig. 2.)
l = span length of flat slab, center to center of columns in the rectangular direction, in which moments are considered; and
W = total dead and live load uniformly distributed over a single panel area.

Wall and other irregular panels. In wall panels and other panels in which the slab is discontinuous at the edge of panel, the maximum negative moment one panel length away from discontinuous edge and maximum positive moment between shall be taken thus:

(a) Column strip perpendicular to the wall or discontinuous edge. 15% greater than that given in table.
(b) Middle strip perpendicular to wall or discontinuous edge, 30% greater than that given in table.

In these strips the bars used for positive moments perpendicular to the discontinuous edge shall extend to the exterior edge of the panel at which the slab is discontinuous.

Panels with wall beams. In panels having a marginal beam on one edge, or on each of two adjacent edges, the beam shall be designed to carry the load superimposed directly upon it. If the beam has a depth greater than the thickness of the dropped panel into which it frames, the beam shall be designed to carry, in addition to the load superimposed upon it, at least one-quarter of the distributed load for which the adjacent panel or panels are designed, and each column strip adjacent to the parallel with the beam shall be designed to resist a moment at least one-half as great as that specified in the table for a column strip. If the beam used has a depth less than the thickness of the dropped panel into which it frames, each column strip adjacent to and parallel with the beam shall be designed to resist the moments specified in the table for a column strip. Where there are beams on two opposite edges of the panel, the slab and the beam shall be designed as though all the load were carried to the beam.

Flat slabs on bearing walls. Where there is a beam or a bearing wall on the center line of columns in the interior portion of a continuous flat slab, the negative moment at the beam or wall line in the middle strip perpendicular to the beam or wall shall be taken as 30% greater than the moment specified

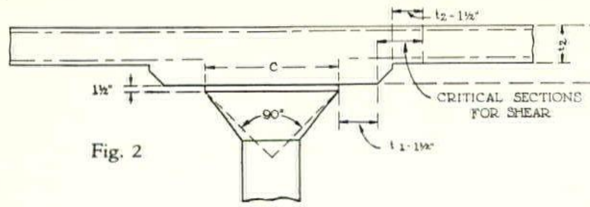


Fig. 2

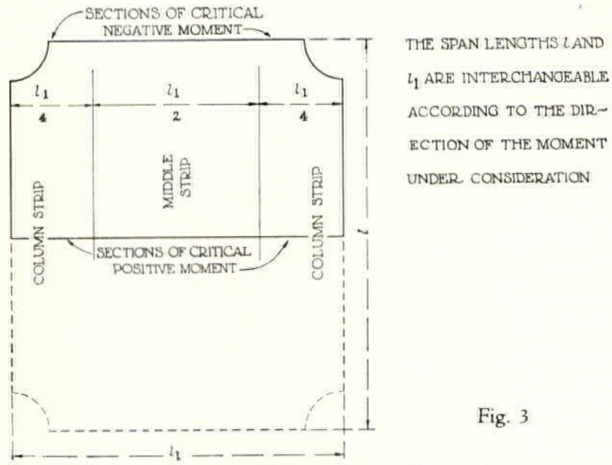


Fig. 3

in the table for a middle strip. The column strip adjacent to and lying on either side of the beam or wall shall be designed to resist a moment at least one-half of that specified for a column strip.

Point of inflection. The point of inflection in any line parallel to a panel edge in interior panels of symmetrical slabs without dropped panels shall be assumed to be at a distance from the center of the span equal to $^3/_{10}$ of the distance between the two sections of critical negative moment at opposite ends of the line; for slabs having dropped panels, the coefficient shall be ¼.

Arrangement of reinforcement. The design shall include adequate provision for securing the reinforcement in place so as to take not only the critical moments, but also the moments at intermediate sections. At least two-thirds of all bars in each direction shall be of such length and shall be so placed as to provide reinforcement at two sections of critical negative moment and at the intermediate section of critical positive moment. Continuous bars shall not all be bent up at the same point of their length, but the zone in which this bending occurs shall extend on each side of the assumed point of inflection, and shall cover a width of at least $^1/_{15}$ of the panel length. Mere sagging of the bars shall not be permitted. In four-way reinforcement the position of the bars in both diagonal and rectangular directions may be considered in determining the width of zone of bending.

In general the negative bending moment for a panel width along a section at and parallel to the wall columns shall be taken as $^5/_{16}\ M_o$. The bending in the exterior columns shall be taken as $^5/_{16}\ M_o$. $\frac{Wh}{4}$ where "h" is the thickness of exterior column.

This method follows very closely that used in the latest report of the "Joint Committee" and the Chicago Ordinance, as it is practically a combination of both.

ITALIAN RENAISSANCE DETAILS

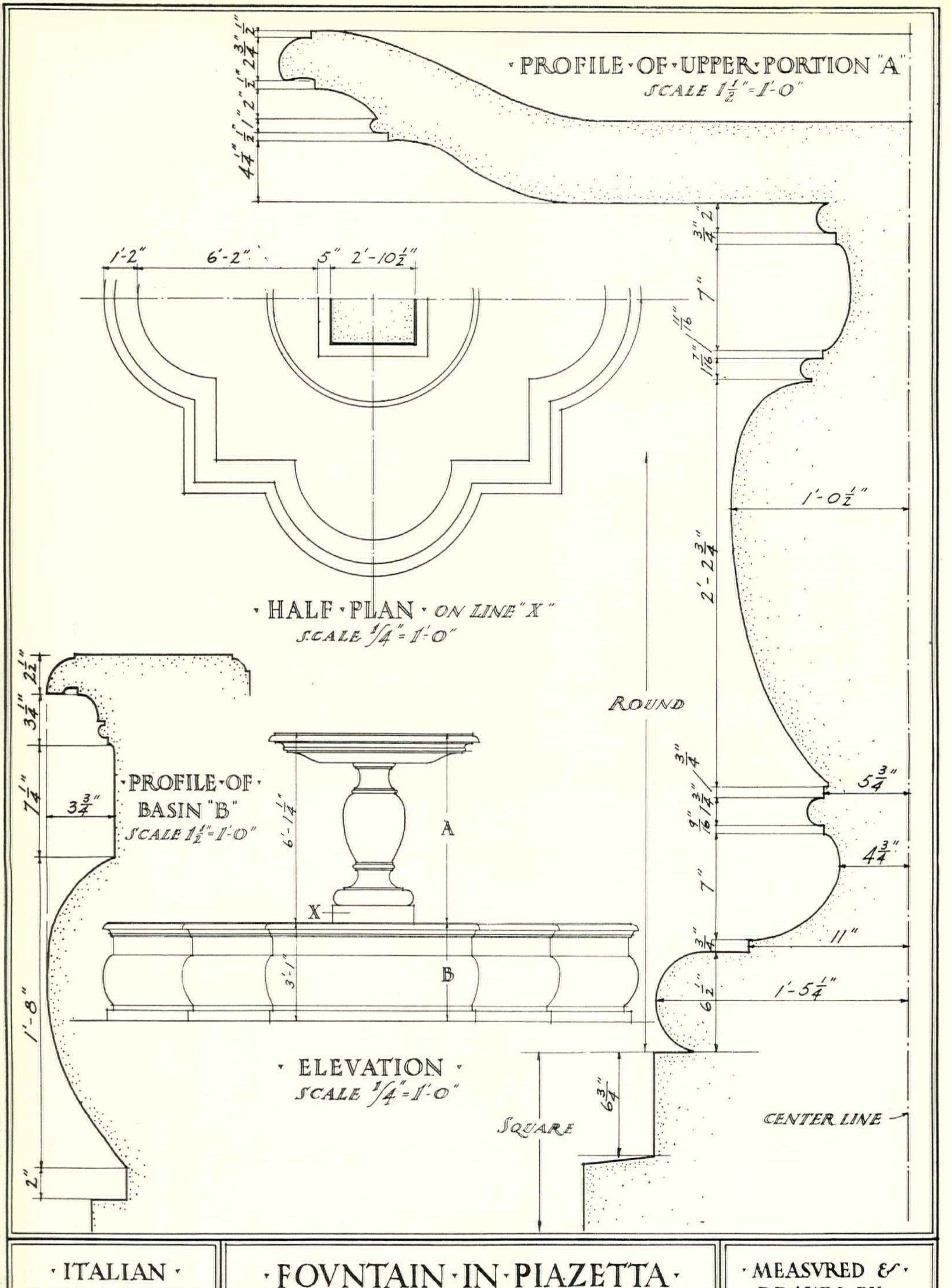
A SERIES OF MEASURED DRAWINGS

By J. HUNTER McDONNELL

FOUNTAIN IN PIAZETTA DELLA ZECCA, THE VATICAN, ROME

THE Vatican, with its bewildering number of rooms, its halls and loggias, contains a great variety of courtyards, large and small. The Piazetta della Zecca (mint) is one of the minor courtyards, and is partially surrounded by the building which until the fall of the temporal power in 1870 was used as the pontifical mint.

At the center of the piazetta stands this fountain which is an excellent example of the type which one frequently sees throughout Italy in public squares or in the courtyards of buildings sufficiently large for fountains of fairly robust scale. This fountain is particularly suitable for use in modern reproduction, since its simplicity of form and lack of intricate ornament render it easily cast in concrete. For its beauty and interest the fountain depends entirely upon its bold and vigorous lines and the skillful use of mouldings about the basin and the upper portion. If cast in concrete, the fountain might be given added variety by the use of different finishes for certain of these heavier mouldings.



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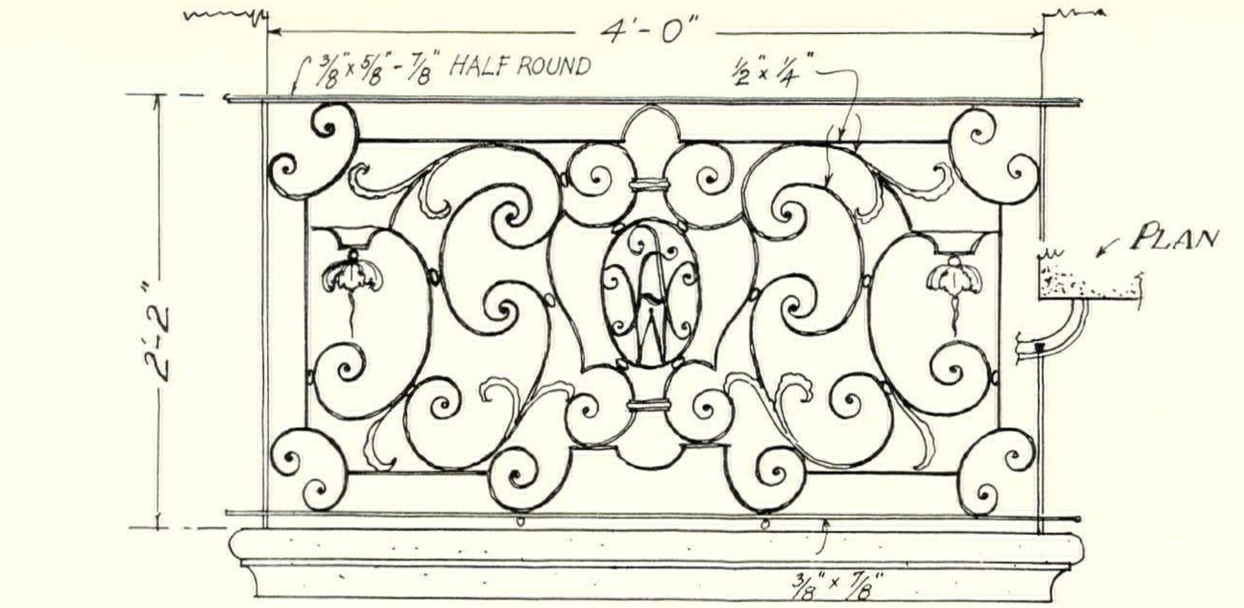
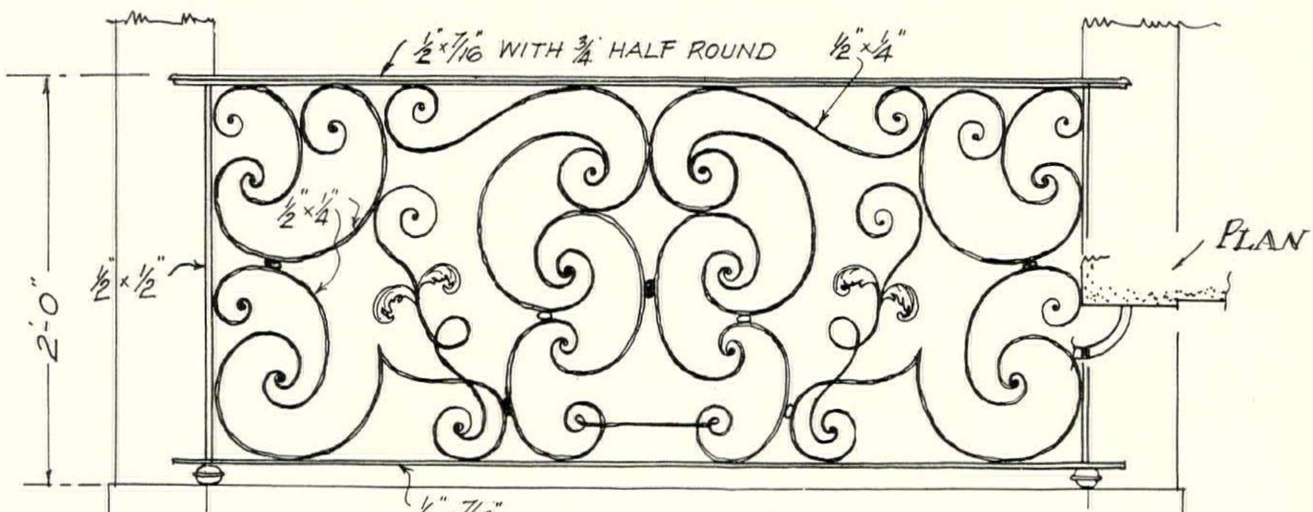
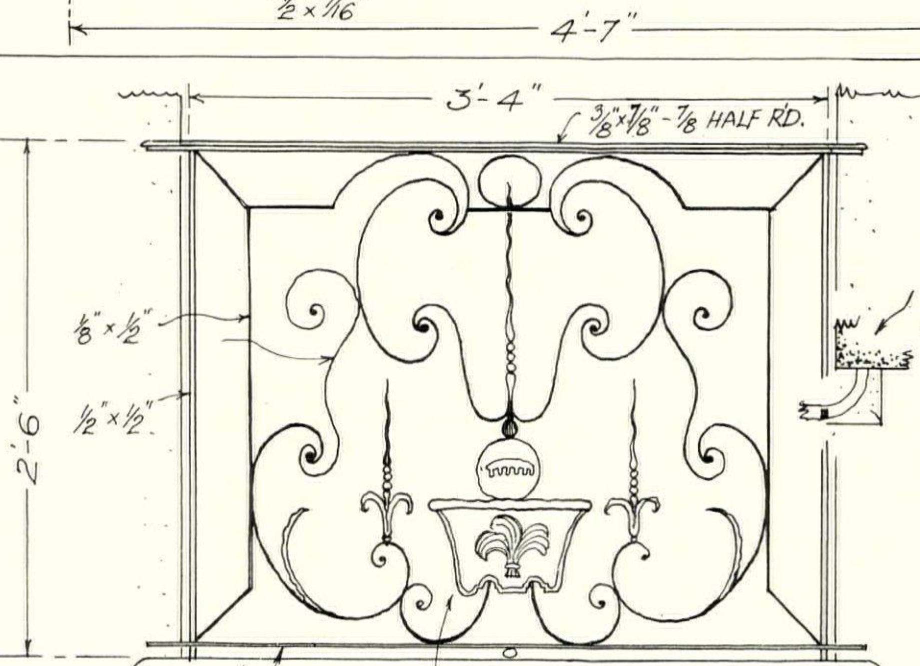
HUNTER McDONNELL







