THE ARCHITECTURAL FORUM

ARCHITECTURAL ENGINEERING & BUSINESS

IN TWO PARTS  PART TWO

SEPTEMBER 1930

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An unusual perspective of the tower showing effect gained by the straight lines. The entire top is encased in Anaconda Copper.

Reproduction of the architect's original rendering of the tower.

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Yasuo Matsui, Associate Architect
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requirements for the roof
of the
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Aluminum Company of America does not sell paint. But aluminum paint made with satisfactory vehicles and Alcoa Albron Powder may be purchased from most reputable paint manufacturers, jobbers and dealers. Be sure the pigment portion is Alcoa Albron and is so designated. Let us send you the booklet, “Aluminum Paint, the Coat of Metal Protection”. Address ALUMINUM COMPANY OF AMERICA, 2412 Oliver Building, PITTSBURGH, PENNSYLVANIA.
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Complete information regarding these compressors, and their applicability to your particular requirements, is available through conveniently located York direct factory branches in 71 cities.
No factor of protection is more important in a home than the pipe installed in it. Because it is in constant service and literally buried in the walls and under floors, inferior pipe is a liability which eventually reveals itself in personal discomfort and damaged property. On the other hand, Byers Genuine Wrought-Iron Pipe is lasting security. Install it once and protection is permanent. Architects recognize the superiority of Byers Pipe, and plumbing and heating contractors welcome it. The name “Byers” imprinted in the metal and the famous Spiral Stripe are assurances of Genuine Wrought-Iron Pipe. Initially, it costs more than ordinary pipe because it is extraordinary. But ultimately, because of the constant service and enduring protection, it is most economical. It is a lasting investment for your client—not a temporary outlay. Byers Genuine Wrought-Iron Pipe is a standard specification in better homes today. Its leadership in other fields of service is equally recognized. Wrought-Iron is the only ferrous metal that contains the Vital Element (silicate of iron) in sufficient quantity to resist corrosion decade after decade. In Genuine Wrought-Iron, this silicate of iron is present throughout the metal, 250,000 and more rust-resisting ribbons to the square inch. Like the companion-silicate from which glass is derived, this Vital Element offers lasting resistance to all forms of corrosion. Remember, “Byers” is the trade name for perfection in wrought-iron pipe. It is readily identified by the Spiral Stripe. If you wish, we will be pleased to send you Bulletin No. 38 which tells more about Byers Genuine Wrought-Iron Pipe and its uses.

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On all two-pipe steam heating systems, the Cryer Radiator Control Valve has these advantages:

1. Saves steam by permitting full control of radiator temperatures for mild, moderate or cold weather.
2. Gives steam systems the desirable operating characteristics of hot water systems.
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No other valve achieves the effects given by the Cryer Radiator Control Valve, the advantages of which have been demonstrated in the laboratory and in actual use.

Effects of Hot Water Heating Possible with Steam

Announcement of a new radiator valve which completely controls radiator temperatures in all two-pipe steam systems, is made. This effect is obtained by a new, unique method of controlling steam input, combined in the valve with a positive method of circulating the steam, air and vapor continuously throughout the entire radiator. Large fuel savings are achieved.

Combines Advantages

Its makers state that the valve regulates the steam input so that the temperature of the entire radiator may be reduced as low as 90° in mild weather, or run up to 212° in cold weather. In this way the effects and economies of heating with hot water are obtained with the lower first cost of a steam installation in large buildings.

The valve, called the Cryer Radiator Control Valve, gives effects on any type of steam heating system — vacuum, vapor or gravity — not heretofore obtainable, by heating the entire radiator evenly at moderate temperatures.

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Cryer products have been installed in thousands of buildings all over the world. The Cryer organization has been responsible for many great advances in the art of heating, such as the Cryer Radiator Control Valve.
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TUNE IN THE WESTINGHOUSE SALUTE OVER THE N. B. C. NATION-WIDE NETWORK EVERY TUESDAY EVENING.
WITH the 80-story building here and the 100-story building in plain sight, the subject of wind bracing these high tower structures demands the best methods of designing. The stability of existing and of future towers is not questioned, because they have been designed to provide adequate strength. With these greater heights the rigidity and prevention of disturbing movement during wind storms and greater economy of construction must be accomplished satisfactorily. The rentable value of floor space can be adversely affected by the fears of tenants caused by storms, even though the structure is entirely safe. It is an economic problem pertaining to rental value and cost of construction.

The subject of wind bracing has been befogged and befuddled by a confusion of ideas and too much mathematics. Young engineers are entitled to expect clear thinking and candid opinions from their elders to guide and instruct. "Stock in trade" should not exist in a profession where all have been beneficiaries of the past.

Lengthy mathematical discussions are no substitute for sound theory, nor as much to be desired as clarity of thought and expression. To clarify the subject of wind bracing, Mr. Spurr presents an exposition of his yardstick for a rational method of designing. It differs from the generally published and used methods in several respects. The yardstick is given in the suggestions for building codes:

1. "All buildings where the height ratio equals or exceeds 7:1 shall be investigated, and shall meet the requirements as to strength and stability to resist in the structural frame an assumed wind load of 30 pounds per square foot at the top, diminishing uniformly to nothing at grade. This triangle of loading is to be assumed on the entire area of the structure with the wind blowing in any direction. No reduction in the 30-pound wind load shall be made in coming down from the top until a point is reached which is below all spires, peaked roofs or other extensions of the main shaft of the building.

"Hotel Planning and Outfitting"

EDITED BY

C. STANLEY TAYLOR and VINCENT R. BLISS

Here is a volume which for the first time adequately reviews the entire subject of the modern hotel,—its planning, designing, equipping, decorating and furnishing. It covers every detail, from the beginning of sketch plans to the registration of guests when the house has been completed and opened. All the different types of hotels are dealt with,—the Modern Commercial Hotel, the Residential or Apartment Hotel, the Resort Hotel, and the Bachelor Hotel. The volume is replete with views of hotels in different parts of the country; their exteriors and interiors, and in many instances their plans are included and fully analyzed.

The editors have been assisted in the preparation of the work by widely known hotel architects and interior decorators and by actual operators of hotels,—practical men, experienced in the management of the "back," as well as the "front," of a hotel. The volume's treatment of hotel furnishing and equipping constitutes the final word on this important subject. There are included views of hotel restaurants, cafeterias, kitchens, pantries, "serving pantries," refrigerating plants and all the departments which are necessary in a modern hotel of any type. The work is of inestimable value to architects and engineers, as well as to practical hotel men.

438 pages, 8½ x 11½ inches—Price $10.00

THE ARCHITECTURAL FORUM
521 Fifth Avenue, New York

Unless otherwise noted, books reviewed or advertised in THE ARCHITECTURAL FORUM will be supplied at published prices. A remittance must accompany each order. Books so ordered are not returnable.

123
College Architecture in America
Its Part in the Development of the Campus

By

CHARLES Z. KLAUDER and HERBERT C. WISE

A NEW and ever higher standard is being established for the architecture of educational structures of all kinds. Some of the most beautiful buildings in all America are those venerable halls in academic groves in Charlottesville, Cambridge, Princeton and elsewhere built by early American architects, and now after long decades of indifferent designing and careless planning American architects are rising anew to the situation and are designing educational buildings of every type which closely rival even the best work of a century ago, while in planning and equipment they establish a standard which is wholly new.

In this valuable and important work two widely known architects of educational buildings collaborate in reviewing the entire situation as it applies to college and collegiate architecture. They have carefully studied practically every important institution in the country, and in their text they discuss administration buildings; dormitories; recreation halls; chapels and auditoriums; gymnasiums; libraries; and structures intended for certain definite and specific purposes, such as the teaching of music, all this being well illustrated with views of existing buildings and in many instances with floor plans and other drawings. A valuable and extremely practical work to add to the equipment of any architect's office.

301 Pages, 7½ x 10 Ins.
Price $5, Postpaid

THE ARCHITECTURAL FORUM
521 FIFTH AVENUE
NEW YORK
They Turned the Boiler Upside Down

When Garfield A. Wood, famous engineer, business man, and speed boat king, installed an oil burner in his home, he liked its automatic heat but his engineering experience told him it was too costly. He discussed this problem with that prominent engineer and inventor, the late H. M. Jerome, who later interested Prof. W. E. Lay of the Automotive Engineering School at the University of Michigan.

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THE ARCHITECTURAL FORUM is published monthly by Building Division, National Trade Journals, Inc., 521 Fifth Avenue, New York. H. J. Redfield, Chairman of the Board and Treasurer; Howard Myers, President and General Manager; John Thomas Wilson, Vice-President; James A. Rice, Vice-President; C. Stanley Taylor, Vice-President; Henry J. Brown, Jr., Secretary.

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AMERICAN INSTITUTE OF STEEL CONSTRUCTION
A growing interest in housing problems has found its echo in numerous articles in the architectural press, illustrating housing projects, both those consisting of individual dwellings and those in urban centers having multifamily houses. They illustrate well the general principles of group planning, layout of units, and exterior design, but there are a host of problems encountered in the actual execution of a housing project which they do not touch and which vitally affect the economy of construction and subsequent maintenance. These notes may, therefore, prove of interest to those working in the field of housing. They are the result of experience with a large housing project recently carried out in Chicago,* covering a block 362 feet by 594 feet and comprising 421 apartments. They touch phases of both planning and specifications, and are presented as itemized problems without any attempt to form a coherent story. Where possible, there are given the pros and cons of methods adopted, and the materials used are named.

**Fireproof Construction.** The Chicago building code requires fireproof construction for apartment buildings more than three stories in height. As this project consists of five-story buildings, it is completely fireproof. Had it been erected in New York it could have been built at a saving of ten cents per cubic foot. This cost translated into rental would mean a saving of about $7.50 per month for a four-room apartment, with rooms of the average size used in Michigan Boulevard Gardens. This saving is predicated on the supposition that the same layout, with rooms of similar size, can be obtained in an equal area in both ordinary and fireproof construction. As a matter of fact, however, non-fireproof construction requires a greater area for a given layout, and this tends to reduce the difference in cost and rental.