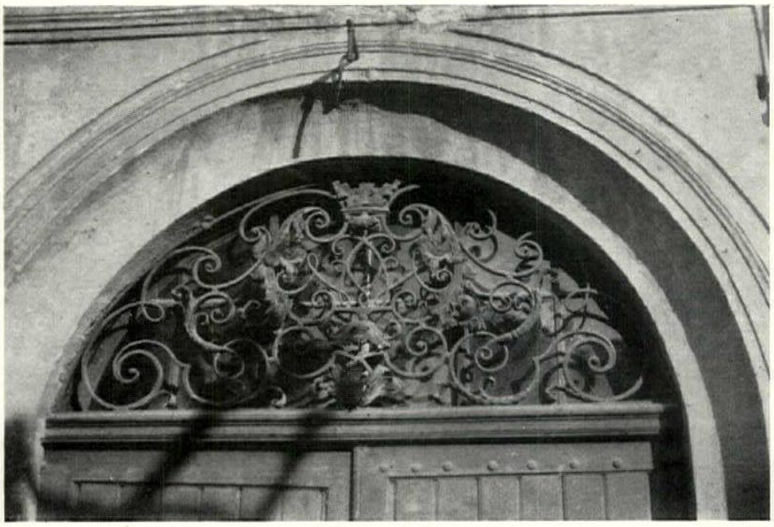
SCALE 1" = 1'-0"

FRENCH DETAILS 1923	WROUGHT IRON BALCONIES TOURS, FRANCE	MEASURED AND DRAWN BY F. N. BREED.

FRENCH RENAISSANCE DETAILS

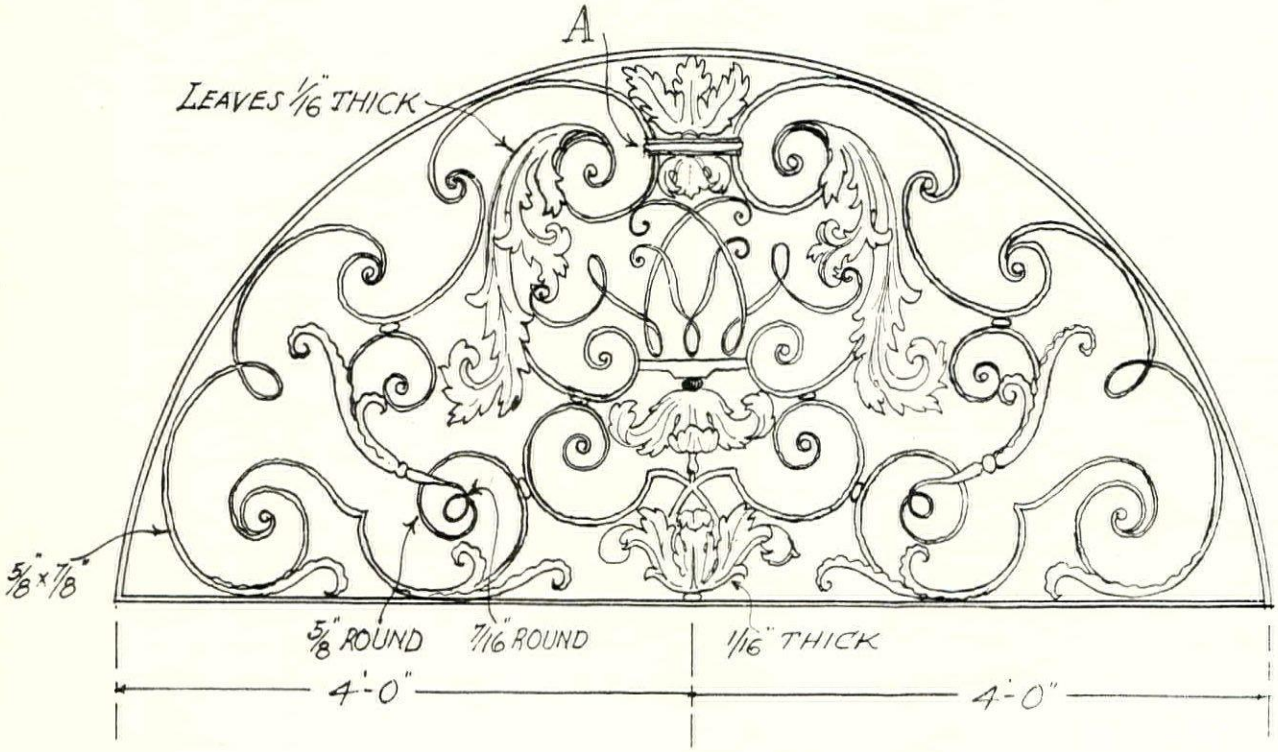
A SERIES OF MEASURED DRAWINGS

By F. NELSON BREED



WROUGHT IRON LUNETTE, TOURS, FRANCE

THE lesser cities of France are veritable museums of excellent ironwork which appears in railings about balconies, as guards at windows, and often as lunettes above doors or gateways. The lunette illustrated upon this page is from the Academy of Music at Tours. Like much old French wrought iron it is of a simple Louis XV type which would be appropriate for use in modern buildings of many kinds. The variety of its forms gives this old French work a quality not always found in English or colonial ironwork, and its flowing, luxuriant design gives it a value in affording necessary contrast to large expanses of wall surface or to compositions in which much use is made of straight lines. Particularly in railings or window guards, such ironwork often includes initials.



Scale: three-quarters inch equals one foot

BUSINESS & FINANCE

C. Stanley Taylor, *Editor*

Prosperity or Collapse in the Building Industry?

THERE can be no doubt that the most absorbing topic in the building industry today relates to the reaction of the public during the remainder of this year and through the year 1924. Again, as in 1920, the building public is becoming acutely alive to a situation of cost increase which tends to make building construction prohibitive in price, consequently threatening the sudden collapse of the recently developed building boom. While definite prediction in regard to this matter is impossible, it is of great interest to examine the contributing influences which tended to create the present indeterminate situation and, insofar as possible, to forecast the trend of public demand for buildings. This can be done only through an unbiased examination of cause and effect and a logical determination of those steps which may be taken to prevent any panic condition which might result in a sudden collapse of present activity.

Architects, particularly, find themselves in a difficult position today in relation to the advice which they should give their clients. Should new projects be withdrawn from the market now? What is the present cost situation? Have we reached the peak, and will costs become stabilized, or will there be an immediate downward trend? These are some of the questions which clients are asking.

In December, 1922, as a result of a comprehensive survey among architects, THE ARCHITECTURAL FORUM predicted a greater volume of building activity for 1923 than the record-breaking volume of 1922. This prediction of an increase, which approximated 20 per cent over the volume of 1922, was based on a large number of confidential reports rendered by architects, and thus far this prediction has been more than substantiated by the actual figures of the first five months of this year. By turning to the chart on the first page of the Service Section in this issue (page 65) it will be seen that the volume of actual and anticipated construction during the first months of 1923 has considerably exceeded that of 1922. While this condition represents a great period of prosperity in the building industry and great activity in the offices of architects, there remains the question whether this activity will be shortlived or possibly extend in diminishing force over a considerable period of time.

The Present Building Cost Situation

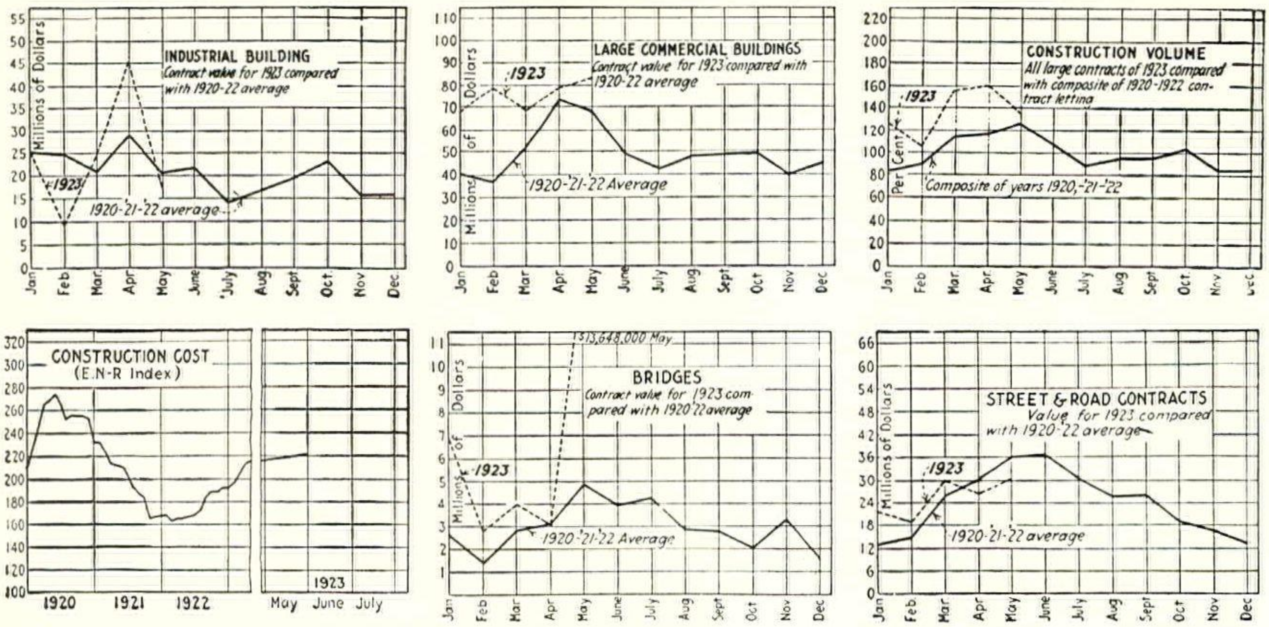
While a certain proportion of this unusual demand for building materials and labor had been anticipated, there is no doubt that the pressure of demand has created a "seller's market" in which to a great extent the buyer has been setting prices at higher levels on a basis of high bidding for quick deliveries. As a result of the activity of last year it has been generally true that stocks of construction materials on hand have been lower than last year under conditions of greater demand. Demand has also produced a similar effect on labor, both in cost and production, so that the anticipated sharp rise in building costs has taken place as indicated in the chart referred to, in these paragraphs, and in one smaller chart shown herewith. In regard to actual building costs today, there is such a wide variation in reports on all types of recently completed buildings that without a thorough analysis of a large number of such reports no fair indices can be established. It is but natural that the unbalanced condition of increasing cost and increasing demand could not continue on a permanent basis.

Recently, certain contributing factors have appeared which are tending to check further increases in price and to cause a temporary stabilization. Among these factors may be noted a definite falling off in the volume of speculative building; failure of mortgage loan appraisals to keep pace with building cost increases; the proof that in many instances materials were over-ordered, and finally, the withdrawal of many projects from the market. In addition to these conditions there is a normal seasonal influence to be taken into consideration, and it is anticipated that the index of building cost will not continue upward but will assume a gradually declining course as unfilled orders are made up and as stimulated production creates a better condition of balance between supply and demand.

Handling the "Buyers' Strike"

In many branches of the building industry a natural fear has been expressed that these conditions would develop what we term a "buyers' strike," in which a large proportion of potential building investments would be frightened out of the market. There is no question of the existence of this element of danger, and that logical steps should be taken to ease the situation. It is obviously true, however, that any concerted effort to control or influence this public demand has in it a number of dangerous elements and should be handled with the greatest care.

Recently, in New York, a group of architects, contractors and producers of building materials



These charts record the volume of construction values of 1923 compared with 1920-1922, and changing costs

have presented through the public press and other publicity channels considerable information of unquestionable value to the building public. The gist of this advisory information has been to cause the public to control its demand while prices are at present high levels. Similar efforts of control demand will undoubtedly be made in many sections of the country. While it is true that some remedy is required by the situation, it is highly important that the dangers of establishing a public consciousness of the folly of building now be clearly recognized. It took several years for the investing public to return to the building field as a logical outlet for its money. It took a long, sharp drop in costs to bring about the building boom which we are now enjoying. To a certain extent the prosperity in the country is today resting on the building industry, as will be explained in a later section of this article. It would, therefore, seem that instead of general advice toward the curtailing of building operations, this advice should be selective in its nature and should tend to indicate the types of buildings which should be deferred with logical reasons for such action by the investor.

From the viewpoint of the individual architect, it would seem to be his duty to clients to admit the wisdom of deferring public buildings and other structures of non-investment or speculative type; to recommend the immediate construction of investment and service buildings, since at present costs the investment is sound in character or else the abnormal cost may be quickly written off by unusual returns from the building, and to do all in his power to discourage that type of purely speculative building which indicates a certain mortgage foreclosure within a brief period of years.

Already there are signs of a curtailment of mortgage funds, and it will be unfortunate indeed if the financing of building operations (at best a difficult problem) should receive a discouraging setback at this time. In the process of a natural reaction to high costs it is quite probable that many projects will be deferred, if not abandoned, and this operation of the law of supply and demand will probably in itself show a sufficient decrease to relieve the present overstrained situation. If this is true, as it always has been true in the past, then is it not possible that any artificial restraint which may be imposed will have a tendency toward such discouragement on the part of building investors that a period of absolute stagnation may be facing our industry?

The Long Period of Prosperity

In order that a fairly clear picture of recent conditions in the construction industry may be established in the minds of readers, there are presented herewith a number of small graphic charts prepared by *Engineering News-Record* and indicating construction activities in 1922 and 1923 in the form of contracts awarded, first, in the United States, and second, in six divisions of the country. In addition to these charts others are presented which show the general division of construction contracts in 1923 as compared with the average of the preceding three years. These divisions cover all construction contracts: bridges; street and road contracts; industrial buildings and large commercial buildings. On the second page of the Service Section in this issue will be found a chart showing a general division by volume and by investment of contracts let in the building field. With this information in mind we may turn to certain comparative conditions in the general business field as recently expressed by George Woodruff, Vice-president of the National Bank of the Republic (Chicago), in which he cites relative conditions and gives an expression of opinion as to prosperity and the building trades. He says:

It was not so very long ago that the business men of our country were looking forward to an improvement from de-pressed business conditions, and were basing their hopes for an era of prosperity upon three factors:

First,—The building up of surplus bank reserves which would make possible a large extension of credit for financing a greatly increased volume of business.

Second,—The development of a domestic trade boom due to increased buying power that would follow the lowering of the retail cost of manufactured goods and the raising of the prices obtained by grain growers, and due also to the general need for houses, roads, railroad repairs, and various types of goods and supplies, resulting from curtailment during the war years.

Third,—An increased foreign trade activity following such a settlement of European political and social problems as would make possible the sale of foreign securities in America, the proceeds of which could be used to pay for European purchases in this country.

At the present time the prosperity that our business men had been looking for is actually in full swing, but this prosperity did not develop just as had been expected. First, it is, of course, true that we have experienced a great increase in surplus bank reserves and that ample credit is available for the financing of our business activities. Second, it is also true that a domestic trade boom has developed, but the basis of this boom has not been entirely sound, because the liquidation of manufacturing costs was cut short during 1922, while the prices obtained by grain growers did not materially improve, the consequence being that the purchasing power of the large agricultural classes has been decreasing instead of increasing, and our domestic trade activity has consequently been temporarily supported almost entirely by the filling of the urgent needs resulting from the curtailment during the war. Third, our present prosperity does not enjoy that degree of permanency that would come from an increasing foreign trade, for Europe has not been able to sell securities in America in large volume, and the people across the water have therefore not yet been able to buy of us the machinery, supplies and raw materials that they need in order to make up for the shortages of recent years.

In view of the somewhat unsound basis of our present prosperity, many people are asking how long this prosperity will last, and in this connection it is interesting for us to note, first of all, that our very satisfactory credit situation shows no signs of weakening for some time to come. This is well illustrated by the chart showing the surplus reserves of the Federal Reserve System.

Next we must give consideration to the fact that many of our pressing needs due to war curtailment have now about been filled, and that *the great activity of the building industry now remains as the one most important factor in prolonging our present lively domestic trade.*

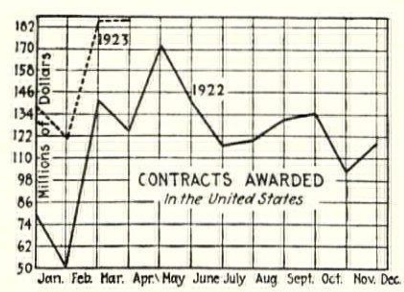
The purchases of our agricultural classes usually form the backbone of any great domestic activity, but no immediate increase in the purchasing power of the farmers would seem to be impending. The condition of the farmer is illustrated by the chart of grain prices and the retail prices of the commodities usually purchased by farmers. It will be noted that the price of these commodities has been constantly rising of late, while the price received by the farmer for his grain has been standing still.

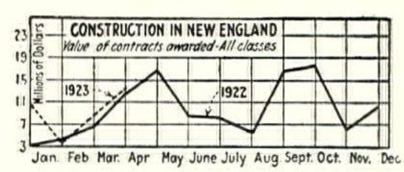
Then, we must also consider the present outlook for a prompt increase in foreign trade, which, unfortunately, does not seem to be very alluring, because while Europeans are anxious to buy in our market, they have no way of paying for their purchases. The chart showing the exports from the United States illustrates the fact that while we are doing a considerable foreign business we are not carrying on an export trade that will support the full operation of our enormous productive capacity.

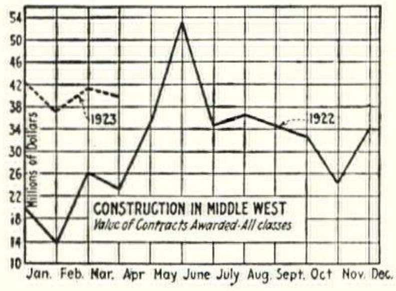
After carefully studying the important factors entering into our business activity we are forced to conclude that our building boom has been supporting our recent prosperity, and this is well illustrated by the chart showing building permits issued in the principal cities of the United States. Never in history have we had such a great amount of building, and the stimulating effect of this construction activity has been felt in practically all manufacturing lines.

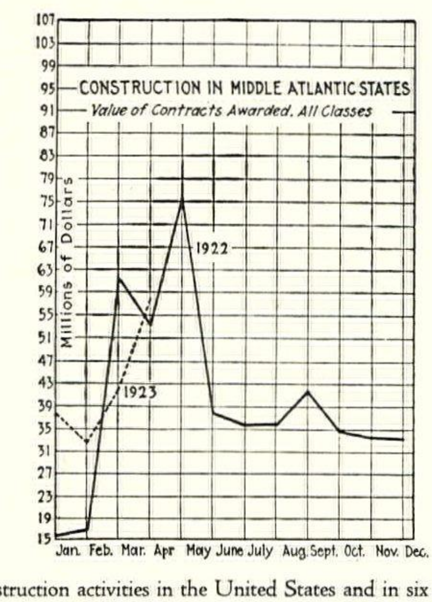
In view of existing conditions it is of great importance for us to note that at the present time there are indications that increasing costs will slow up building activities, and that there are many current reports of a buyers' strike. Of course, if such a "strike" should come about, there may develop a belief that it will be well to wait for a considerable fall in building costs before going ahead with building contracts, and this would be a very unfortunate development, because if our building activities are now interrupted, the chief support of prosperity will be withdrawn and some degree of business recession will follow. It would therefore seem as if those who are engaged in the building industry could render a great service to themselves and to the country if they were now promptly to adopt the slogan, "Build in 1924," for such a slogan would tend to hold costs down during 1923, prevent any undue spread of the talked-of buyers' strike, and at the same time keep the people of our country in a mood to build. Prospective building activity in 1924 would tend to convince the people that it would be unprofitable to cancel building plans with the idea of waiting for prices to go to the "bottom," as an active year in 1924 would mean that there would be no "bottom" for some time to come.

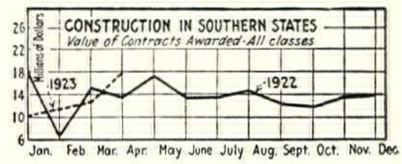
All well informed business men admit the possibility of a moderate business recession before the end of the year; nevertheless it would seem that those engaged in the building industry are the "pinch hitters," who may be able largely to pre-

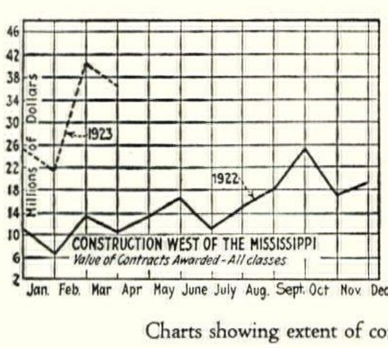


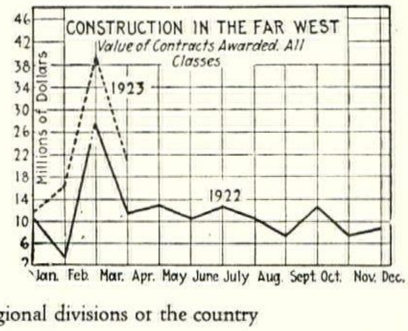




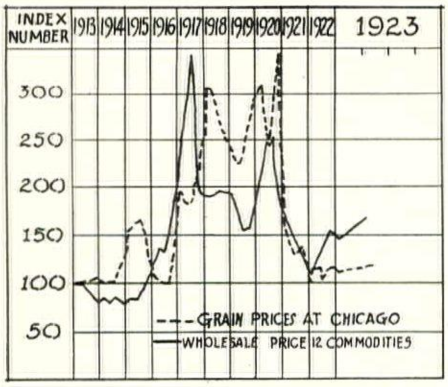








Charts showing extent of construction activities in the United States and in six regional divisions of the country



Values of Products Sold and Bought by Farmers

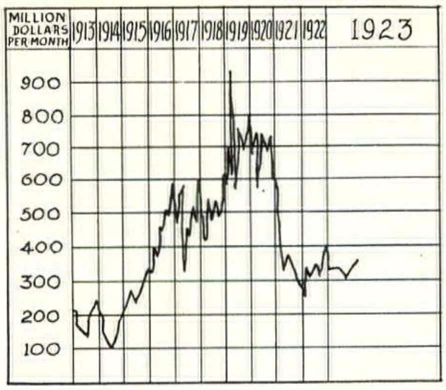
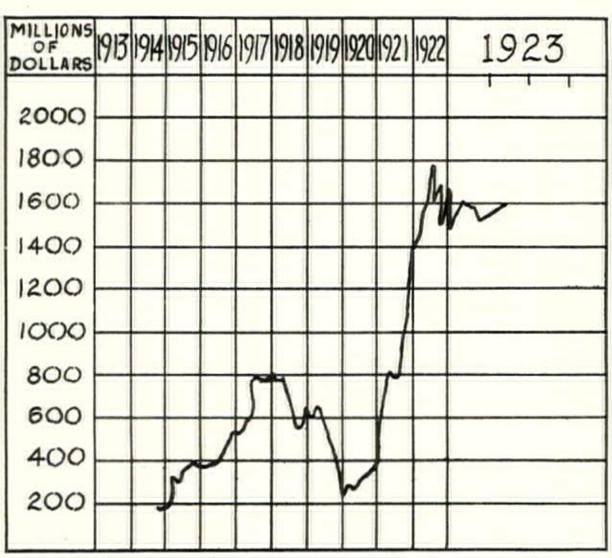


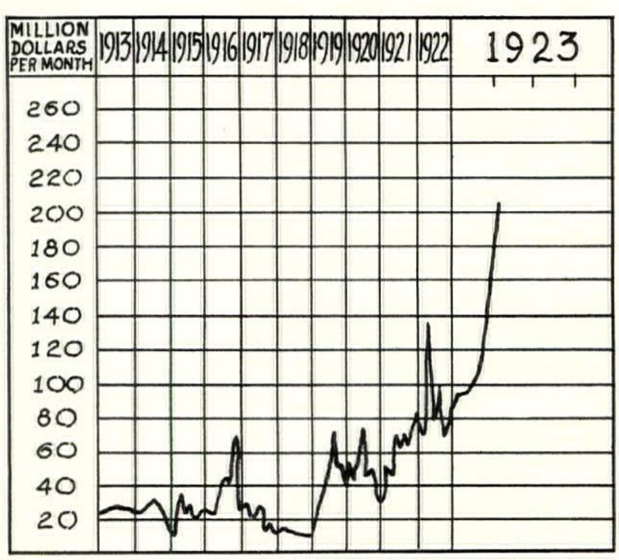
Chart Showing Extent of American Exports

vent this threatened slump. If our present building activity proceeds to fall down, the ensuing business recession will considerably decrease our prosperity until we can gather ourselves together for a fresh start, but if the building industry is able to tide us over into 1924 we may then find that a settlement of European social and political questions will make possible the sale of large amounts of foreign securities to American investors, and the proceeds of the sale of these securities would be used by Europe for the purchase of American goods. Such a development would prolong our prosperity for some time to come, because of the manufactured goods that would be shipped to foreign shores and because of the increased purchasing power of the grain growing sections of our country that would follow the increased demand for agricultural products on the part of the people across the sea. Upon the intelligence, team work, and vision of American builders now depends the immediate continued prosperity of the nation.

Considering all affecting conditions, it would seem quite logical that we may expect a period of long continued prosperity in the building industry by reason of a well maintained demand for new structures, if no unfortunate complications bring about a loss of confidence in the building field from both the mortgage investment and the equity investment viewpoints. It is to be hoped that the curtailment of building programs will not be carried out in a manner discouraging to the investing public, and that the advice given to the public through channels of publicity will explain this curtailment not as a desperate reaction against increased costs but as a logical extension of the building program to ease the present situation in a manner which will render unnecessary any further cost increases, and may as a matter of fact bring about a return to lower cost levels for good of the industry. Because of the nature of their production, it is illogical to expect a great increase in the available supply of building materials. The investment required is too large, the time required is too long, and profits would not justify such measures to meet the temporary condition of demand. With the relief which will naturally be afforded as cheap speculative projects are forced out of the market and comparatively unnecessary building projects are withdrawn, it would seem that a sound condition should develop in the construction field, involving a definite demand for a high type of architectural design and specifying the use of quality materials and good equipment. Rather than withdrawing from the market, loaning interests should become more discriminating in this respect and should appraise plans and specifications on a basis of quality, low depreciation and low maintenance costs, which are assured by the use of efficient planning and good materials. This action will help materially to check the economic drain which results from the depreciation and waste of cheap construction, and should tend to maintain the building industry on the basis of sound prosperity which is important not only within its own circle, but as a strong contributory factor in stabilizing prosperity in the United States during the next few years. Much depends upon developments of the next few months.