Some of the compensating advantages of fireproof construction are these. In ordinary construction, 12-inch walls would have been required around the stair halls; with plaster on one side the total thickness would be 13 inches. The partitions used finished 4½ inches thick. To have the adjacent rooms of similar sizes, the former type of construction would require an additional 17 inches in length of outside wall for each staircase. With 29 stair halls, 41 feet were saved. Translated into cubicage this represents nearly 40,000 cubic feet. Where the plan requires offsets in the stair hall with long landings at the floor levels, the advantage of fireproof construction is obvious. Partitions surrounding the floor landing are readily placed on a continuous fireproof slab and if necessary can be varied from floor to floor. Nor is the same degree of accuracy required in locating doors to apartments, as the hall partitions may be installed after the interior partitions are set.

With a completely fireproof construction, metal, self-closing doors to all apartments, the stairs carried from ground to roof and a continuous roof permitting exit from one stair-head to any other, the customary requirement of a second stair exit from every apartment was waived. In Chicago this second stair is usually an outside wooden structure reached from the kitchen. In addition to the saving in cost, its omission permitted a much greater flexibility in planning. Kitchens could be placed anywhere, front or back, without marring the appearance of the building.

In ordinary construction cross fire walls are necessary at intervals. If they run straight across the building they hamper flexibility in planning. It is frequently advisable to interlock rooms of apartments in the length of a wing, causing an offset in the division between two adjacent units. With a masonry wall this is expensive, with fireproof partitions it is comparatively inexpensive. Again the thickness of the wall makes a differ-

---

ence in the aggregate cubage of the buildings. Under favorable conditions some saving may be made in fireproof construction in the finished thickness of the floor construction. If we leave out of consideration the greater resistance to spread of fire and vermin, and the elimination of wood shrinkage, there is still much to be said for the use of fireproof construction, even where local ordinances do not demand it.

THE BASEMENT. This floor is the servant of the upper stories, and as is frequently the case with servants, its life is warped to conform with the requirements of the family upstairs. An economical layout is very difficult to obtain. Columns, plumbing pipes, staircases and dumbwaiter shafts are laid out for the best convenience of the upper floors, and the servant downstairs must accept them and make the best of them. Access to stairs and dumbwaiters is essential and usually cuts up the plan into comparatively narrow units.

In a small building with one staircase and one or two dumbwaiters, the solution of the basement plan is more or less indicated; where the basement is continuous and reached by a series of stairs, the problem is more complex. Certain principles may, however, be observed.

The basement unit should be as large as possible without causing too long a walk to any of its functions. If incinerators are charged in the basement, one stack can serve many apartments as well as a few. Only one toilet for delivery men is necessary for each unit, and one delivery entrance, again pointing to the advantage of the large unit. Laundry, drying room and store rooms arrange to better advantage and do not require the same percentage of surplus allowance. As far as possible, a given service should be concentrated in one area.

In a large project certain basement elements may occur but once, such as the boiler room, transformer vault, tank and pump room, and telephone room. Apartments for janitors may not be necessary in every unit. The same is true of perambulator rooms, the assumption being that children are taken out in perambulators mostly in fair weather, when a short walk to the perambulator room is no great hardship. These details should be repeated in every basement unit: 1. Laundry; 2. Drying room; 3. Store room for household goods; 4. Incinerator and utility room; 5. Room or rooms for gas and electric meters; 6. Toilet facilities for delivery men.

LAUNDRY FACILITIES. These will vary considerably, depending on the habits of the ten-
In this case the tenants are colored, and as a large proportion of colored women do their own washing, ample provision had to be made. Each unit laundry contains one pair of wash tubs, one three-burner gas plate, and one section of gas dryer for every 7 ½ families served. As some of the tenants prefer air drying to gas, a separate room is provided for this purpose as well as a small room for storing privately-owned washing machines. A line is run from each private gas meter to a manifold in the laundry. When the gas is turned on it flows to a given gas drier and gas plate. Thus the tenant uses her own gas supply. The supply cock can be locked shut with a padlock on the handle, preventing use by others, and when the gas is on, the lock can be transferred to the dryer, so that a woman can leave her clothes drying without danger of theft. In actual practice it has been found that very few of the tenants own washing machines, and it is questionable whether a storage room is essential.

STORE ROOMS. Individual store rooms were considered, but abandoned in favor of the common room. If a tenant has a separate room, of which he only has the key, there can be little question of the owner’s responsibility in case of loss; there is also less danger of the spread of vermin. On the other hand, the cost of installation is considerable, and the space consumed is greater than for common rooms. Most families of small means have little surplus furniture, and half of the rooms would be empty. These considerations prompted the scheme adopted. The janitor is the custodian of the key, and no one enters except in his company. Goods removed are receipted for. An allowance of 30 square feet of area per family was made and seems to be ample.

INCINERATORS. Disposal of garbage presented a serious problem. There are two usual methods. In one, the incinerator has an opening on each floor and the tenant empties the garbage into the hopper on his floor. This has the advantage of eliminating service, and of giving quick removal of waste from the kitchens. Its drawbacks are several. There must be an incinerator stack for every staircase; the space consumed is considerable; and if there are only two apartments per floor, the cost per family is excessive; the odor of garbage is likely to pervade the stair hall, as hoppers are sometimes left open and tenants occasionally are careless in dumping their pails. The second scheme was preferred in this case. Garbage is kept in a ventilated container built in the outside wall, until collections are made. The attendant in the basement travels from one dumbwaiter to another, wheeling a truck. As the collections are made he replaces the full can on the dumbwaiter with a clean empty can. When full, the truck is wheeled to the utility room, where the contents of the cans are thrown into the incinerator and the cans scoured at a sink. This system necessitates dumbwaiters and periodic service furnished by
the landlord. On the other hand it is cleaner. It requires fewer incinerators. As many as 55 families are served by a single stack in Michigan Boulevard Gardens. As no access is required above the basement, the incinerator stacks may be located in the "blind corners" of the plan, wherever space is available.

METER ROOMS for gas and electricity are essential. Whether to have one room for each basement unit, or one at or near each staircase is a moot question. The former arrangement lengthens the average branch service line up to the apartment, the latter lengthens the average run to the manifold in the laundry.

Toilet facilities for delivery men are essential in cities where public comfort stations are infrequent. They prevent considerable nuisance. It is also well to have a toilet in connection with the laundries in large units where women work for a considerable time at a distance from their apartments.

STAIR HALL PARTITIONS. The walls of stair halls are always a problem, the more so in a building in which all furniture must be carried up and down the main stairs. To avoid the constant cost of cleaning fingermarks and repairing the chipping of plaster caused by moving furniture, a material had to be found which is readily cleanable and which withstands abrasion. Brick walls would have required 8 inches of thickness, and unless glazed they are hard to keep clean.

The material adopted was a salt glazed vitrified tile block, with rounded corners and having the back scored to receive the plaster. The advantages of this material are its thinness, pleasant color, and glaze. The halls are cheerful and the light carries well to the rear. The difficulties likely to be encountered are these: The block is produced in a kiln, and the color varies with its position in the kiln. Uniform color on a block and avoidance of flashed colors are difficult to obtain, and to get them means vigilant inspection and rigid insistence that the material man furnish what is wanted. The material is difficult to cut, and no pipes can be run in the partitions. Shelf angles must be bolted to the concrete to carry the surface continuously past the floor levels. If delivery is not made promptly, plastering will be delayed in the rooms adjacent to the stair hall.

FLOORING. Two principles should be observed in determining the finished floor material in a fireproof building: (1) Avoid excessive thickness between the rough slab and the finished floor. (2) The thickness should be uniform in all cases so that the slab may be poured at a single level throughout.

With sleepers underneath the wood floors a thickness of 2½ inches is required between the rough and the finish. About the same dimension is necessary where tile floors are installed in bath-
rooms and terrazzo in hallways. The adoption of materials in all three locations which would finish 3/4-inch thick above the rough slab saved 1 3/4-inch per floor, or 8 3/4 inches in the total height of the building; multiplied by an area of about 70,000 square feet resulted in the saving of approximately 50,000 cubic feet.

The materials used were these: In the stair halls, stair treads and bathrooms, a composition consisting of magnesite with marble chips as a wearing surface, which when ground is 3/4-inch thick. In rooms, closets, apartment foyers and halls, a wood floor was laid, of oak in squares made up of pieces 2 1/4 inches by 9 3/4 inches, or 13 inches. Adjoining squares had the boards running in opposite directions, thus making a basket-weave pattern. This flooring is attached to the floor by dipping the bottom surface of the boards in asphalt.

Some difficulties have been encountered. Wood floors must be carefully dipped so that the asphalt does not get above the tongue, otherwise a liquid filler will bring the asphalt to the surface in the cracks. When these floors expand, due to moisture, the expansion can be taken care of by leaving an open margin under the shoe mould. This expansion occurs evenly over the whole floor. When the boards contract there is no general pulling back, but the contraction is likely to show as an open crack at any point. When the flooring is brought into a building that is still damp there is a certain swelling across the grain. This means that the resultant panels are not exactly square, and gives rise to irregularities at the meeting of the squares. Unless great care is exercised in laying, this may result in open holes between the squares, sometimes as large as a lead pencil.

Magnesite terrazzo should not be used with a dark background. There is salt in the composition which shows as a white efflorescence on any dark background. By repeated washing the salt may be removed, but it greatly mars the appearance while it persists.

PLUMBING FIXTURES. In speculative projects intended for quick sale it is customary to skimp the quality of the concealed work and have the trimmings showy but unsubstantial. Large housing projects are seldom sold; the owner must therefore consider the question of upkeep very carefully. Brass goods must be of the best quality with as few movable parts as feasible. Faucet seats should be readily removable. Handles and escutcheons should be metal, not china. The latter need constant replacement. For tubs with showers above it is advisable to use a combination fitting with one cold water valve, one hot, and a diverting valve to direct the united stream either into the tub or to the shower. This means three moving parts instead of the customary five. Mixing valves are expensive and may frequently get out of order. Any form of standing waste on bath tubs is a source of trouble and most of them require an access panel. A heavy rubber plug with a strong chain is about as satisfactory as anything. In the worst case, if lost they are readily replaced.

To avoid the cost of individual shut-offs for each fixture, a pair of valves may be installed controlling the water of each apartment. This permits making repairs on a given floor without losing the use of other bathrooms and kitchens on the same stack. Good toilet seats are a sound investment. Exposed metal parts are subject to verdigris. This can be avoided by having all brass work covered with vulcanized rubber. In kitchens a combination sink and wash tray with movable drain board and swing spout faucet is advisable. It permits light laundering of perishable fabrics in the apartment and relieves the demand for use of the cellar laundry.

ELECTRIC METERING. In a large project it is possible to make the purchase and sale of electric current a source of income by having a master meter, buying the current at wholesale rates and charging the tenant the retail rate. If this is done the landlord must buy and install the apartment meters, he must read them, send bills, and collect the money. In addition to the cost of these services, there are likely to be bad debts and disputes with tenants over the correctness of the reading. If the tenant has contracted with the power company and does not pay his bill, his supply is shut off, but there is not the same bad feeling as if the landlord were to do the same thing, under the same circumstances.

It is hoped that these paragraphs may prove of value to those of the profession who are engaged in the arduous struggle with the housing problem, and that they will prompt others to add their contributions setting forth their experience.
FINANCING COÖPERATIVE APARTMENTS

BY

LOUIS G. KIBBE*

The financing of cooperative apartment buildings calls for the utmost in conservatism, for whereas in the case of a rental operation the builder is the only one who suffers loss in the event of failure, in the case of a cooperative apartment project any loss through foreclosure might fall upon the tenant owners. Fortunately the promoters of these projects in New York City have exercised commendable judgment in their financing, and as far as I know, no tenant owner of an apartment in Manhattan has ever suffered a loss from this source.

Broadly speaking, there are three acceptable methods of financing apartment buildings of the rental and cooperative types:

1. By what are known as institutional loans—that is to say, loans made by such institutions as life insurance companies, title companies and savings banks, the amount of the loan ranging from 50 to 65 per cent of the appraised value of land and building.

2. By means of a bond issue, usually in an amount representing approximately 75 per cent of the value of land and building.

3. By either a bond issue or an institutional loan, supplemented by a second mortgage, this method being used extensively in financing rental and semi-cooperative buildings.

In some of the western cities, notably Chicago, where there is not free access to institutional funds such as those described in plan 1, the promoters have been forced to utilize the bond issue method. However, in New York City this method is seldom used, practically all of the cooperative apartment projects having been financed by institutional loans.

Taking the three plans in the sequence just named, the advantages and disadvantages may be stated somewhat as follows:

1. **Advantages.** The initial cost of financing is much less than under any other plan, averaging 2½ to 3½ per cent of the amount of the loan. The interest rate is also the lowest available in the market, being as low as 5 per cent in normal times and seldom exceeding 5½ per cent. Because of the fact that in a cooperative project these loans are usually less than 50 per cent of the sales value of land and building, and of the care usually exercised by the promoters in the selection of the site, the annual amortization is considerably less than in any other type of financing. These savings contribute notably to the success of the project, being reflected, 1st, in the sales price of the apartments, and 2nd, in the annual charge for maintenance, frequently referred to as proprietary rent. These institutional loans have an average maturity of about five years. Where amortization is not demanded by the lending institution, provision should be made for the creation of a sinking fund for the purpose of paying off part of the mortgage at its maturity, thereby insuring refinancing at a minimum cost.

The difference between the amount of the mortgage and the sales price of land and building is referred to as "equity" and in the case of cooperative apartments must be supplied by the purchasers of the respective apartments, with due consideration to the size, location, etc., of the apartment units. Obviously, the purchasers are called upon to pay more in cash for their apartments where the initial financing is in the form of an institutional loan than would be the case when a bond issue is involved. This condition represents about the only objection that can be given to the use of institutional loans and is more specious than real; moreover, the objection can be overcome completely by providing for term payments by the individual purchasers of the apartments, thereby insuring sound financing of the building and at the same time affording a convenient means for financing the equity payments.

Plan 2. The only appeal that this plan offers is in the reduction of the equity cash to be supplied by the individual purchasers, but the attendant disadvantages are so pronounced that this means of financing is seldom resorted to where institutional funds are available. The initial cost of a bond issue averages 8 to 10 per cent of the amount of the loan—the interest rate averages 6 per cent—sometimes even 6½ per cent being charged—while the annual amortization runs around 2 per cent to 3 per cent. These factors are reflected in the initial cost of the apartments and in the annual maintenance charges.

Plan 3 combines a first and second mortgage in the financing and should never be used in connection with cooperative apartment projects unless the second mortgage runs for a sufficient term of years to permit complete liquidation at maturity. A short term second mortgage in a considerable sum, maturing before liquidation can be accomplished, is a distinct hazard and may cause serious embarrassment through the necessity of refinancing at maturity.

*Assistant Manager, Cooperative Sales Division, Douglas L. Elliman & Co., Inc.
THE quickest and most certain way to bring back to normal the building of apartments and apartment hotels is to design structures to meet the price ranges and comfort specifications of people who now live in one- and two-family houses and obsolete multi-family dwellings,” said a builder whose developments are meeting with success.

“People often speak with sarcasm of homes which, in their estimation, are built to sell,” he continued. “Personally, I make an obvious attempt to have every one of my structures built to sell. This doesn’t mean that I don’t put honest materials and workmanship into my buildings. But it does mean that I consider the factors of style, color and luxury to the same degree as do the mechanical and sales engineers.

“The average motorist buys a new car every year or two. The average apartment dweller, especially in the larger cities, moves as frequently. But my problem is greater than that of the motor manufacturer, because I can’t get high enough rentals to justify scrapping my investment when my original tenants move out. What I have done is to look ahead at least five years and include the most modern features, and at the same time plan for enough flexibility to add later improvements as they come along. With the addition of such sales features and by maintaining my buildings in good condition, I am able to keep some of my tenants longer than usual, and to get new ones without a great deal of difficulty.”

Women invariably cast the deciding vote in the selection of a home is the report from every rental agent. The man of the house is satisfied if his new home is convenient to the office and golf links and has adequate garage accommodations. He is finicky about a shower, good shaving mirror and light, a large tub, large drain pipe and ample storage space in the bathroom. Generally, he wants a quiet place that is warm in winter and cool in summer. Creature comforts are more important than beauty. But the modern woman, and she grows more modern each year, demands the last word in construction and equipment.

The list included here is as complete as space permits. It is based on the experience of realtors, builders and apartment dwellers in several states. The data have been checked against mail questionnaires and the writer’s personal experience as the operator of hotels and a resident in apartments the past 12 years. It has been impossible to make allowances for certain sectional requirements due to climatic and other local conditions.

**PLAN FEATURES**
- Light, airy courts
- Adequate entrance lobby
- Rooms proportioned to class of apartment
- Rooms sized to take usual furniture
- Cross ventilation
- Minimum private halls
- Convenient communication between rooms
- Exposure of most used rooms
- Convenient door swings
- Unbroken wall spaces
- Large closets
- Adequate number of closets

**CONSTRUCTION FEATURES**
- Soundproof construction
- Fireproof construction
- Friction door hinges
- Servidors
- Ventilator doors
- Roll screens
- Rubbish chutes
- Safety locks above knobs
- Weather strips
- Large windows

**PHYSICAL SURROUNDINGS**
- Landscaped grounds
- Parking space
- Miniature golf course
- Putting greens
- Swimming pool
- Garden seats
- Playground, roof, safety features
- Flower gardens
- Fountains
- Tennis courts
- Wading pool
- Garden parasols
- Roof garden (seldom profitable as apartment house restaurant)
- Colorful awnings
- Chauffeur signals
- Porte cochere
- Mail boxes
- Window flower boxes

**MECHANICAL FEATURES**
- Concealed radiation
- Central cleaning system
- Incinerator
MECHANICAL FEATURES, Cont'd
Silent mechanical refrigeration
Self-leveling elevators
Safety features on elevators
Circulating ice water
Water softener
Rustless hot water lines
Filtered drinking water
Ventilated kitchens
Ventilated corridors
Automatic door checks
Temperature control
Noiseless, sootless heating
Radio outlets
Easily opened windows
Surplus hot water

KITCHEN FEATURES
High grade range, gas or electric
Step-saving kitchens
Colorful walls and trim
Colorful floor
Floor of cork, linoleum or rubber
Automatic dishwasher
Stainless sinks
Mixing faucets
Laundry tub in kitchen
Built-in ironing board
Built-in table
Built-in can opener
Built-in bottle opener
Broom closet
Numerous electric outlets
Modern kitchen cabinet
Dumbwaiter

BATHROOM FEATURES
Color in tile and fixtures
Safety shower mixer
Heated baths (all year)
Glass enclosed shower
Enclosed tub bath
Enclosed toilet
Chair over toilet seat
Tub and shower combination
Colorful shower curtain
Silently flushed toilets
Floor material
Mixing faucets
Built-in bathroom scales
Dental lavatory
Double medicine cabinets
De luxe mirrors
Built-in bottle opener
Hot water bag hooks
Clothes hooks
Convenient towel racks
Recessed tissue holder
Large tubs
Large drain in bath
Special shaving lights

ROOM EQUIPMENT
Bathroom features, Cont'd
Built-in drawer space
Several electric outlets
Ventilated baths
Chromium plated fixtures

NURSERY EQUIPMENT
Electric clocks
Casement or double-hung windows
Numerous base plugs
Radiator enclosures
Luminous door numerals
Parquet floors
Floors of cork, linoleum, rubber
Draperies

WALL DECORATION
Wood burning fireplace
Fireplace, gas log
Modern wall finishes
Quality window shades
Unbroken wall areas
Arched doors
Built-in book cases
Modern facilities for hanging pictures
Decorative lighting fixtures
Luminous electric switches

CLOSET EQUIPMENT
Cedar closet
Built-in drawers
Shoe racks
Hat stands
Built-in hangers
Tie racks
Cellarette closets
Lighted closets
Carpeted large closets
Adjustable shelves
Special door locks

SPECIAL FEATURES
Well equipped house laundry
Modern clothes drier in laundry
Dry storage for trunks
Baby carriage hall
Ballroom or meeting room
Food shop
Valet shop
Maids' rooms
 Provision for pets
Garage
Solarium
Ample fire protection
Public dining room
Safety deposit boxes
Delivery door in kitchen
Telephone wall cabinets
Mail chutes
Centralized radio
Awnings
SOUND INSULATION IN APARTMENTS

BY

ROGER W. SHERMAN

THE fact that noise has become a problem necessitating control indicates a fundamental and important change in the life of society. This change relates to the mushroom growth in complexities of existence. It is noticed in pressure and confusion. The stream of business and industrial life swirls daily into new nervous whirlpools; and the demand is growing that more compensatory measures for private life be developed to maintain an equable balance between the varied activities of living.