Building Permits Show that Industry is Enjoying Record Activity



Excess Federal Reserves Still High and Adequate for Financing Prosperity

The Architect's Troubles

AS SEEN BY AN ENGINEER

By WALTER W. CLIFFORD, *of Clifford & Roeblad*

THE relations of architects, engineers and the public have given the interested parties some thought during the last few years. Some of the confusion in discussions arising therefrom seems to have been due to a laxness of definition as to what constitutes an architect or an engineer. In most states there is nothing to restrain any individual from calling himself by either name. The general public may be forgiven for the error of judging a profession by its less qualified members, but there seems less excuse when members of one profession judge those of an allied profession similarly.

The members of a single profession may not agree among themselves as to its scope. Robinson* says: "We must therefore think of true architecture, not as the development of economical planning" and "not as the expression of construction . . .," while Statham** speaks of "the few perfect styles, each of which is the expression of a structural method." The one is exemplified by the architect pained at the crass spirit of a client who complains about a house because it is unlivable when it is admittedly pleasing to the artistic eye; the other, somewhat broadly, by the architect who cries out that the engineer is robbing the world of its æsthetic birthright by designing the simplest type of structure.

The "box type" of factory building, which the engineer is accused of foisting on an indifferent world, comes in for its share of architectural criticism ever and anon. Perhaps, though, criticism is a bit too flattering a term for the attention bestowed on such a structure. But let us consider for a moment that which Henry Ford calls "bunk."

Structurally the Egyptians and Greeks followed along the same lines of short lintel construction. The mechanical limitations of stone beams and the unexplained aversion of these people to the arch de fined the form of their construction. With all their lack of refinement, the Egyptians achieved what Statham says "must have been one of the finest and most impressive interior effects ever realized in architecture." And the Greeks, with the same limitations, backed by a great civilization (Wells to the contrary notwithstanding), gave us the best of the wondrous monuments of antiquity. The Roman arch, vault and dome contributed to construction and architectural design, an advance in construction methods developing a new architectural style. When in Byzantium they developed pendentives, it would seem that construction was adapted to design without a sacrifice of quality in either. So the Romanesque developed into the Gothic, when the broken arch came to the rescue of the designer. All this time construction and art went hand in hand for the simple reason that they were ideally situated for co-operation, namely, in the same individual's brain.

Incidentally, if we except the few theaters and an occasional bath or other not too common building, architecture limited itself to religious buildings, although some utilitarian structures like the aqueducts show the advantage of having the architect and engineer one and the same. Industry in a modern sense was not yet born, and the housing of the proletariat occupied little of the architects' time or attention.

Before the first of the Egyptian temples was built mankind had emerged from the stone age into the iron age. But in the matter of building, the iron age may be said not to have been reached until the Gothic monuments of the stone age were sufficiently far in the past to be venerated and copied. To the short stone lintel and the arch the iron age brought the long lintel construction, the noticeably distinctive feature of modern building. Excepting where the merchant demanded clear show window space, where has the modern construction been so honestly displayed as in the factory? "Honest but ugly," we hear. Yes. Still in most cases it is possible to so proportion columns, spandrels and openings that a pleasing as well as an honest effect is obtained, at no additional cost. It is, to be sure, more difficult to achieve satisfactory design in such simple members and materials than with all the range of terra cotta veneer, but mere difficulty does not discourage the architect.

Concrete is the most modern of construction materials. It is masonry without joints. This characteristic has been frankly considered in some bridge designs, resulting in really graceful structures. The Germans have built a few buildings taking their outlines from the monolithic concrete bent,—huge, powerful, honest and cumbersome in effect. But these efforts represent an infinitesimal percentage of the concrete buildings. These buildings afford examples of the need of co-operation between the architect and the engineer. The factory owner considers the architect too impractical, and may admit that he does not like to look at the work of his engineer, but as a matter of economic necessity, if he must choose between them, he is obliged to turn to the engineer.

One architect lays the sad things in the life of the architectural profession to the fact that this is a commercial age. A horribly cynical viewpoint, this! And is it true? With all its infantile failings, is not the taste of the "common people" (how short a time it has existed at all!) really improving? The literary man has much more cause to complain than the architect. The gingerbread age in architecture has largely passed, while in writing we are at the height of a similar period.

As a symptom of the commercialism is the fre-

* "Architectural Composition."
** "A Short, Critical History of Architecture."

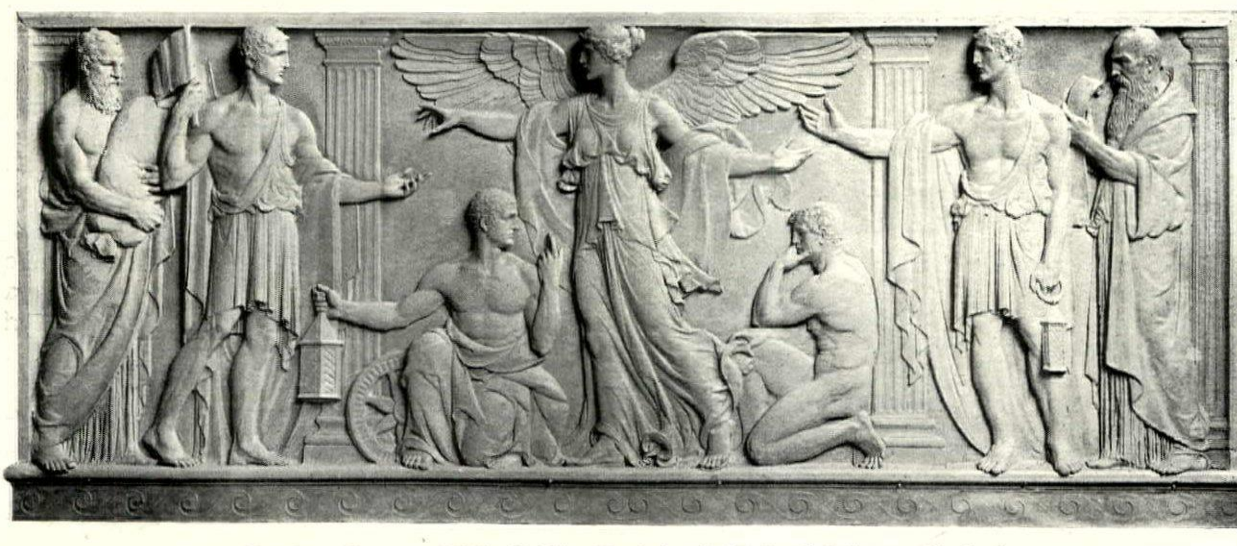
quently made statement that success in any line is proportional to selling ability. Whether we like it or not, this is true in a large degree. At first glance it seems detrimental to the development of taste in architecture, but consider why salesmanship was relatively less important a few generations ago. Was it not because wealth was so limited in those days that there were practically no buyers excepting for the limited staple necessities? The present success of salesmanship is due to increased purchasing power and, more important still, to a desire on the part of the individual to think for himself, and a commendable desire to be shown.

The architect is often rightly accused of weakness in salesmanship. We speak not of the commonly discussed selling of services, but of the more abstract problem of selling ideas. This applies to the architectural profession as a body as well as to the individual. Cement and its uses are much better known to the public through the Portland Cement Association than architecture and its advantages through the efforts of any architectural body. The National Geographic Society syndicates geographical information for the enlightenment of the public in what might be called a commendable way. Edward Bok, pioneering in the *Ladies' Home Journal*, did more to influence the minds of the great public in architectural matters than anyone else, as he naively admits in "The Americanization of Edward Bok." Unfortunately, some of his followers have done much to neutralize any good results which he may have achieved.

The individual architect falls short of the best in selling when he vetoes his client's ideas with the blunt explanation that they are not good. He may awe the client, but how often does he try to *convince* the client, and how often does he take full advantage of his opportunity to *educate* the client?

The application of the words "architect" and "engineer" through the centuries is of interest. Vitruvius, by his insistence that an architect must have a musical ear, that he might properly tune *ballistæ*, would indicate that he included even the army engineers as architects. Not long after this the army construction men took unto themselves the title "engineer," and for centuries the engineer was a military man. All civilian construction, including bridges and hydraulic works, was in the hands of the architects. A few centuries ago the architects who built bridges and such work, which would now be called engineering, wished to call themselves engineers. It took time to overcome the opposition of the engineers of the army, but eventually "civil engineers" were recognized. Since that time mechanical, electrical, mining, sanitary and hydraulic work have become recognized specialties in engineering, and many other men have added "engineering" to the description of their work in order to gain dignity or popularity. Architecture, on the other hand, has not been divided into recognized specialties. In most large modern buildings which are expected to make a return on money invested, architecture and structural, mechanical and electrical engineering are involved. Expert ability in two of these is unusual for one man, and real expertness in more than two we do not expect to find. The architect views work from the æsthetic standpoint and the engineer from the utilitarian. This seems to be a fundamental difference. The two viewpoints seldom seem to combine in the one man, so that in addition to professional skill there arises need for the ability to co-operate with others for both the architect and the engineer, and for both from time to time the necessity of successfully co-ordinating the work of others.

When engineers and architects learn to appreciate each other and co-operate as whole groups to an extent which has been done in a few individual cases, there will be no cause to complain of the unsightly boxes built by engineers or the impractical designs of the architect, and the client will be properly served.



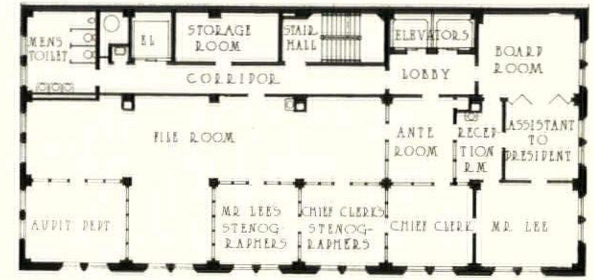
Panel over Entrance of Office Building, Brotherhood of Railroad Trainmen, Cleveland
Charles S. Schneider, Architect. Ulysses A. Ricci, Sculptor