The isolation of sound is one such measure. Being largely psychological in its aspect, it has seemed less essential, heretofore, than the more obvious problems involving the organization of other planning factors. Excellent progress is being made toward criterions of structure and spatial efficiency. Problems of sanitation, light, ventilation and heat are being well met, and the solutions indicate a high degree of physical comfort. But the importance of questions involving mental and nervous reactions has not been, until recently, sufficiently recognized. Color, unity of arrangement, organization of time, conservation of human energy, the isolation of sound,—these all deal largely with the mental processes that influence physical action. They are questions, therefore, of great moment to the architect who is concerned with planning for private life. Upon him devolves the responsibility of organizing in terms of space and time physical entities in the production of a unity,—a unity which will, in turn, generate in its inhabitants a maximum of physical comfort and mental well being. The isolation of sound is recognized as a factor of increasing importance in this unity, and the solution of the problem it presents demands serious consideration.

FOUR PHASES

The apartment building as a unity peculiar to the present social structure is an established fact. Its purpose is the housing, for private family life, of an urban society. Within it, therefore, should be developed a maximum number of factors compensatory to the tension of public relations to achieve its proper function as a home, a place for physical comfort, nervous relaxation and mental pleasure. Sound isolation is a contribution to this function. Specifically, as a problem, it has four distinct phases:

1. The Psychological.
2. The Planning.
3. The Structural.
4. The Economic.

PSYCHOLOGICAL IMPORTANCE

This has been briefly indicated. Further investigation reveals that noise acts through the ear on the involuntary nervous system controlling the heart, the lungs and general metabolism. Tests under varied conditions show a lowering of efficiency in action and mental processes when noise is introduced, and a subsequent return to normal when the noise is removed. This seems to hold true in all cases, even when the noise has been tolerated for a sufficient time to be unnoticed as such. Sleep under noisy conditions has proved less generally recuperative than under conditions of quiet. It has been proved that quiet surroundings shorten the period of recovery from nervous strain. Rest is more profound, a tendency toward calmness and a lessening of mental distraction is noticed when noise is largely eliminated.

PLANNING

Insulation of apartment buildings against noises incidental to location may be accomplished in part by proper planning. Since walls act as an effective barrier to noise, the location of living spaces should be removed as much as possible from noise sources. The placing of service areas toward the street and the development of an interior garden court may accomplish this. Having many openings from the street to the court should be avoided. In large projects an arrangement of offset entrances to an indented court may serve as sound baffles. Air intakes should be located in quiet areas. Elevator shafts should be isolated from living quarters by corridors and stair wells. Bathrooms should be placed where sound is least likely to be heard, and plumbing lines should be located within the apartment that they serve and never within a wall separating two apartments.

STRUCTURAL INSULATION

I. THEORY. Sound, a form of energy, is produced by vibration that travels in waves of varying velocities, depending on the medium. The denser the medium, the faster the sound will travel. Sound waves travel in solids, liquids and gases. "When waves in one medium encounter a second medium with a different elasticity or density, their regular progression is disturbed.
Part of the energy is thrown back in the form of reflected waves, part is absorbed in the second medium, and part is transmitted, the relative amounts depending on the differences in elasticity and density between the second medium and the first." Sound waves may be transmitted in three ways: First, by passing through air spaces of a porous material, Second, by contact with a medium that in turn transmits a modified wave, and Third, by causing a minute vibration of a structure as a whole. Since sound is a form of energy, it cannot be destroyed. It must be transformed, and all solutions of sound isolation problems take this fact as a basis of procedure.

Laboratory experiments with materials of all types to determine their value as reflectors, absorbers and transmitters of sound disclosed three major facts:

1. Weight offers the greatest resistance to transmission.
2. Porous materials absorb the most sound energy.
3. Hard, smooth-surfaced materials best reflect sound waves. These three statements relate generally to air-borne sounds. Various combinations of materials have been developed that, when used as walls and floors, reduce the transmission of such sounds between two rooms. Vibratory, or structure-borne sounds, are not as easily controlled. Watson states that: "... The theory of the subject is incomplete, and practical attempts to secure effective soundproofing are not always attended with success, even though the constructions used are in accord with the theory and apparently have the elements of adequate insulation. Sound progresses with facility through the different solid materials of a building in paths not easy to trace, and may be heard in positions quite remote from this source. This action, together with the extreme sensitivity of the ear, explains why the insulation of sound is a difficult matter."

Sound is measured in "Sensation Units" (S.U.) or in "decibels" (dbs.). It has been demonstrated that the ear responds to the loudness of sound as the logarithm of the sound's physical intensity. (If one device, for example, produced 10,000 intensity units, it would require 100 devices to produce 1,000,000 units. Yet the ear would respond to the increased loudness only as the logarithms of those two quantities, 4 and 6, indicating the loudness of 100 devices to be only half again as great as one.) A sensation unit, or decibel, is the product of this logarithmic unit, or ear scale, multiplied by ten. The range of sound measurement begins at the lowest point at which sound energy becomes audible,—the Threshold of Audibility; it ends at the upper level of maximum distinguishable intensity,—the Threshold of Feeling. Between them there is a scale of about 135 decibels. Ordinary conversation ranges between 35 and 65 dbs.

The penetration of a sound's intensity varies with the pitch. Sound vibrations cover a range of frequencies from about 16 to 21,000 per second, and the reduction factor of a given combination of materials in walls or floors will vary with even slight variations in pitch. (See Fig. 1.) In general, reduction is greater for high frequencies than for low. Since noise is composed of sounds of several frequencies, reduction values are usually given as the average of transmission tests in several frequency bands.

II. Practice. Sound control in apartments divides naturally into three groups:
1. Reduction of sound at its source.
2. Prevention of sound transmission through the structure.
3. Isolation of air-borne sounds from the area of audition.

REDUCTION OF SOUND AT ITS SOURCE. Since mechanical units generally produce noise, elevator machinery, blowers, fans, laundry machines, refrigerating and heating units should be selected for quietness as well as for efficiency of operation. Bathroom fixtures should be of the noiseless type. Sounds of running water may be lessened by the selection of pipes and connections adequate in size for the known velocity of water. Annunciater systems and door signals should be of the buzzer type. Checks on doors will prevent their
A Quiet and Restful Apartment Offsets the Effects of the Noise and Tension of Business Life. Buildings Facing Open Spaces Suffer Least from Reflected Street Noises

slamming, and care in the selection and installation of windows will reduce rattling and noises incidental to operation. Floors,—especially those of corridors and lobbies,—should be of a resilient material to prevent impact sounds.

Prevention of Sound Transmission Through the Structure. Several patented systems have been developed for insulating structure-borne sounds. As installed, they employ the principle of discontinuity of interior finish with the frame of the building by the use of absorbent sheathing and padded chairs or clips that support the interior finish and are designed to absorb and dissipate vibrations with the structure. Though many of them have been employed in the soundproofing of special rooms, radio broadcasting stations, schools of music, and for the correction of sound problems in completed buildings, their use in apartments has not become general. Figs. 2, 1 and 2 show partitions, and 5 and 6 floors that are typical of current practice. Several structural systems are in use for large projects. They combine some methods of sound insulation with the employment of pre-cast gypsum units for partitions, floors and ceilings. No reliable tests are available, but it is claimed that in addition to effecting considerable economies in construction they effectively reduce sound transmission. A common type of wall between two apartments consists of two tiers of 3-inch gypsum block separated by a 2-inch space in which are hung strips of felt, absorbent quilt, or a similar textured wall board. In some cases the space is filled with sawdust, rock cork, etc. Experience shows, however, that strips of any kind rarely add to the reduction value of the wall, and in the case of fill actually lessen it, as do ties or struts, by establishing a mechanical bond between the two walls. (See Fig. 1.) Furring strips on tile or gypsum block with the application of plaster over a fiber board base materially decrease transmission through single partitions and walls. Contact of walls with floors and ceilings should be prevented by the use of a cork or felt strip as indicated in Fig. 2, sections 1 and 2. Floating floors over the usual types of masonry and a furred ceiling plastered over fiber board reduce the transmission of impact sounds through floor constructions. Transmission of the noise of mechanical units may be lessened by setting machines on mats,—often made of alternate layers of cork, felt and lead, and sometimes supported on stiff spring clips,—which act as shock absorbers. Vents, pipes, soil lines, etc., should stand free of the structure wherever possible. Where they pass through floors and partitions they should be wrapped in felt, and hangers and braces should be applied over felt or porous rubber. Elevator shafts should be of very rigid construction, and the enclosing wall panels should be as nearly soundproof as possible.

Isolation of Air-Borne Sounds From the Area of Audition. Sounds within a room,—conversation, piano playing, radios, etc.,—may be reduced in intensity by the application, on ceilings or walls, of sound-absorbing materials. Cloth-
Fig. 2. Sections 1, 2, 5 and 6 Show Current Types of Wall and Floor Insulation. The Trend of Building Is to a Lighter, Less Cumbersome Structure. Sections 3, 4, 7 and 8 Show Possibilities of Combining Present Materials Toward This End.
covered felt, rock wool covered with perforated metal, wall boards of cane or similar fiber, special acoustical plaster, loosely pressed composition tiles,—these are efficient in varying degrees. Rugs, draperies, furniture and people absorb considerable amounts of sound. Care should be exercised in the application of sound absorbents to prevent the creation of dead space without sufficient reverberation for aural comfort. Transmission of the noises may be reduced by using partitions and floors of the types mentioned. None can be especially recommended. Though many laboratory tests have been made, there exists a lack of practical data regarding reduction values for current types of construction. Field conditions vary greatly, and construction should be designed to produce the maximum efficiency for this and other factors involved. Doors of the usual type do not reduce sound greatly, and the consistent use of a sound-insulated type is important. To prevent travel of sound in ventilating systems, outlets from a single duct should alternate to individual apartments. Duct and fan connections should be of canvas. Air chamber or machinery noises from intakes may be reduced by using a series of baffles in the chamber or by the use of felt as an absorbent lining in the ducts.