GENERAL EXTERIOR VIEW

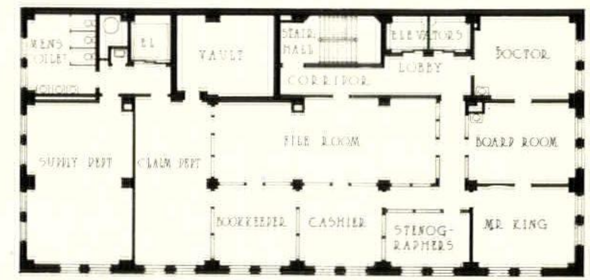
BUILDING OF BROTHERHOOD OF RAILROAD TRAINMEN, CLEVELAND

CHARLES S. SCHNEIDER, ARCHITECT

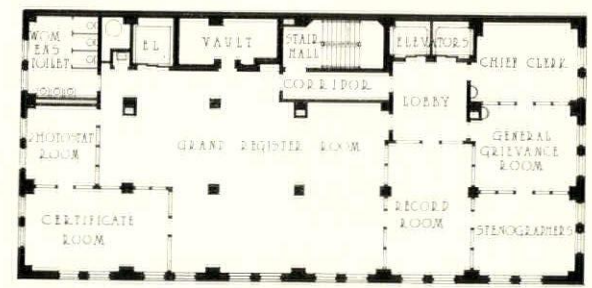
Photos by Clifford Norton



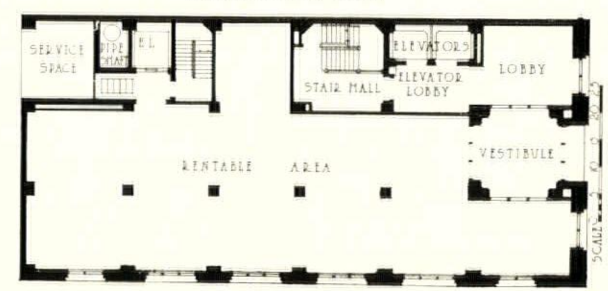
NINTH FLOOR PLAN



SEVENTH FLOOR PLAN



SIXTH FLOOR PLAN



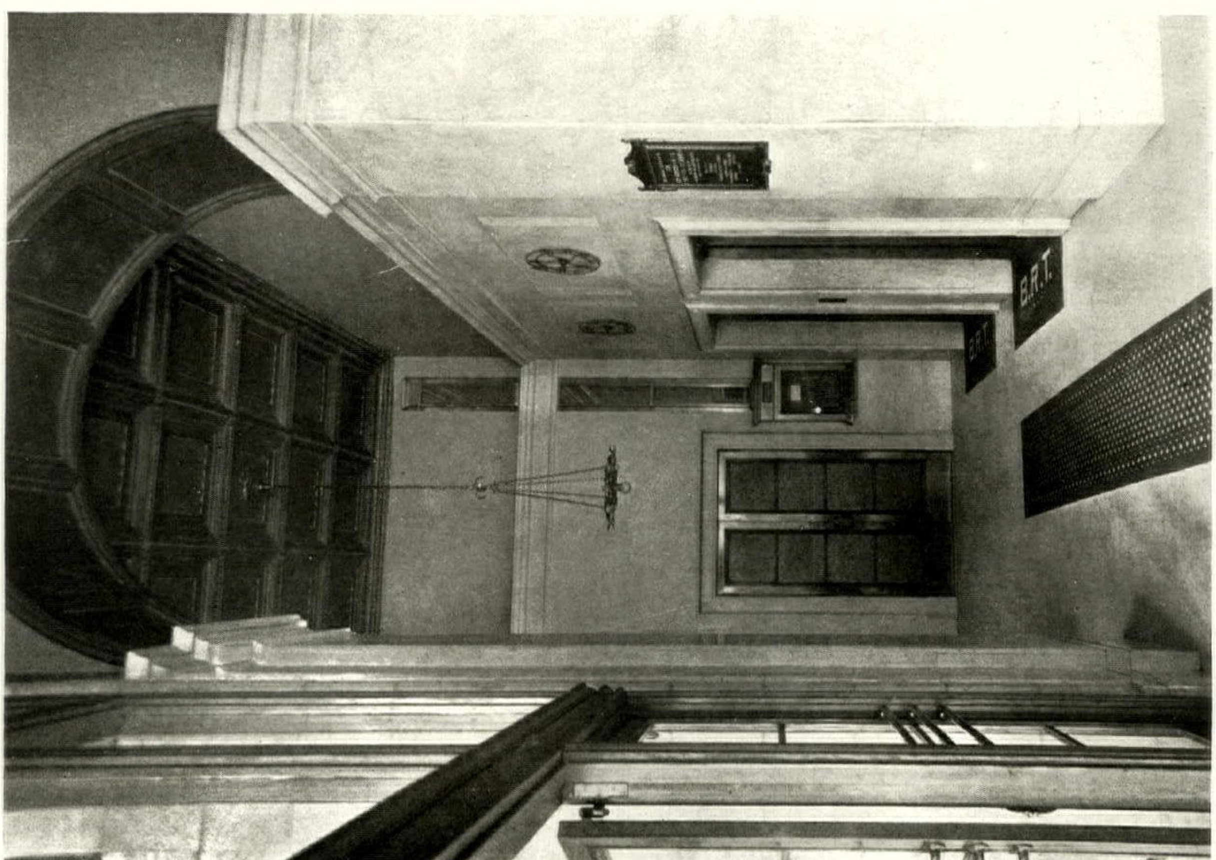
FIRST FLOOR PLAN

DETAIL OF ENTRANCE

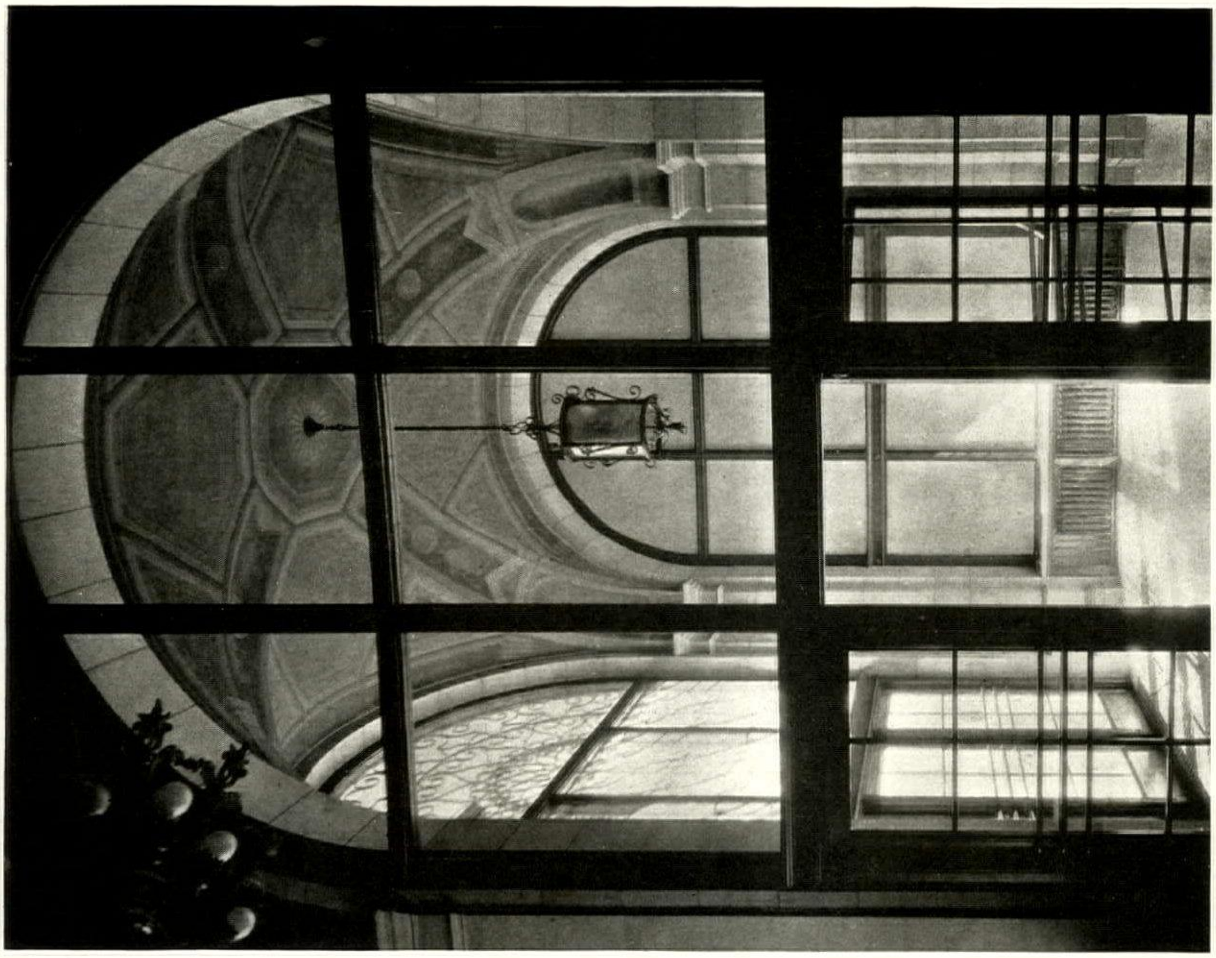
BUILDING OF BROTHERHOOD OF RAILROAD TRAINMEN, CLEVELAND

CHARLES S. SCHNEIDER, ARCHITECT

ULYSSES A. RICCI, SCULPTOR



ELEVATOR LOBBY

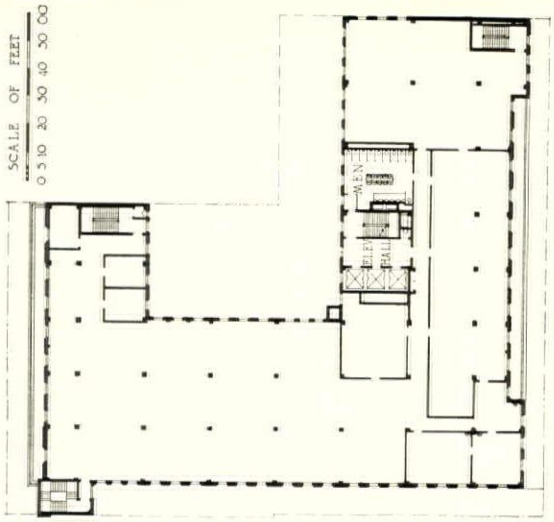


ENTRANCE VESTIBULE

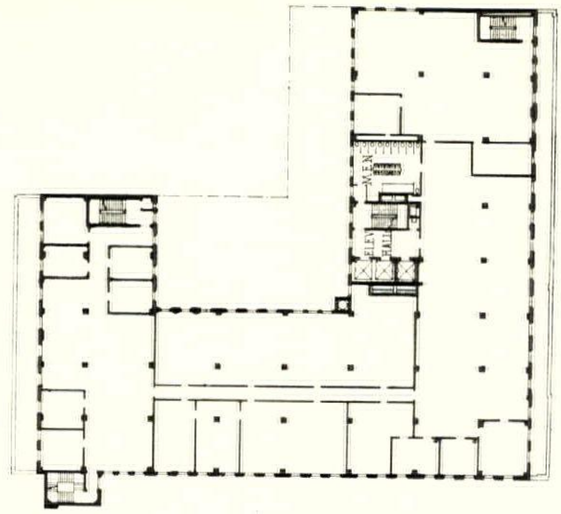
BUILDING OF BROTHERHOOD OF RAILROAD TRAINMEN, CLEVELAND

CHARLES S. SCHNEIDER, ARCHITECT

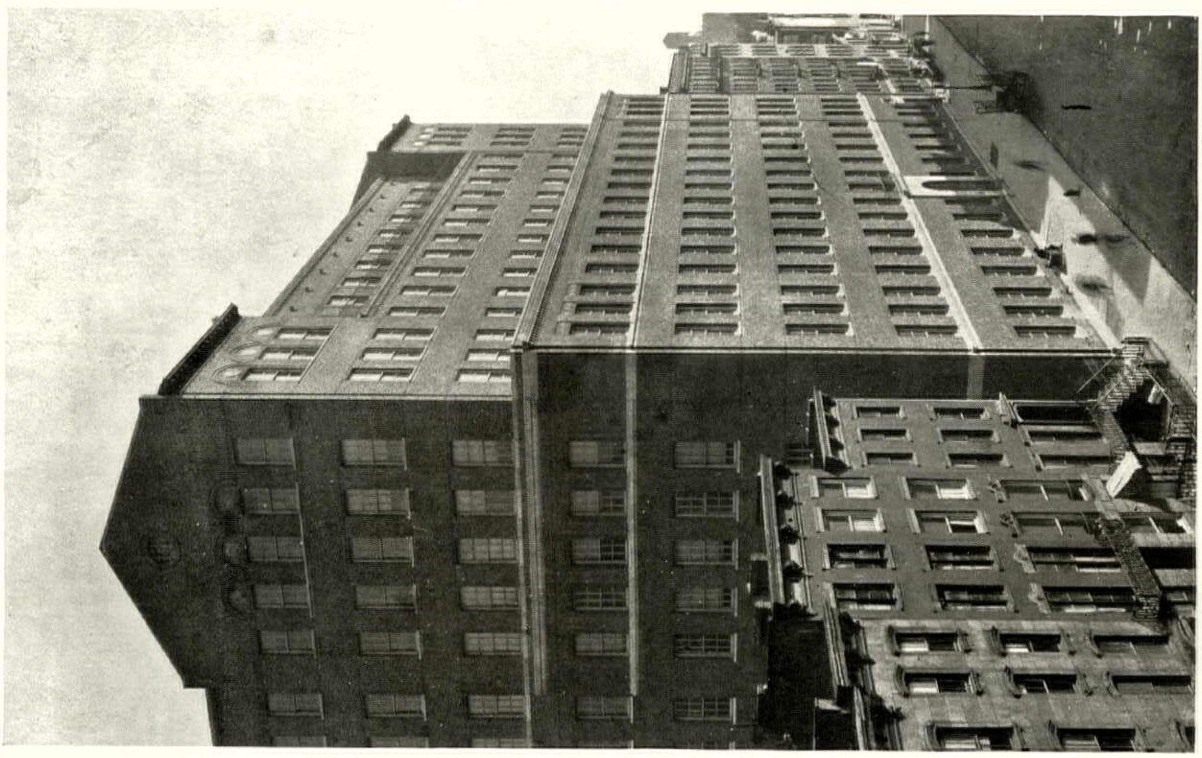
FAUSTINO SAMPIETRO, MURAL PAINTER



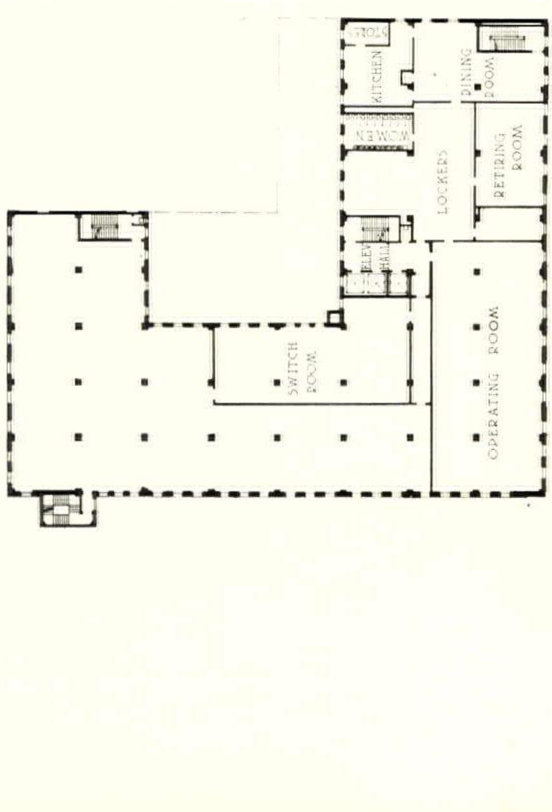
EIGHTH FLOOR PLAN



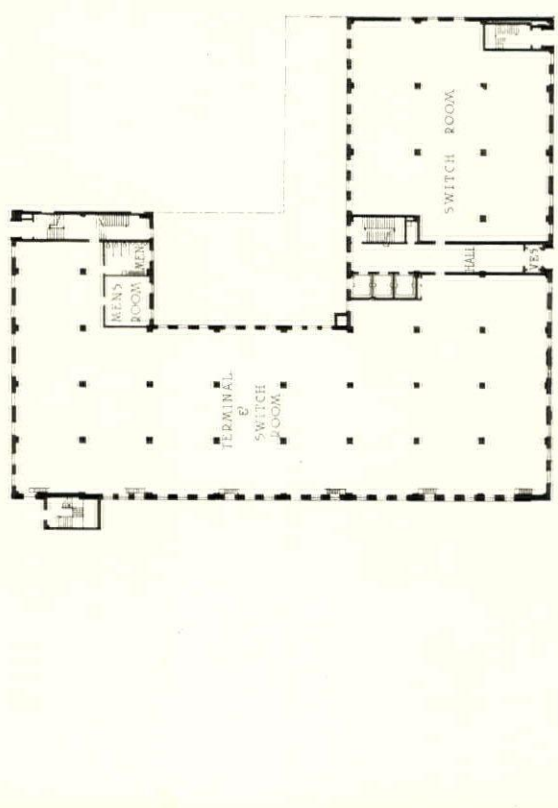
SIXTH FLOOR PLAN



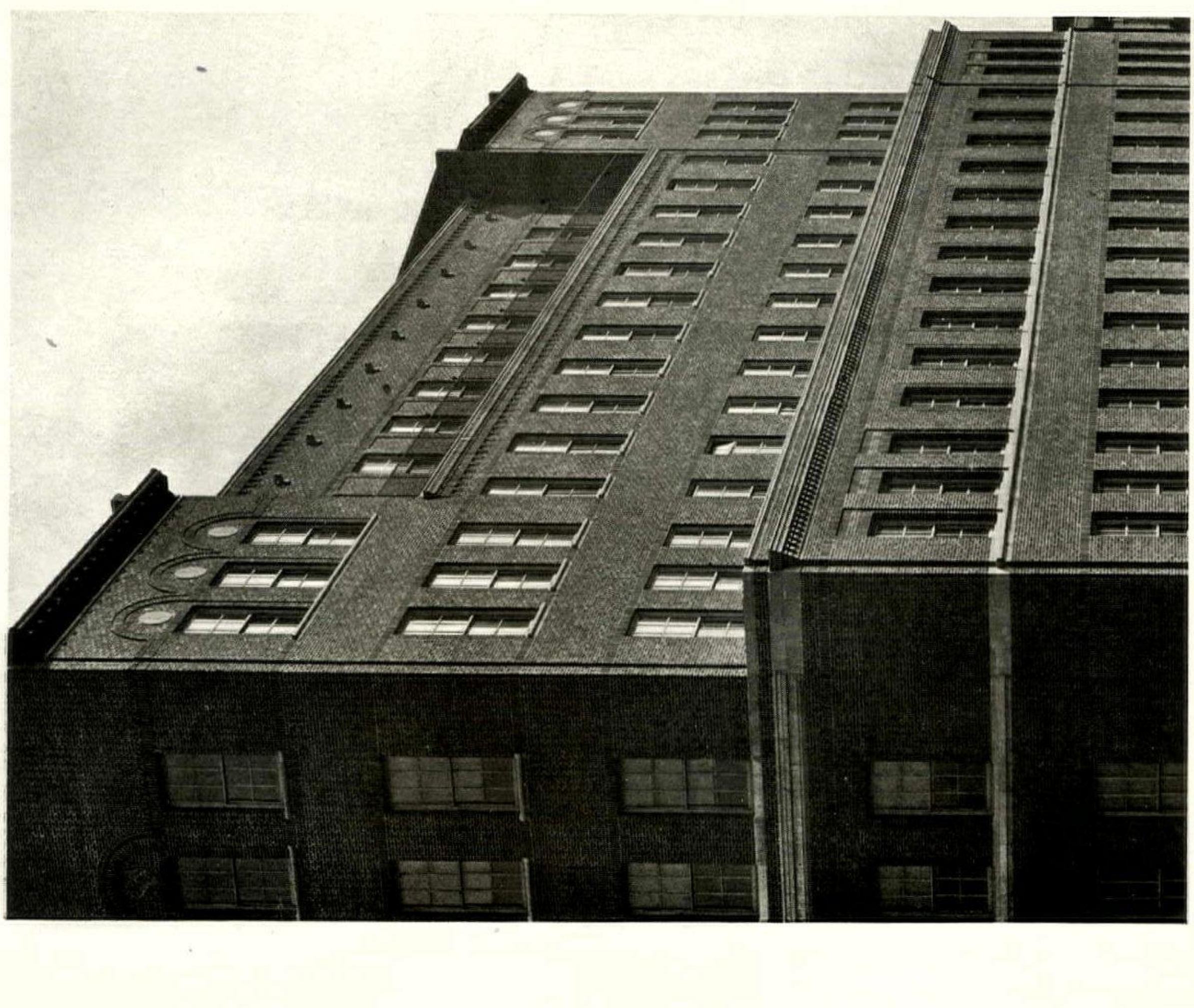
GENERAL VIEW OF EAST 30TH STREET FACADE
NEW YORK TELEPHONE COMPANY BUILDING, NEW YORK
McKENZIE, VOORHEES & GMELIN, ARCHITECTS



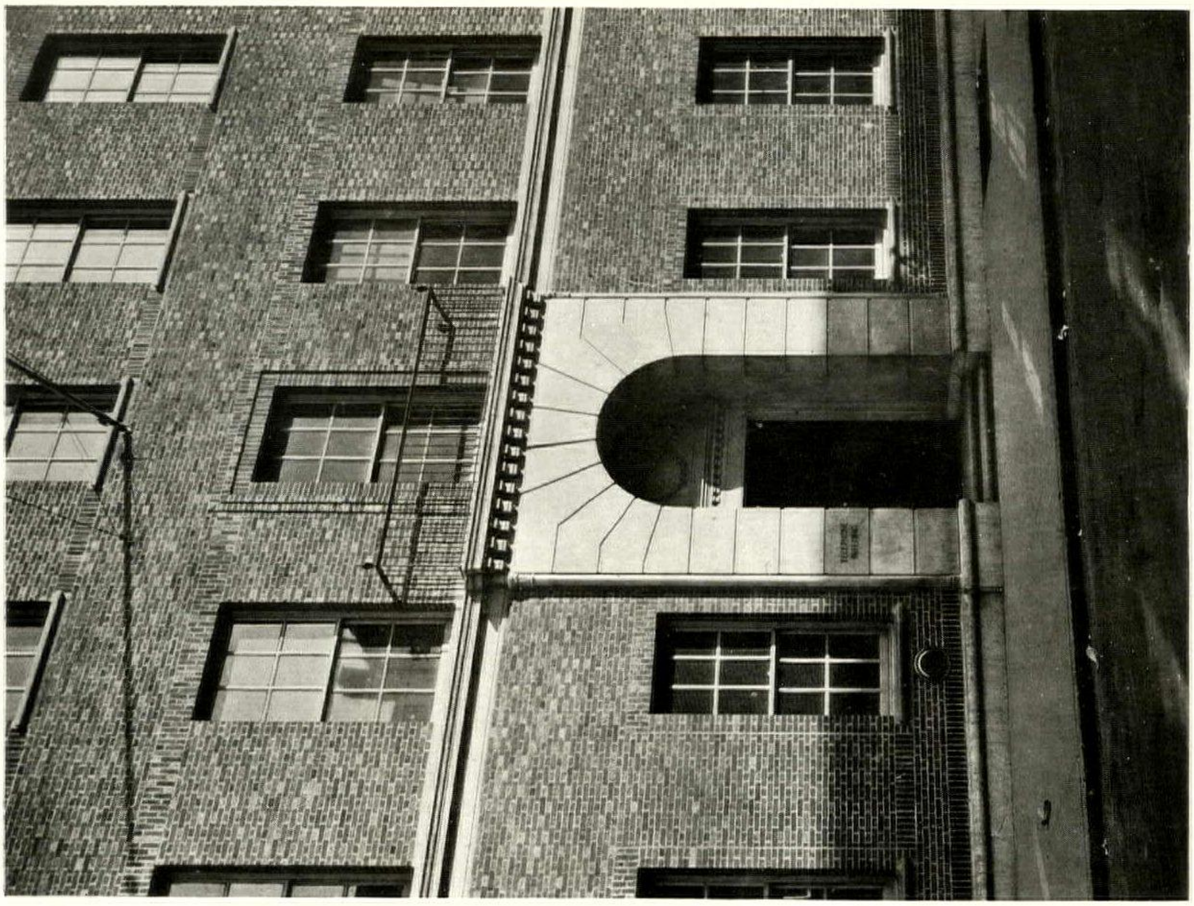
SECOND FLOOR PLAN



FIRST FLOOR PLAN



DETAIL OF UPPER STORIES



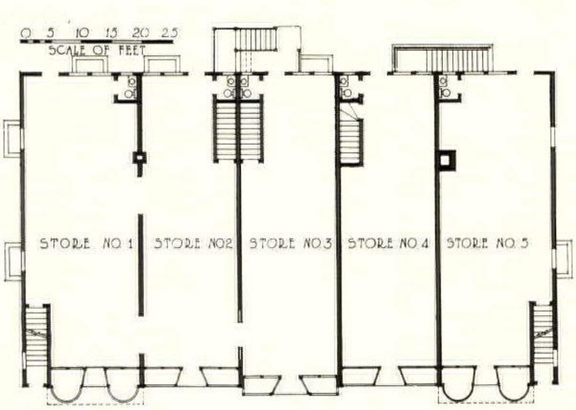
DETAIL OF ENTRANCE

NEW YORK TELEPHONE COMPANY BUILDING, NEW YORK

McKENZIE, VOORHEES & GMELIN, ARCHITECTS

Photos by Tebbs Architectural Photographic Co.

GENERAL VIEW OF FRONT



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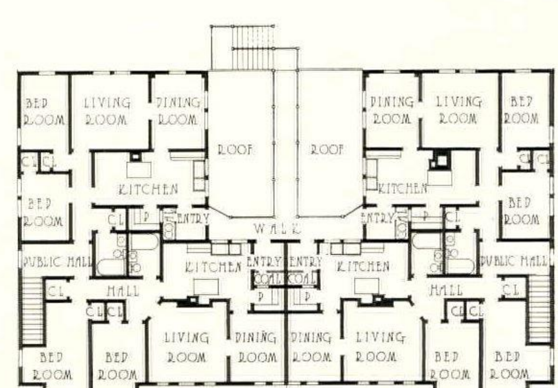
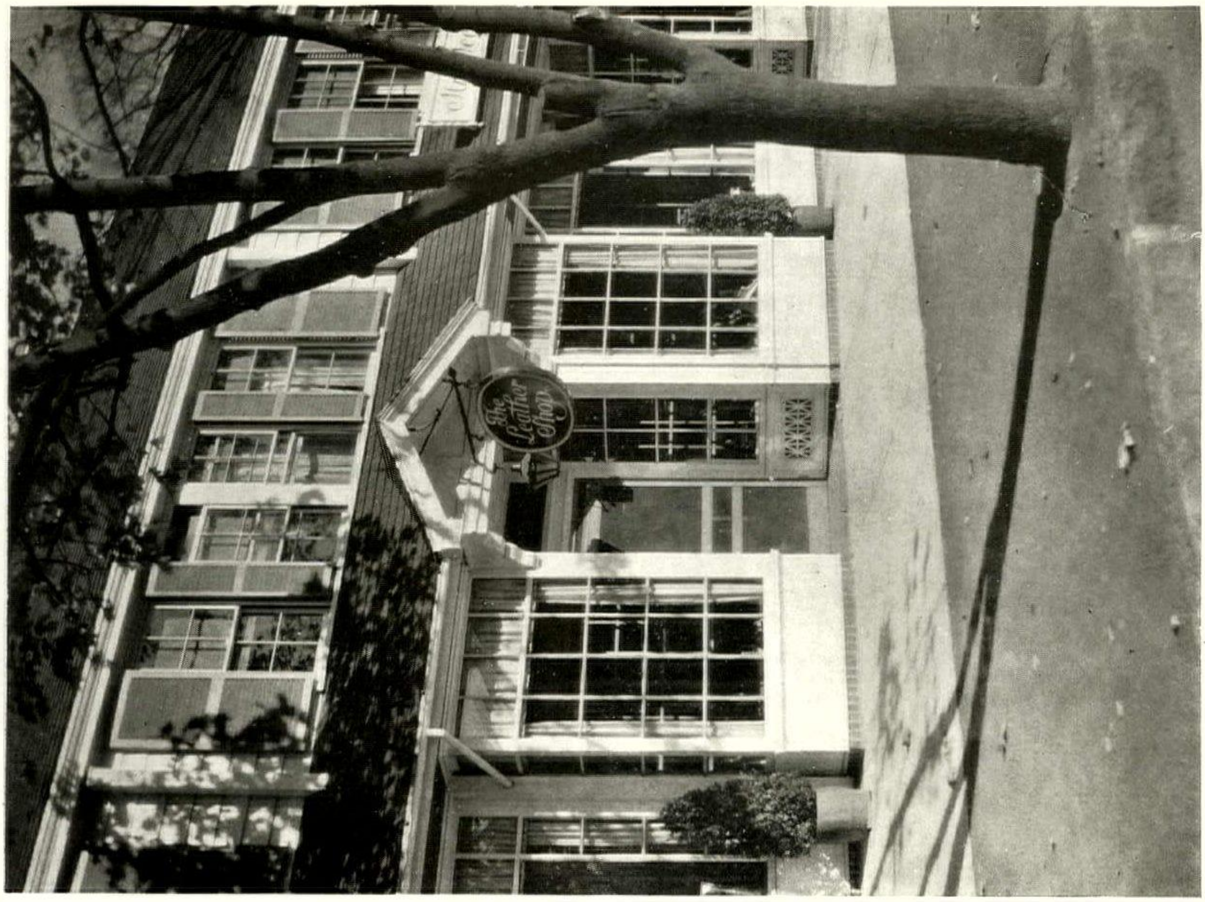


SECOND FLOOR PLAN

SHOP AND APARTMENT BUILDING, FALMOUTH, MASS.

HUTCHINS & FRENCH, ARCHITECTS

DETAIL OF END BAY



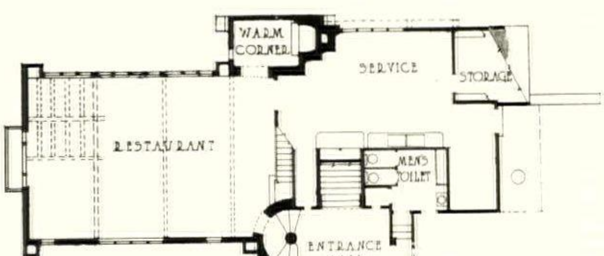
DETAIL OF FRONT

SHOP AND APARTMENT BUILDING, FALMOUTH, MASS.