The isolation of traffic noises constitutes a serious problem. All efforts to insulate for airborne sound may be nullified by intrusion of harsh street noises through open windows. Methods to exclude such noises are few. In some cases balconies may serve as sound barriers, and in some buildings a patented device has been installed on the exterior sills to accomplish the same purpose. In tests it shows a reduction of about 9 dbs. per window. Though this may prove adequate in some instances, the amount of ventilation obtained while still receiving the benefit of sound exclusion is limited. If the exclusion of outdoor noises is an important factor, windows should be stationary, and the mechanical ventilation of the building is indicated.

If the sound level of known conditions is established, it is possible to obtain another desired level by the use, as sound insulators, of construction units of known reduction values. These quotations, from the Bureau of Standards, are self-explanatory.

"Panels Whose Reduction Factors are Over 60 Sensation Units: Conversation carried on in an ordinary tone is reduced to inaudibility. If there is external noise in the listening room, a shout on the other side of the panel would be practically unnoticeable.

"Panels Whose Reduction Factors Lie Between 50 and 60 Sensation Units: Conversation in ordinary tones heard through the panel is barely audible, but unintelligible.

"Panels Whose Reduction Factors Lie Between 40 and 50 Sensation Units: Conversation in ordinary tones heard through the panel is quite audible, but difficult to understand. If the voice is raised, it becomes intelligible.

"Panels Whose Reduction Factors are Less Than 40 Sensation Units: Conversation in ordinary tones heard through the panel is distinctly audible and intelligible.

The above comparisons are based on tests in a listening room in which there was no noise and which was quite reverberant. In a room furnished with rugs, draperies, or other sound-absorbing objects, the panels would be apparently more effective than when tested in bare rooms.

"Attention must be called to the masking effect of external noise. If a panel having a reduction factor between 30 and 40 sensation units is taken as an example, the following facts may be noticed. If there is no external noise and the panel acts as the wall between two rooms which are fairly reverberant, it is quite easy for two people who are on opposite sides of the panel to carry on a conversation, but if there is the slightest noise in the room where the person is listening, the conversation becomes a mumble, and the chances are that not a single word will be understood. The louder the noise the greater the masking effect.
From the above it is readily seen that a panel might give entirely satisfactory results under some conditions while under other conditions it would be entirely unsatisfactory. In other words, the conditions under which a structure is to be used are to be considered, as a given structure may seem satisfactory or unsatisfactory as these conditions are favorable or unfavorable. 

ECONOMIC VALUE

The complete use of sound insulation systems in apartment buildings has been limited, due to (1) complex installation, sometimes causing confusion in the field, (2) the fact that they occupy an appreciable amount of space, thereby cutting down rentable area to some degree, (3) additional cost implied by the foregoing, and (4) the unwillingness of owners to install such systems unless forced to do so by public demand or by unsatisfactory sound conditions in a completed building. Walls between apartments, elevator shaft enclosures and bathroom partitions are usually insulated to some degree, depending upon the location, the type and the cost of the building. Regarding such questions as possible increase in rents, prevention of early obsolescence, and the development of a preferred location resulting from the use of sound insulation, no reliable data are obtainable. Surveys should be made for every project to determine the relative importance of these points with others involved.

It is believed that public demands for adequate sound insulation in apartments will shortly become insistent. In New York City, the Noise Abatement Commission has made an extensive survey of the causes and prevention of street noises and is advocating legislative control of noise where possible. A committee of the American Society of Mechanical Engineers is investigating the causes of machinery noises and is endeavoring to fix a standard of sound by which machines can be graded. Both efforts are fundamentally economic, and indicate the importance of the subject from this standpoint. Quietness usually tends to increase values in a given locality, and programs or methods to promote it have a certain economic worth. A statement of this necessitates a close relation with other influences, and any other procedure is mere guesswork.

SUMMARY

1. Sound insulation in apartments constitutes a complex problem. Economic and structural questions vary in every case and require study. If sound insulation is to be procured, methods must include three parts:
   1. Reduction of noise at its source.
   2. Prevention of sound transmission through the structure.
   3. Isolation of air-borne sounds from the area of audition.

Construction that provides for two of these parts may prove ineffective if the third is neglected. In many cases a standard method may prove unsatisfactory, and difficulty may be encountered under any or all headings. In such cases a searching technical analysis, an unbiased use of methods and materials and extremely close field supervision offer the only means of obtaining satisfactory results.

II. Future development of materials may do much toward the securing of quiet apartment buildings. A deep inquiry into sound insulation problems discloses close association with several others. If the subject of sound insulation in apartments becomes of vital economic importance, subsequent construction methods will greatly influence current practice in heating, ventilating, sanitation and structural design, with a possible departure from present plan requirements and a consequent radical change in exterior expression.


Sabine, Paul E. —Transmission of Sound by Walls (A Reprint from The Journal of the Acoustical Society of America, January, 1930.)


Reports of Various Committees, New York Noise Abatement Commission.
Practically all zoning regulations and building ordinances outlaw the parking garage from urban residential districts. There is, however, an actual necessity for having parking garages in multiple-dwelling residential districts to contribute to the convenience and comfort of their inhabitants. Parking garage accommodations also enhance the rentability of multiple-dwelling buildings, provided they are unobjectionable in appearance and operation.

There must have been valid reasons, sustained by popular approval, for declaring parking garages a nuisance occupancy in residential districts. The ordinary commercial parking garage building was cheaply constructed and architecturally unattractive. These undesirable features are often further added to by the noisy operation of the garage, conducted by ill-kempt operatives. To these undesirable features there may be added unsightly gasoline pumps and the characteristic over-illumination at night.

Architects and garage engineers are today designing parking garages that are acceptable in residential districts and that are distinctly fine architectural contributions to their neighborhoods. These buildings, with high class management and operation, have definitely removed the parking garage from the nuisance occupancy class. In some cases there were objections to their construction, resulting in litigation. The courts evidently held that with proper design and operation, sufficient safeguards were provided for the protection of the surrounding property. The number of adequately designed parking garages is limited, but they are widely distributed geographically, which indicates the universal necessity for this class of buildings. Different solutions of the problem have been made, tributes to the ability of the architects.

A notable example of the parking garage in close proximity to high class apartment buildings is that of the Garden Court Apartments occupying the city block bounded by 47th, 48th, Pine and Spruce Streets, Philadelphia, Ralph B. Bencker, architect. The project consists of seven apartment buildings facing the different streets. The central...
The problem of the parking garage adjacent to apartment buildings was solved in a different manner in the Homewood Garage, Baltimore, Palmer, Willis & Lamdin, architects. This garage building is placed on one side of a city block and is a detached structure. The remaining portion of the block is occupied by apartment buildings. It is an exclusive neighborhood, adjoining the new site of Johns Hopkins University. Entrance garage, one story above ground, is pitched to drains and finished with a membrane waterproofing covered with asphalt. A concrete curb about 2 feet, 6 inches high forms a lily pond which also contains a small fountain. Eighteen inches of soil is placed on top of the roof, which is planted for turf and flower beds. The roof of this garage forms the garden court and presents a pleasing aspect to the surrounding apartments. Exhaust fans remove the engine fumes through vent ducts in the adjoining buildings. In this instance the garage is secluded from the adjoining buildings and streets, except for its entrance and exit, and the garden is an attraction added to that of the convenience of the garage.

portion of the block is occupied by a one-story and basement garage building. The entrance to the garage, on Pine Street, is flanked by a one-story store room on each side. The roof of the garage, one story above ground, is pitched to drains and finished with a membrane waterproofing covered with asphalt. A concrete curb about 2 feet, 6 inches high forms a lily pond which also contains a small fountain. Eighteen inches of soil is placed on top of the roof, which is planted for turf and flower beds. The roof of this garage forms the garden court and presents a pleasing aspect to the surrounding apartments. Exhaust fans remove the engine fumes through vent ducts in the adjoining buildings. In this instance the garage is secluded from the adjoining buildings and streets, except for its entrance and exit, and the garden is an attraction added to that of the convenience of the garage.

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Homewood Garage, Palmer, Willis & Lamdin, Architects.
Garage Building in Center.
Surrounded by Apartment Houses

The street elevation is severely plain, having a series of finely proportioned arched recesses in the wall. An entrance for pedestrians is placed in the center of this elevation. The whole conception has been designed and constructed in a dignified, simple manner, appropriate to the neighborhood.

In restricted residential districts provision is made usually for a small business center conveniently located, in which there is a parking garage. The Ward Parkway Development, Kansas City, has such a garage, designed by E. W. Tanner, architect. Two entrances on the front and one on the side provide access to the building. In the front portion are located the gasolene pumps and service station. There are no signs, oil pumps, or other garage features to indicate the specific use of this attractive commercial structure.
Large apartment buildings are being constructed in old, exclusive residential districts made up of one-family city dwellings, such as the Rittenhouse Square section of Philadelphia. As the parking garage is a necessary adjunct to the high class multiple-dwelling house, the Rittenhouse Square section is served by the Plaza Garage, formerly the Aldine, located on Sansom Street, the Ballinger Company, architects. This building is of the ramp type, with two stairways and a passenger elevator; garage office, waiting rooms and toilets on the first floor, and chauffeurs' room on the roof.

The parking garage has been incorporated successfully in high class apartment buildings. The advantage of this arrangement is that a direct and convenient connection, by elevator, is provided between the apartments and the garage. The type of construction used is such that the garage por-
tion is effectively insulated from the rest of the building for noise, fire and fumes. Of this type, reference is made to the Continental Apartments, Arsenal Square, Cambridge, Charles R. Greco, architect. About 40 per cent of the ground area, a rear court, is occupied by a garage in the basement and sub-basement, each with direct access to the street. The Longwood Towers Apartments, Brookline, Mass., Harold Field Kellogg, architect, and the Park Mansions Apartments, Schenley Park, Pittsburgh, T. R. Hinckley, architect, are important examples of the inclusion of the garage in the apartment building.

The residential district parking garage is operated exclusively on the 24-hour monthly contract system, having little transient business. Experienced observers are of the opinion that it operates on as profitable a basis, by and large, as the business-section commercial garage. The land investment is comparatively small. The established confidence in the operator results in additional revenues, frequently amounting to more than 60 per cent of the total receipts, from the sale of accessories, gasoline, oil, washing, lubricating and other services.

It is necessary and proper to define legally the permissible locations of garage and other business occupancies by zoning laws. It is demonstrated that in high class multiple-dwelling residential districts, the parking garage is a social and economic necessity. It follows, then, that some legal method must be found to permit their construction that will insure the conservation of property values and the peace and comfort of the people. In formulating a method of legalizing their construction it must be remembered that a prohibition under ordinary conditions always enhances the value of its violation. Under some existing methods of legalizing violations of building ordinances and zoning laws, these valuable privileges have become a matter of barter and trade because of improperly constituted authority. The dismissal of injunctions has proved to be a successful method under existing laws, entailing the loss of valuable time and undue monetary expense to which no one should be subjected. Possibly a solution of the problem of these zoning laws or building ordinance violations would be to establish certain legal requirements as to architectural design, mechanical equipment, sound insulation, fumes disposal, fire protection and character of operation, and the adjudication of the zoning law violations to be made by an established method of arbitration between all of the parties interested.

Elevators Direct From Apartments Have Small Lobbies in the Garage

Entrance to Apartments Upper Left, Entrance to Garage Lower Right, Park Mansions, Pittsburgh. T. R. Hinckley, Architect
SELECTING APARTMENT ELEVATORS

BY

W. T. WHITE *

PARALLELING the growth of the apartment building has come the development of the “Tenant-Operated” elevator. First we saw the familiar standard straight push button type which still finds its place in the scheme of things in spite of the fact that it is essentially a “one-man” car, or as someone has said, it is “one for all and all for one,” one after another. Second was developed the modern Two-Button Multicall type, today’s great forward step, in which almost all the advantages of an operator-controlled car may be available to the public, providing both power-operated car and hatch doors are installed. Then came three modifications of this control: First, the Single-Button Multicall, developed to give to the small apartment house many of the advantages of the Two-Button type at about the price of the straight Push Button type; another, the Two-Car, Two-Button Multicall Control which extends the advantages of this type to a bank of two elevators controlled from a single riser of corridor push buttons; and finally, the Personal Service feature designed for apartments of the highest class where an attendant is provided to watch over and assist the passengers. For the skyscraper apartment hotels and cooperative apartment buildings the standard operator-controlled cars which have been developed for the modern office building, are available, and arranged for either car switch operation with level landing or for Full Automatic Control.

Fortunately the intense activity in the building and development of apartments has failed to curb individual expression. The present-day apartment house or apartment hotel has grown to be “home” for many of us. There seems to be just about as much variation in apartment houses as there is in private homes, and so it is with the elevator requirements. The type of elevator service rendered must make its appeal to the tenant through his home life, which is distinct and different from his business activities. Does he come from a former home where he has been accustomed to have servants to wait upon him? Then in general the “Tenant-Operated” elevator is not for him, unless it be equipped with the “Personal Service” feature. Is the building speculative in character? Then the equipment may have to be selected almost entirely on a price basis, but here sufficient consideration must also always be given to sound engineering principles. In other cases the owner may wish to make his building outstanding in character, but he must not be unduly influenced by the spectacular without due regard for fundamentals.

FUNDAMENTALS. What are these sound engineering principles, these so-called fundamentals? Let us list the major characteristics of an apartment house elevator in the approximate order of their importance.

They are: (1) Safety, (2) Reliability, (a) Accessibility, (b) Ventilation, (3) Quietness of Operation, (4) Appearance, (5) Type of Service Rendered, (a) Convenience, (b) Control, (c) Traffic Handled, (6) Standardization, (a) Costs.

1. SAFETY. Safety is of the utmost importance in apartment houses, because it affects the passenger at home where it involves the safety of the family, children as well as adults. Standards of practice which would be relatively safe for adults would be unsafe in elevators used frequently by children and old persons. Particular attention should be paid to safety where the elevators are “Tenant-Operated” and no operators are in attendance. Some of the factors which determine the safety of an elevator are not always appreciated. For example, in some cases in order to match up with the rest of the corridor trim, the swinging elevator hatch doors have been so mounted that the distance from the car platform door to the corridor door has become large enough to permit a child to step onto the threshold and then allow both doors to close. Under such conditions, a “Tenant-Operated” elevator might easily move away to answer another call, with possible disastrous results.

It is natural and well within the realms of possibility for an elevator to stop between floors, due to setting of the safety, or to pass the top or bottom floors due to overload or control failure. Provision should be made so that a hoistway door may be opened from the outside by an attendant to allow the removal of passengers. The elevator should be equipped with a call bell so that passengers may send for assistance. Hoistway doors may be either of the sliding or swinging type and should be self-closing. For “Tenant-Operated” cars the car gate or door should also be equipped with a reliable closing device. The present trend
is toward a power-operated car door. Solid doors should be used when power-operated, since fingers may be hurt if caught in a scissor-type power-operated gate.

2. RELIABILITY. Reliability of operation is of great importance in an apartment house because the service is frequently dependent upon a single elevator. In the hall type of apartments, two elevators may be grouped together to give service to a number of apartments on the same floor. The design of many apartment houses, however, is such that only one or two apartments can be served from a single elevator. This arrangement is often desired because of the privacy obtained. It has a disadvantage, however, in that the service is dependent upon a single car, and a shutdown would render this group of apartments without service. In some cases where service elevators are installed, they are so arranged that entrance to the apartment is obtained only through a kitchen or butler's pantry. In one particular apartment house, the passenger elevator in the front and the service elevator in the rear were purposely made to open upon a communicating hall. It was the practice of this building when a shutdown occurred in a passenger elevator, to lay a carpet on the floor of the service elevator which had purposely been equipped with a rather good cab, and use this elevator as a passenger elevator. Guests could then be escorted to this elevator and from the elevator to the front door of the apartment which they were visiting.

Another factor which greatly increases the reliability of service is to have all machinery in an accessible place. A secondary sheave or governor located beneath the main penthouse floor and in such a small space that it is very difficult to get at, is apt to be neglected. Ventilation is of great importance, and this, too, is frequently neglected. The insulation of electrical machinery will stand certain working temperatures for a long period of time. If this temperature is exceeded, deterioration may in some cases be very rapid. It frequently happens that machine rooms which are poorly ventilated are for the same reason very inaccessible. Repairs are not only expensive and difficult to make, but delay may be involved which will be detrimental to service, particularly where the whole building is dependent upon a single elevator.

3. QUIETNESS OF OPERATION. It is common knowledge that machinery for apartment house work should be particularly quiet in operation. 4. APPEARANCE. The appearance of the elevator, such as the cab, accessories and entrances are of as great importance as smoothness of operation, elevator speed and capacity. The tenant frequently knows nothing about the elevator at all except that it has a beautiful cab and other appointments, which, of course, should

<table>
<thead>
<tr>
<th>Class No.</th>
<th>Type of Bldg.</th>
<th>No. of Floors</th>
<th>Type of Equip’t.</th>
<th>Speed FPM</th>
<th>Capacity of Car</th>
<th>Control</th>
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<td>Hatch</td>
<td>Car</td>
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* Or Two Button Multicall with Personal Service.
be in harmony with the building decorations. Proper attention to these details will enable the elevator equipment to attract tenants by first impressions and hold them afterwards by performance.

5. TYPE OF SERVICE RENDERED. The service rendered should be consistent with the type of building and conform to the building standards. The service outlined is recommended.

The elevator must be convenient to use if it is to be of the “Tenant-Operated” type. For this reason power-operated doors are recommended in the given outline wherever the cost is in keeping with the character of the building. The development of the Personal Service feature has been brought about largely through the desire of the owner or manager to make the elevator service as comfortable and convenient as possible for his tenants. The types of control, as listed here, are in general to be recommended, but variations are oftentimes acceptable. Any elevator manufacturer would welcome the opportunity to investigate and make unbiased recommendations.

THE TRAFFIC PROBLEM in apartment houses is seldom one in which the number of passengers to be handled has a great deal of bearing upon the equipment to be used. The problem is frequently one of psychology rather than traffic, and the service to be rendered is more one of personal service to the individual than it is of general service to the building. The lack of appreciation of this fundamental principle has been the cause of many misapplications. The speeds of elevators, for example, are determined not only by the time required to carry a passenger from an apartment to the street, but also upon the effect of this speed on women, children and elderly persons.

It is assumed that there will always be at least a service elevator available in case it is necessary to shut down a passenger car for any cause. The desirability of incorporating in the building plans such arrangements as to make the use of this service car convenient and comfortable for the tenants has been touched upon under Reliability. Where more than one elevator is provided, it is desirable that they be placed in adjacent hatches wherever possible. Of course, such an arrangement is out of the question with certain types of buildings where each section or wing may be provided with its individual elevator. In such case the availability of the corresponding service car must be carefully studied. The actual number of passenger cars required to give adequate service in the many varying types of apartment buildings, apartment hotels and cooperative apartments should be given the most careful attention. The leading manufacturers maintain engineering staffs, available to the owner or architect. When consulted, they should be given all of the essential data, including the location and type of the building, the kind of competition, the type and habits of the tenants if possible, the number and sizes of the apartments and the approximate number of tenants, plans of the first or lobby floors and the various typical floors, with an elevation giving floor heights.