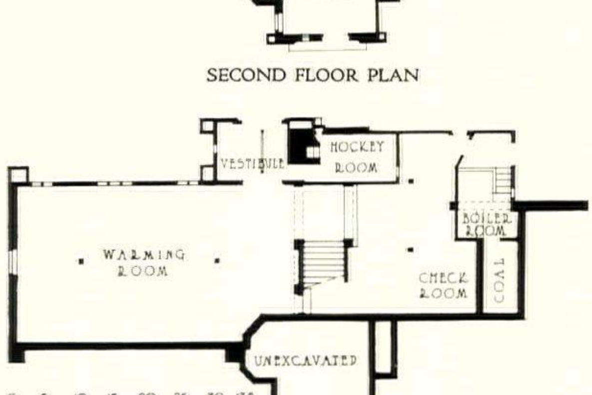
HUTCHINS & FRENCH, ARCHITECTS

Photos by Paul J. Weber

GENERAL VIEW FROM LAKE



SECOND FLOOR PLAN



FIRST FLOOR PLAN

DETAIL OF ENTRANCE

JOHNNY PARSONS CLUB, CORNELL UNIVERSITY, ITHACA

ROGER D. McPHERSON, ARCHITECT

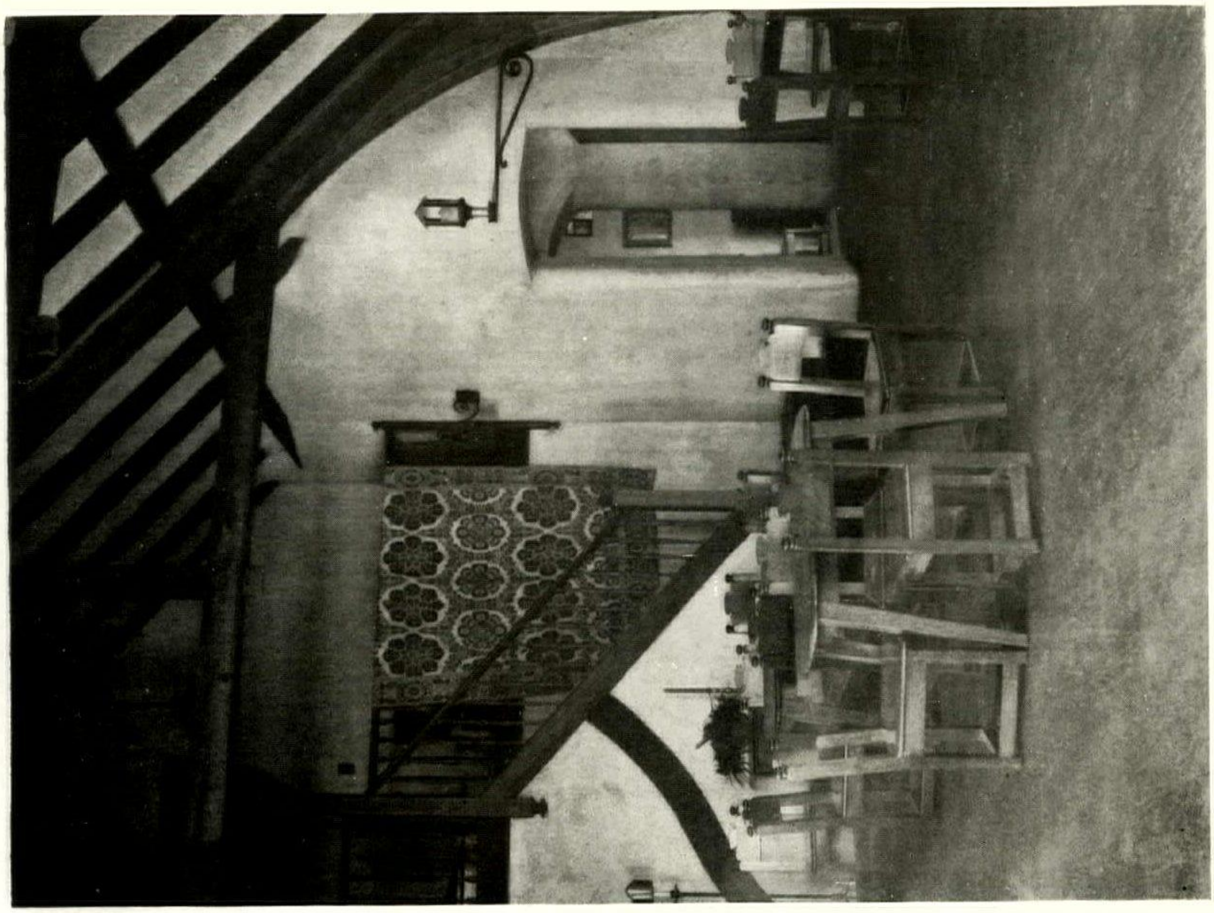
Photos by the Architect

ENTRANCE FROM LAKE

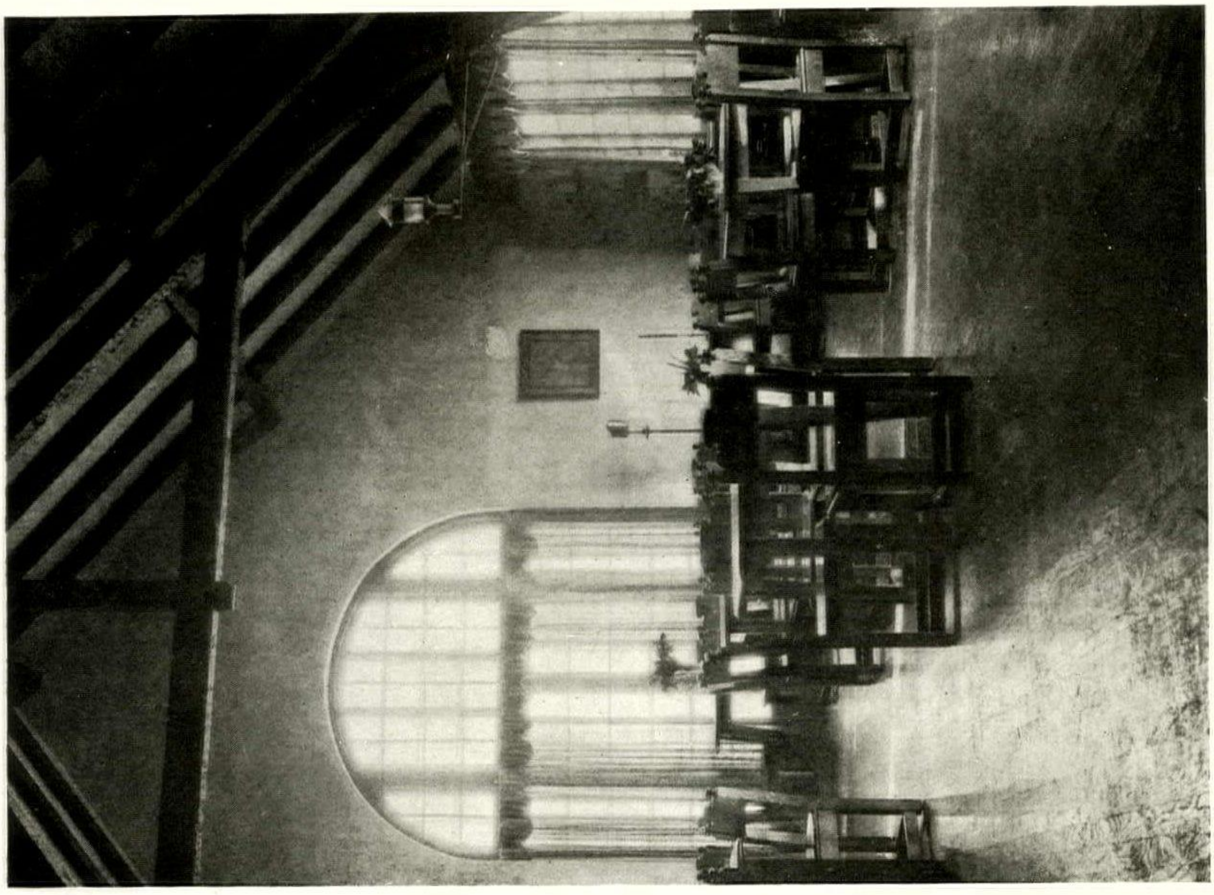
ENTRANCE FROM CAMPUS

JOHNNY PARSONS CLUB, CORNELL UNIVERSITY, ITHACA

ROGER D. McPHERSON, ARCHITECT



RESTAURANT FROM ENTRANCE HALL

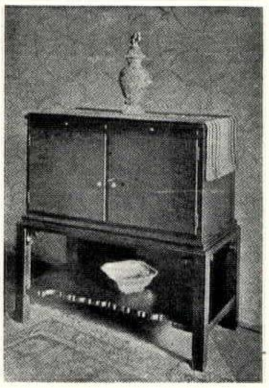


VIEW OF RESTAURANT

JOHNNY PARSONS CLUB, CORNELL UNIVERSITY, ITHACA

ROGER D. McPHERSON, ARCHITECT

DECORATION *and* FURNITURE



A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

INTERIORS OF MODERATE COST AUSTRIAN HOUSES SHOWING MODERN MACHINE MADE FURNITURE EXECUTED FROM DESIGNS OF HUGO GORGE, ARCHITECT

Recent Austrian Styles in Furniture

By HUGO GORGE

THE world war was responsible for much revision in values. Before 1914 Europe, as well as most of the rest of the world, was governed by a desire for display. The people grew accustomed to living what might be called a dual life, real and false, in which the false played by far the greater part; only a few were interested in the realities of life, and so it has remained until comparatively recently. All this holds true in a particular degree with what made up the furnishings of the home; domestic furnishings of all sorts were chosen for the most part with an eye to their showy qualities, and while excellence of workmanship existed, the popular demand was not so much for objects well designed and carefully made as for furnishings which would afford the maximum of display at the minimum of cost. Of no country was this more true than of Austria, where fondness for the merely showy was among a great part of the people carried to an extreme.

In this respect the end of the war brought a welcome change. We were forced to become more self-reliant and to utilize all available material and work in such ways as to make them useful and serviceable. Another factor which has brought about this change is the great scarcity of houses and dwellings. The law prescribes many restrictions in housing accommodations, and in conforming to these conditions we had to modify the furnishing and decorating of our homes. The "living room," which proved to be superfluous, has disappeared from most dwellings. Many people who were unable to find larger quarters turned the living room into a bedroom. In this way a new style in furniture has gradually been developed, which has been determined by the actual needs of the middle class population in Austria, by the available methods of work and kinds of materials, and by present-day technical achievements. The illustrations which are presented here show how architects have tried to accommodate themselves to the altered circumstances. In the opinion of many, these pieces of furniture show conclusively that it is possible to establish a style in furniture which has a permanent value irrespective of the fluctuations of fashion. We not only restrict ourselves in everything, but we also try to avoid anything that is false, that is to say not genuine, and that is superfluous. Furniture of good proportions, suitably dimensioned and well made, will make a good impression even without decoration, and will form serviceable objects irrespective of the whims of fashion.

The keynote of the new furniture is that it is adapted to the restricted facilities in satisfying everyday wants brought about by the war, so far at least as Austria is concerned. In this way new forms of furniture pieces have arisen which were unknown heretofore, and which were made with a view to satisfying all possible wants with a minimum of outlay in material and labor and at the same time preserving æsthetic qualities.

In this way a new style of furniture has sprung up among us in Austria which has become symbolic not only of our outward life, but also of our psychical development during and since the war. The pieces of furniture do not belong to the old world of art and handicraft, but to the new world of the machine, for which they are designed. As it is not possible to reconcile these two worlds, any embellishment of our modern furniture can only be of a constructive-symbolic sort. The emphasis is thus laid more on the variety of combination of the pieces of furniture and less on the individual pieces. For instance, we attempt to create a rich impression by way of contrast in placing chairs with carved backs against smooth, straight-lined cabinets and chests. In this way we manage to get in the same room a different and richer perspective and constantly changing harmonies as against the immobile chests and cupboards along the walls. But even these cupboards and chests are supported on tall legs in order to permit a view of the borders of parquetry, mostly beautifully wrought in dark woods. Wholesome tones in draperies and gay coloring in carpets enliven and enrich the entire ensemble of the rooms.

The interiors and pieces of furniture illustrated here have not all been made for special occasions. They were designed, produced, and made as the need for them arose, and it has been gratifying to note that before long similar pieces of furniture were being produced abroad, as this furniture was readily recognized as being adaptable to machine methods of manufacture. In pointing out its merits for machine production, it is not meant that furniture of exclusive design and workmanship will have no place in our modern home furnishings; the necessity for exclusive and valuable pieces of furniture will always remain, but on the other hand machine-made furniture, if satisfying distinct æsthetic wants and desires, will win more and more friends, especially if the new style is shown to be the logical expression of the needs of the times, and if it embodies purpose in construction and economy in material.

These examples will show what has been done to win over many people to a uniform, modern expression in furniture design and execution, and how practical requirements were reconciled with æsthetic wants. It will be seen that motifs have been adapted from a number of widely different sources, but so combined as to produce forms which are pleasing and full of expression, while being kept within the limits of what may be produced by the methods which present-day economic and industrial conditions in Austria render necessary.

INTERIORS OF MODERATE COST AUSTRIAN HOUSES SHOWING MODERN MACHINE MADE FURNITURE EXECUTED FROM DESIGNS OF HUGO GORGE, ARCHITECT

Constructing the Curved Stairway

By MOTT B. SCHMIDT

THE matter of constructing a curved stairway seems to have always been somewhat of a mystery to the layman, but it is very simple and merely requires, like any other stairway, the work of a good stair builder. Where the stair string under the handrail is closed with a partition, it is of course very easy to support the stairway on that partition, as all the constructional work of the stair can be entirely concealed. But, if the inner string under the handrail is without a partition to support it, one can then see under the stairs, and the construction must therefore be concealed in the stair soffit, just as in the case of a stair directly over another stairway beneath.

In this case, and when the outer edge or string of the stairway is formed by a partition or wall, the stair must be supported by braces or supports from that wall to the inner string of the stair. This inner string can of course be continuous from floor to floor, and together with the carriage or other support that is placed under or inside of it, forms in itself a sort of arch or truss that will take a considerable portion of the weight of the stairway. Then in the thickness of the soffit, supports are carried out at an angle so that they follow the curve of the soffit, the outer end of one support being carried by another at an intersecting angle, which in turn transmits its load to another support, and so on until the load is carried to the floor from which the staircase starts. The thicker the stair soffit can be made, the easier it is to provide sufficiently heavy supports, but even in a thin, graceful stairway, entirely of frame construction, the supports and carriages can be braced and trussed from the wall to the string, and from one brace to the other, so that a most rigid stairway can be built with little apparent support. Where a staircase is entirely free-standing, such as a curved stairway in a square well, the construction is done in the same manner, except that both inner and outer strings become continuous supports, with the braces trussed between them. Then at the mid-point of the stair, where it becomes

Stairway in House of C. W. Carr, Esq., Lake Forest, Ill.
H. T. Lindeberg, Architect

STAIRWAY IN HOUSE OF MRS. W. K. VANDERBILT, SUTTON PLACE, NEW YORK

MOTT B. SCHMIDT, ARCHITECT

more or less tangent to the wall, it is usually possible to provide an inconspicuous brace that is practically concealed from view.