6. STANDARDIZATION. There is a definite economic need for a high quality elevator designed and built especially for the service indicated under Class 1. Apartment houses of this type have yielded to mass production methods. Thus it follows that the elevator equipment must necessarily be cheaper than other types, and first cost and maintenance must be kept lower. To obtain for a lower cost and smaller maintenance charges an elevator which is safe for women and children to operate, reliable, quiet, smooth in running and with small space requirements, it is necessary that equipment be selected that has been specially designed for such service and which is the result of considerable study and experience on the part of the manufacturer.
UGLY BRIDGES

BRIDGES appear to be receiving general attention, as was indicated by an editorial in the New York World, August 25, 1930, which makes specific reference to the new Poughkeepsie Bridge. This editorial contains two statements to which exception may be taken as being unsound and dangerous to the promotion of aesthetic bridge design. One statement: "Yet with regard to the appearance of bridges, we have often wondered whether it is possible to build an ugly one." Ugliness, of course, is susceptible to definition as applied to bridges. By and large, it is evident that bridges of all kinds as disposed throughout this country are unparalleled examples of ugliness. Efficient? Yes, the American engineer gets the maximum work from every ton of structural material used,—that is economical designing, of which we are proud,—but beauty has not been a consideration. The wonder is, rather, that it is possible for us to build a beautiful bridge.

Again: "All bridges are beautiful because of the nobility of their function, something that transcends even the worst blunders of design." Nobility of function does not necessarily establish beauty of structure. A battered box car or a dilapidated gondola transports food to the starving or coal to the freezing,—both noble functions of charity and mercy,—but are these cars structurally beautiful? The principle involved, in bridges or even chairs, is applicable to the innumerable structural forms that properly, adequately and economically serve their purpose, but from these a selection must be made that is good looking. Man's handiwork, per se, has no inherent beauty. Beauty is the resultant of certain qualities introduced intentionally.

American bridge engineers have failed pitifully to incorporate beauty in bridges. The few bridges that do possess that quality serve but to accentuate this failure. Engineers collaborate frequently with architects in European countries, and the good results are readily apparent in a study of European bridges. Collaboration between engineers and architects is rare in this country. In some cases it has improved decidedly the aesthetic design of bridges. It is a question as yet as to just what our architects can contribute to the betterment of bridge design. Their failures appear to be a lack of understanding of the function of the parts of the bridge and a failure to dissociate their conception of a building with its stylistic accessories. There is, however, a growing appreciation of the problem of the aesthetics of bridge design among architects and engineers that must lead to the betterment of American bridges.

A. T. N.

PLANS AND RENTS

A CRITICAL study of the American apartment building as a type discloses two obvious characteristics,—plan and architectural design. The apartment building is a distinct type that has been developed apparently to satisfy the ideas and demands of the tenant occupants. Rentability and earning capacity are the principal factors that influence the design. Thus the economic interests of ownership rather than appropriate architectural design are the causes of the apartment building's present status. These justly may be the premier considerations, but it is entirely possible to associate financial success with the finest quality of architectural designing in every kind of income-earning building.

Rentability depends chiefly on two factors,—location and plan. Every tenant desires the most comfortable and convenient quarters purchasable by his rent-paying ability. Competition for tenants has resulted in the development of plan arrangements and mechanical equipment that best satisfy these two desires. As a result, the plan of the American apartment as a type is probably the most comfortable and convenient of any. Competition has compelled also the development of the most economical,—not always the best,—kind of construction. Plan and construction, then, have been classified and standardized, in a measure, into the several grades or classes of apartments in keeping with the procurable rentals. Recognizing the social and economic necessities for the several grades or classes of plan and equipment, it is acknowledged that the apartment house plan has been developed to a high state of perfection. The standardizing of plans has made it possible to produce them at a surprisingly low cost.

In these studies, it is found that the characteristics of plan and construction vary in the different sections of the country, indicating the influence of local conditions as to materials, methods of construction, building laws, social customs and methods of financing.
REDUCED to its simplest terms, a kitchen exists as (1) a place in which to prepare food, and (2) as a place where dishes are washed and put away. In addition, it provides storage for food, utensils and cleaning articles. Apartments are tenanted by people with interests other than a personal and meticulous upkeep of a complicated establishment, and the arrangement of equipment to serve the purpose of a kitchen with the minimum of time and effort is of great practical value.

GENERAL FACTORS INFLUENCING DESIGN

1. SIZE, SHAPE AND LOCATION in relation to living quarters, corridors, ventilation, daylight, heat and water supply. These will be determined by the factors of location, cost, size of units, rental scale or selling prices, and percentage of equity return governing the choice of building types.

2. EFFICIENCY OF EQUIPMENT ARRANGEMENT. Experiments in home laboratory kitchens* have established the value of a scientifically compact area where all equipment is available with a minimum of motion and effort. Location of work counters, food, utensils, sink and stove should be governed by this principle. Sinks should have drains or counters on both sides where possible; if not, the drain should be at the left of the sink. Cabinet and refrigerator doors should swing in a direction to expose interiors most naturally from the center of the working area.

3. COMFORT OF OPERATION. A minimum working space of about 30 inches between fixtures is necessary for kitchen work without strain. Cabinets above a height of 7 feet are of little value where space does not permit the use of a small portable step-ladder. Ideally, the heights of counters, sinks and stoves should be adjustable, but a counter height from the floor of 34 1/2 inches should be specified as suitable for the average person. Catches on cabinets should be positive, but easy to operate, such as the bullet type; and drawers should be of metal to prevent sticking. Confusion in unit door swings and inaccessible corner cupboard space should be avoided. Floors should be quiet, durable and resilient, such as linoleum, cork or similar compositions. Light should be evenly diffused, and fixtures should be placed so as to avoid shadows within the work area. Wall plugs above counters permit the use of various kitchen appliances and should be specified and their location shown on plans.

4. MAINTENANCE. Equipment should be selected for convenience, minimum of upkeep, and possible salvage value. Cabinets and shelving should be units of standard approved manufacture, avail-

* Spatial efficiency and labor saving methods are being intensively studied by housing engineers throughout the country. Results of scientific experiments with kitchens by experts of the Good Housekeeping Institute and the Herald Tribune Institute constitute the authority for many of the statements contained in this paper.
Figure 1. An Efficient and Compact Arrangement of Units. Door Swings Make the Interiors of Cabinets, Refrigerator and Cupboards Available Without a Change of Position. The Location of the Sink and the Pull Out Counters Give Adequate Working Space. Light, Wall Plugs and Shelves Are Placed for the Maximum of Utility. A Ceiling Light Should Be Provided, Switched Automatically by Enclosing Doors. The Butts of These Doors Should Cause No Interference with the Operation of Unit Doors. Metal Grille Should Be Entirely Removable for Access to Sink Trap and Mechanical Unit.

A Poor Arrangement. Unit Doors Swing in Wrong Directions; Sink and Drain Installation Is Unsanitary and Difficult to Keep Clean, and Counter Space Is Inadequate. Units Are Cramped Behind Doors.

Good Arrangement in a Small Area. Integral Sink and Drainboards Are Easy to Keep Clean. An Oven Is Not Always a Necessity in Kitchen of This Size. Pull Out Counters, a Shelf and Wall Plugs Would Increase the Efficiency.

Courtesy C. E. Sellers Co.
able in either wood or metal. Counters should be of a material that resists stains, is durable, and is easily cleaned, such as non-corrosive metal, enameled iron, or a composition material impervious to moisture. Sinks should be integral with drains and splash backs. Plumbing fixtures and mechanical units should be easily accessible, but protected from possible damage. Floors should be coved to bases, and small waste spaces difficult to clean are to be avoided. Smooth plaster or tile surfaces are best for walls, as rough textures collect dirt easily. They should be washable. A vented hood over the stove protects ceilings from dirt.

5. **COLOR**

A treatment to aid light reflection is the best. Walls, ceilings and equipment should be in the same general tone. Contrast in the color of detail aids visual efficiency, but should be simple and direct. Cabinet bases and other parts receiving hard wear and susceptible to stains and mars should be in dark, neutral tones. Simplicity is desirable, but extremes lacking a quality of cheerfulness are to be avoided.

**TYPES**

The efficiency of the small kitchen is established by layout, size and arrangement of equipment. Types should be chosen in relation to class of tenants, location and rental of unit apartments, and should be carefully planned for the minimum of installation and maintenance cost consistent with these considerations. There are three general types.

1. **THE BUTLERY KITCHEN** is a recent development for enclosed installation in one-room or studio apartments. No stove is provided, and in large projects it is used as a serving pantry in connection with a complete kitchen. (See Fig. 1.)

   **A. Layout.** This varies with different projects. Planning considerations are easy availability, economy in relation to living space, and unit grouping for economy of mechanical installation. Doors should be provided for enclosure when not in use.

   **B. Space.** The minimum practical width is 5 feet; the average is about 5 feet, 6 inches. The minimum depth should be about 22 inches.

   **C. Equipment** should include refrigerator, 3 cubic feet in capacity — with mechanical unit
under sink; base cupboard for pots, pans, etc., with cutlery drawer; sink, 14 x 20, or 16 x 24, integral with drain board and splashboard. Pull-out counters are necessary for units of this size. China cabinets should be above the sink. Space should be left at both sides of cabinets to form shelves for storage of cleaning materials, etc. The sink should be set between the refrigerator and base cupboard, and the doors of these units should open in opposite directions from the center. Doors of cabinets should be similarly swung.

2. Efficiency Kitchenette. This is a larger development of the foregoing. It is also for installation in a one-room or two-room "light housekeeping" apartment. The assemblage of units constitutes a complete kitchen in a shallow enclosed area.

A. Layout and Space. The layout of this type would be similar to that of the butlery kitchen. The minimum space—by using a gas refrigerator—is 5 feet, the depth 25 inches in the clear. Although the addition of cabinet units, etc., may enlarge the space to any desired length, the recommended size is about 6 feet.

B. Equipment includes refrigerator of about 3½ or 4 cubic-foot capacity, with mechanical unit under sink; base cupboard for pans with two
The Plans Below Show the Value of Proper Equipment Arrangement. A Typical Operation Involving 281 Steps in the Kitchen at the Left, Was Done With But 45 After a Rearrangement of Units Illustrated on the Right.

drawers and bread box; sink, 16 x 24, or 18 x 24, with integral drain and splashboard; pull-out counters; stove and oven with vented hood; cupboards over the sink with a shelf next to the hood.

The arrangement of both types should place all equipment and supplies within easy reach of a person standing at the counter.