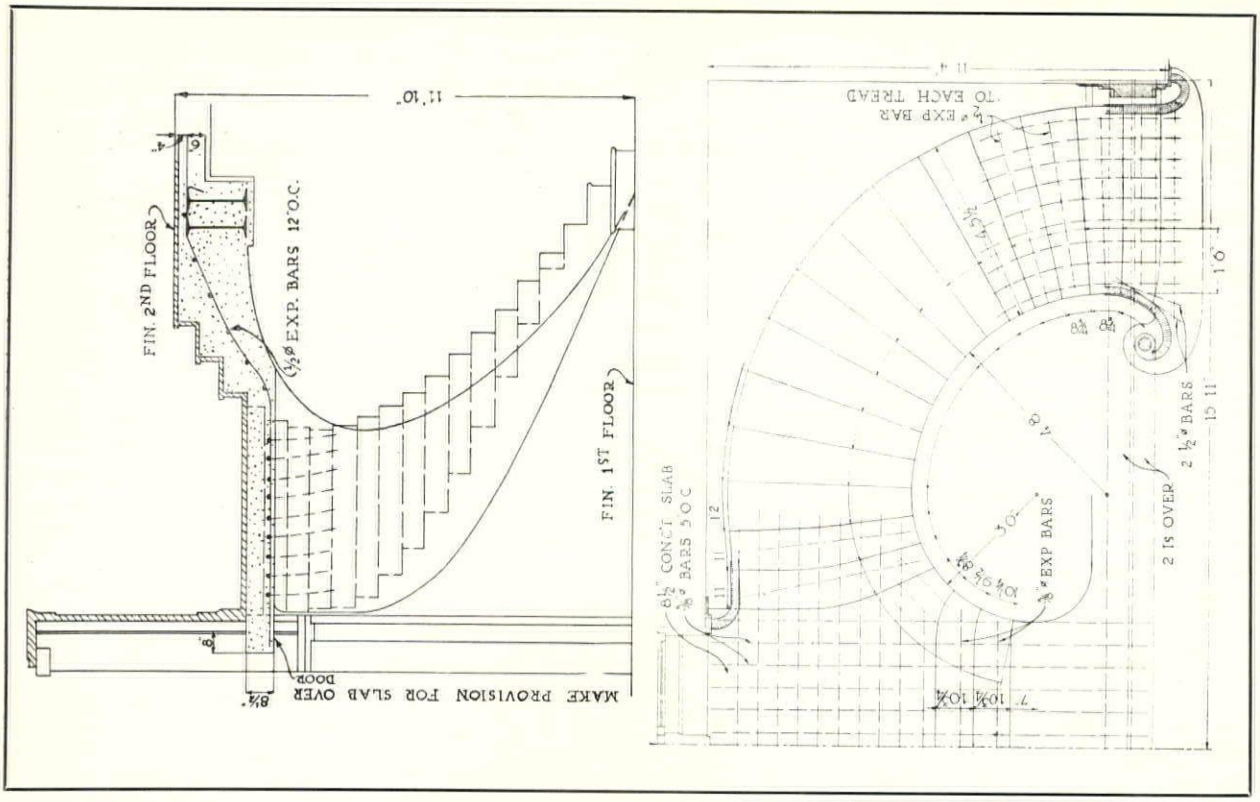
When a stairway is of reinforced concrete, iron or steel, it is merely a definite engineering problem to provide sufficient strength to insure support, but it is possible to construct self-supporting stone steps so as to form a spiral stair, merely by placing one solid stone step upon another until the top is reached, and clamping them together with small iron braces near the inside edge, the whole then forming a keyed arch, which, like any arch, would collapse if one of the keys were removed.

In designing the spiral or curved stairway, the principal consideration must be that the risers and treads be properly proportioned at the point of usual travel—that is, that there be an easy relation of rise to tread at the place where a person usually walks up or down the staircase, which in an average stairway would be about 12 inches from the inside line of the handrail. Of course in any curved stair the treads will naturally become narrower as they approach the railing, and wider as they get farther from the center of the curve. A spiral or curved stairway properly designed will be more convenient of travel and an easier stair than a straight stairway of similar proportion, as well as being more graceful and pleasing in appearance. The one thing that sometimes makes a curved stair difficult of ascent is the fact that the steps are brought so sharply together as they approach the handrail that they become too narrow to allow sufficient space to walk. In very steep spiral stairs, which must be crowded into a limited space, the risers are sometimes cut out to allow room for the feet, to avoid the stubbing of the toes that would occur if the risers were solid. There are many such examples in old American houses, where such a stair was often supplementary to the main staircase of the house. They can be made beautiful, but not comfortable for general use.

In an ordinary commercial spiral stairway, such as is often built around a center post, the risers are generally entirely open.

Such stairways are often sold from stock designs, usually of iron or steel, and represent the least possible space in which a stairway can be placed. They are made as small as 3 feet, 6 inches in over-all diameter, and of course are so steep that adequate headroom is secured with each complete turn of the spiral. About the only other point in which the design of a curved stairway presents a problem differing from that of an ordinary stair, is in the matter of headroom, as occasionally the wellhole opening is so designed that while there is sufficient headroom when one takes the usual line of travel, close to the rail, the sharp, radiating lines of the treads bring the outer portions of the lower steps so far out as to end where sufficient headroom may be lacking.

Detail of Iron Balustrade, Curved Stairway, 35 Lincoln's Inn Fields, London
(Now in South Kensington Museum)



DETAILS OF REINFORCED CONCRETE CURVED STAIRWAY
HOUSE OF CHARLES H. SABIN, ESQ., SOUTHAMPTON, N. Y.
CROSS & CROSS, ARCHITECTS

Plate Description

BUILDING OF THE BROTHERHOOD OF RAILROAD TRAINMEN, CLEVELAND. Plates 7–9. This structure, of which Charles S. Schneider is the architect, is intended primarily for containing the executive offices of this organization, with the ground floor and certain of the upper floors arranged for renting as sources of revenue. Of fireproof construction, the building is of limestone and terra cotta. Windows of the first floor are provided with steel frames, the windows of the upper floors being of wood, double-hung and pivoted so that they may be easily cleaned. For the lobby and the corridors of the building the walls as well as the floors are of marble. In the offices the floors are of composition, and the woodwork throughout the building is of walnut. Heating is supplied from a vapor system, and electric power is used for the operation of the elevators. The building contract was let April 15, 1921, and the cost of the structure was 83 cents per cubic foot.

Much of the interest of the building is due to the appropriate use of sculpture, painting and wrought metal. Ironwork in the forms of grilles, lanterns at the main entrance, screens about the elevator shafts and elsewhere is from the forges of Samuel Yellin, and the sculptured panel above the principal entrance to the building is the work of Ulysses A. Ricci, while the ceiling of the vestibule, painted by Faustino Sampietro, is one of the artist's most interesting examples of mural decoration.

BUILDING FOR THE NEW YORK TELEPHONE CO., EAST 30TH STREET, NEW YORK. Plates 10, 11. The rapid development of the New York telephone service is indicated by the number of large buildings which have been erected during the last few years for the accommodation of central offices and for other departments of this vast public service corporation. The structure illustrated here, situated in the block bounded by 30th and 31st streets and Second and Third avenues, while by no means the largest telephone building in New York in the extent of its floor area, covers a larger plot than any of the other central office structures. The building is L-shaped and extends through the block, occupying the entire depth of a New York block, about 200 feet.

In its exterior design the building shows the excellent use which may be made of the setback made necessary by the present New York building laws. The building is as nearly fireproof as modern skill and building methods can make it, and is of steel and brick construction with trimming of limestone. As in all recent buildings belonging to the New York Telephone Co., there is included a fire tower which affords an enclosed fire escape, and in addition there are three stairways enclosed with fireproof walls and fitted with fireproof doors, the effort of the architects, McKenzie, Voorhees & Gmelin, having been to safeguard in every way the lives of those working in the building and to eliminate the danger of destruction by fire of very costly apparatus.

SHOP AND APARTMENT BUILDING, FALMOUTH, MASS. Plates 12, 13. The designing of business structures for small towns and villages presents so many opportunities for the securing of excellent architectural results that it is surprising how seldom the opportunities are improved, particularly since such a building when well designed and planned possesses far greater value for its owner and is likely to be a more profitable investment than the usual village store building which is wholly lacking in architectural character. A structure tastefully designed and well planned does more than its share toward the improvement of its surroundings.

What may be done with a building such as is likely to be built in any small town or village is illustrated by this shop and apartment structure of which Hutchins & French are the architects. Wood has been used as a building material and shingles for roofing, while the interior trim is of N. C. pine stained. The exterior walls are painted white, the roofs are stained brown, and the shutters are dark green, a color combination which added to the excellent architecture would tie the building into its place on any village street. Heating is from a vapor system. The contract for this building was placed in March, 1922, at a cubic foot cost of 32 cents.

JOHNNY PARSONS CLUB, CORNELL UNIVERSITY, ITHACA, N.Y. Plates 14–16. Of the various problems which come into an architect's office there are few which are more interesting than the designing of a building which is to be devoted in a large measure to amusement, such as a theater, particularly a theater of minor scope, or a structure devoted to various forms of out of door sport, where the very atmosphere suggests play and informality. A particularly interesting result in the working out of such a problem is found in this clubhouse upon the campus of Cornell University, Roger D. McPherson being the architect.

Owing to the steepness of the grade upon the western shore of Lake Beebe, where the clubhouse is built, the structure is one story in height upon the entrance side and of two full stories upon the side facing the lake. The exterior walls are coated with hand troweled plaster of moderately rough texture, and the gables are covered with chestnut weatherboarding. The roofs are covered with black slates laid in uneven courses, these different materials creating a pleasing color combination.

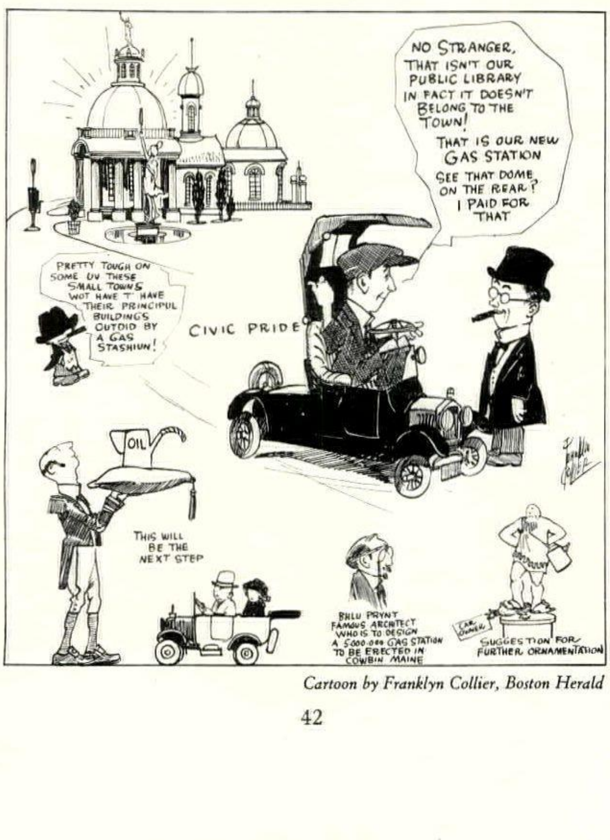
Within the clubhouse the walls are sand finished in pale buff, and the exposed structural timbers are given hand-adzed surfaces stained light natural brown, while other interior woodwork is of rough sawn chestnut. Floors are of polished red oak except in the entrance hall and for the area before the fireplace, where the floors are laid of blue flag stones. Heating is by steam. The building contract was let in April, 1922, and the cost of the structure was about $24,000.

EDITORIAL COMMENT

SYMBOLISM IN ARCHITECTURE

FROM the beginnings of architecture certain forms have been closely associated with definite types of building. It is not alone in character of ornament, which is perhaps first thought of when symbolism is mentioned, but in the general mass and outline of buildings that standards have arisen which permit the purpose of a building to be recognized at a glance. The church, of course, from the tenth century through the renaissance was the great patron of architecture, and it was while in the employ of the church that architects and master builders developed the characteristic forms and details of the later great styles. Thus the Gothic spire grew out of the desire to give physical expression to the aspirations of the church; later the campanile and tower were evolved, to indicate the locations of seats of municipal government, and the dome was about equally divided between religious and civic service. These architectural forms have always necessarily been expensive to construct, and this may account for their practical exclusion from ancient buildings other than those given over to religious or civic purposes. We think, however, there is another, more real, reason; it is that symbolism in architecture was at one time an active force; the province of the spire, campanile, and dome was respected, and they were purposely kept from serving other than the church or state.

Commercialism is a force that has to be reckoned with in the world today. It has little tradition, and in seeking a physical expression, which is entirely reasonable, it has no background upon which to depend for suggestion; it has had, therefore, no compunction in appropriating to its use these architectural symbols that for centuries have stood for definite things. Should not this be a matter of great regret, and is it not worthy of the serious thought of architects? In their hands is placed the keeping of the great traditions of architecture, to be perpetuated for all time or to be debauched and cheapened, as their intelligence and respect for their art dictate. We should not acknowledge ourselves incapable of interpreting our own time to future generations, and modern commercialism is a factor of our civilization that will leave its mark; it warrants its own symbolism, however, and should not be decked out in forms that for ages have represented civic and religious dignity. It is the function of the modern architect to accomplish this result; his creative and constructive talents will be strengthened by solving today's architectural problems with the same unfettered reasoning that has produced the problems themselves.



Cartoon by Franklyn Collier, Boston Herald

It may be argued that as commerce is so vital a factor in our lives, it is appropriate to clothe it in the most commanding forms we know. The value of these forms as arresting objects lies in their comparatively infrequent use; generally adopted, they would create a babel. That confusion already exists in the public mind is suggested by the cartoon reproduced herewith from the Boston *Herald* on the present tendency to build miniature courthouses and capitol buildings for gasolene stations. The newspaper humorist says: "It is going to be easy to find a gas station in the future. Just pick out the most magnificent and imposing edifice in the town, and that will undoubtedly be it. Of course these buildings with their sunken gardens and ornamental trees may cause confusion for a while by being mistaken for courthouses or libraries by strangers, but they will soon get over that idea."

The "gas" station is perhaps an interesting spot in the whir of the landscape to the motorist, and may be permitted its little joke. The recent example of an attempt to produce a monument to American business success in the Chicago *Tribune* building is more serious and indicates the paucity of our ideas; every symbol from that of Mohammedanism to Gargantuan German kultur was pressed into service—and by architects. This may be democracy and it may be safe in the hands of architects, but it is well for the future evaluation of our civilization that by good fortune all these designs were not really executed in brick and stone.

WELL HEAD IN COURTYARD
HOSTEL DIEU, BEAUNE, FRANCE

FROM PHOTOGRAPH BY G. DOLBY