3. KITCHEN AND DINETTE. Two general types are included under this heading. (See Fig. 2.) The first is a kitchenette with additional china and storage cupboards in connection with a dining space, for use in one- or two-room apartments. The second provides adequate facilities for apartments that include a living room and two bedrooms.

A. Layout. The combination of kitchen and dinette normally constitutes a room opening from the living room. Complete enclosure is not necessary in the small apartment, but some separation from the living room is usually desirable. A corridor service door should be provided. Dumbwaiter shafts should be located for non-interference with efficient arrangement of equipment units. If the space is enclosed, a window should be installed.
B. Size and shape vary with different projects. Typical layouts and minimum sizes are indicated in Fig. 2.

C. Equipment for the first type has been indicated. Units for the second should include a complete kitchen cabinet; four-burner stove with oven and broiler; mechanical refrigerator, 4 cubic-foot capacity; a sink, about 18 x 24, integral with drain and splashboards; cupboard with vegetable bins; storage cupboards with drawers; and cabinets for glass, silver and china. The size and location of units will vary with differences in layout, but should be considered in relation to compactness, comfort, easy availability and good lighting.

In apartments larger than those implied by the considerations mentioned, the kitchen usually becomes a room separate from others and should be developed as a unit space in relation to the requirements of the apartment layout. As in other types, the conservation of space and effort are important for comfort and efficiency.
DRAFTING ROOM PRACTICE
IN APARTMENT WORK

BY
LAURENCE AND JOHN SCACCHETTI

The architect who has been commissioned to prepare plans for multi-family dwellings is immediately confronted with the problem of doing so in a minimum of time in order that the owner may be relieved of carrying charges which increase daily in considerable amounts. It is also to his interest to have the plans completed with a minimum of labor, as these projects are not usually full fee commissions, due to the fact that the owner, who is generally the builder as well, frequently maintains a skeleton architectural force of his own which is entrusted with carrying out those portions of the architect’s service which have been omitted to reduce the cost of plans.

The division of the planning of the project, while it may result in an economy to the owner, is generally a prime factor in increasing the cost of the plans to the architect. It is obvious then that the architect who is to realize a profit on such a commission must rely upon a definite system by which his employees may be guided, in order that no unnecessary work or duplication of work be performed.

With mass-production methods injected into every line of endeavor, it seems inevitable that this system should eventually creep into the drafting room. It is now applied to the extent that draftsmen are proud to admit that they are specialists—not for a particular type of building nor a specialized form of construction, but experts in the development of detailed data for a portion of a particular type of building.

There is probably no type of building where "expertizing" has been developed to a greater degree than the apartment house. While sound apartment house planning is comparatively new, the place of the apartment in the world is very definitely established as the ultimate living quarters for all types and manners of urban and suburban people.

As the majority of people in metropolitan districts favor this form of living, a type of apartment are either extravagant in the use of space or materials for a cheaper grade of construction, or too parsimonious in the use of these for higher grade work.

Another factor which has forced drastic action in drafting room methods is the intensive development of realty which has done so much to enhance land values. An owner is quite unwilling to allow his architect to experiment with an untrained force on a project where the daily carrying charges assume alarming proportions for even a moderate-sized project. A delay in the drafting room, even though of minor duration, may mean the difference between a paying venture and a failure. A holdup of this nature tends to inject a panicky feeling into all involved in the project. It leads to the issuance of incomplete or incorrect drawings which, in turn, leads to misunderstandings and errors in buildings and, of course, "extras" to be paid for by the owner.

STANDARDIZATION is the only remedy for inaccuracy and limited time. Oversystemization retards progress and clutters an office with files whose place should properly be taken up with men. The reduction of overhead depends a great deal on the drafting room efficiency.

THE "SET UP." In adopting methods of standardization, the system, to work properly, must start with the first line that is drawn. A sketch for a proposed building should not begin until all the requirements are known. Without drawing a line, it should be possible to pre-determine from tabulations on previous work, the approximate number of rooms available, from which is determined the best possible division of suites. Approximate cubes may also be worked up on this basis, which result may determine whether the scheme as outlined possesses the merits attributed to it by an anxious promoter or overzealous architect.

FIRST SKETCHES. Familiarity with all details concerning a site for an apartment building is an invaluable asset to the architect in making his first studies. If any savings on drafting room costs are to be made, the best time to conserve is at a project’s inception. Almost invariably, the first scheme is also the last in the office of the architect who is familiar with this type of work.

The individual entrusted with the development of a sketch for a new project may utilize tables to considerable advantage in the preliminary
work. While these, at best, are "rule of thumb," they have been found to be time savers. The tables here shown are examples of this. Though the plots used as a basis for comparison have been selected at random from a group of buildings recently erected, it should be noted that while the sizes and areas of the plots vary to a considerable degree, the net and gross average areas allowed to each room remain quite consistent, with just slight variation.

A sketch is more than an indication of the lot's possibilities. It should be considered as a preliminary working drawing. All legal requirements for exits, light and ventilation, construction, and the thousand and one details which are apparent when the project materializes should be taken into account before issuance. Usually these sketches should be accurately drawn at the scale 1/16 inch = 1 foot.

"RUBBER SKETCHES" are those optimistic rough layouts so called in the drafting room, due to the fluctuating and diminishing of room sizes and clearances, which should be avoided. In addition to making a bad impression on owners, whose spirits are bolstered with promises of large rooms only to have these hopes shattered when the sketches are converted to working drawings, they work incalculable harm in the drafting room. Much time is wasted in attempting to regain space on a plan which never existed, but was indicated on the "rubber sketch." If thicker walls are required for fireproofing or structural reasons, they should be considered at the time the sketch is drawn. Honesty is the best policy, particularly when the outcome will prove more disastrous to the offender than to the victim.

STARTING WORKING DRAWINGS. When the project materializes, it is essential that it be put through the drafting room in the least possible time. In speculative work the architect is rarely commissioned to proceed until all financial details are complete. This means that carrying costs are charged by the owners against the project from the day the architect is commissioned to prepare plans, and hence the necessity for speed and accuracy. It is at this point that the architect reaps the benefit of having a complete and accurate sketch, which may be taken and dimensioned for courts, yards, rooms, stairs, and in fact everything that is necessary to lay it out quickly and accurately. It is obvious that a small-scale study is better for "revamping" than the more cumbersome quarter-scale.

When dimensioned, the sketch is then laid out on tracing paper, and the structural engineers are consulted for column layouts which are worked out together with the architect. In the meantime small-scale studies of fenestration are being worked out from the figured sketch, and changes

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A Development of Preliminary Plans

A. Plot layout, accurate as to dimensions and angles. Locate mandatory unoccupied areas; thus establishing envelope. B. Approximate number of rooms determined by cross-section of average-room sizes for class of apartment. Determine location and approximate area of stairs and services. C. Divide area into approximate actual rooms, considering orientation, circulation, etc. D. Develop plan and balance units.

in walls and partitions are made before the engineers have advanced too far with any definite framing. Mechanical and sanitary engineers are also provided with the preliminary data in order to be made acquainted with the project. The architect will also avail himself of the engineering advice maintained by all elevator companies to obtain a layout for architectural and structural purposes. In this manner loads and impacts on beams and columns are definitely determined at the proper time, requiring no revision of structure at a later date.

CONCURRENT PLAN DEVELOPMENT. The alert captain will obtain prints of the preliminary typical or governing floor layout when sufficient dimensioning has been done, and distribute these drawings to other men for the purpose of laying out upper or lower floors, or other arrangements varying from the general layout. First or ground floor plans are studied for entrance requirements; cellars are sketched out to develop a scheme of circulation for service and equipment; upper floors are studied with an eye toward conserving space where setbacks or other legal limitations restrict the layout.

SECTIONS. Preliminary sections through the building are started as soon as the typical floor arrangement is settled. Only in this manner may the always serious problems of stair headroom, curb lines and grades be settled. Beam depths are assumed prior to the receipt of framing plans. For each type of house, experience only can show which depth beam is most economical to use for uniform, symmetrical and inexpensive framing.

SCHEDULE OF DRAWINGS. One may gather from the foregoing that the development of apartment houses is nothing more than a series of guesses, each subsequent guess being a little more accurate than its predecessor. It is only by assumption that a definite result is obtained. Moreover, the assumption is not confined merely to drawing; it is also used extensively in scheduling the project for the proper coordination of all work common to commercial architecture. The director in charge of a project will usually schedule it for its various stages in order that he shall at all times be familiar with and be in position to determine the status of a project by merely glancing at his data sheet. This may be arranged in the form of a graph, a chart, or by memorandum. A system which is quite simple is illustrated herein. Fig. 1 shows a chart for an apartment building from its first stages to the period of filing in the municipal bureaus. This type of schedule permits laying out work for a period extending from a few weeks to several months. The diagram is a simple affair, which may be drawn out and run off on a mimeograph at a very small cost.

The squad leader at the job's inception, will estimate from experience the time required for developing each drawing and may, if he so desires, write in the names of the men working on each sheet. If properly worked out, one will not find a discrepancy or variation exceeding 5 per cent in the length of time required to carry a project through to the various stages of completion. Moreover, a constant check is maintained over work not being directly handled in the office. The assumed time is of course shown on the chart in a black, unbroken line. Changes in the schedule may be made with crayons, such as red for work behind schedule and blue for drawings in advance of the time slated for their issuance.

LEGAL REQUIREMENTS. In preparing drawings for examination in the bureaus, it is imperative that all legal phases be amply covered. Avoidance of the issue or incomplete data will never
escape the eye of the trained examiner. Vague information or ambiguous notes will serve only to aggravate the official and make him more cautious, causing delay on an approval. A thorough knowledge of all legal requirements combined with experience to show a minimum of confusing information, will go a long way toward securing a speedy approval. The departments are not concerned with decorative features, nor whether the flooring is to be of a stock or a special pattern. Only those doors which affect egress or privacy need be shown on filing plans; no mention need be made of wall or ceiling treatments; closet dimensions are superfluous. Briefly, only the work involving structure, light and ventilation, fire precautions and sanitation need be indicated. Information other than this means wasted effort for the examining authorities.

The legal requirements may, for our purpose, be separated into four main subdivisions as follows:

1. **Height and Bulk** of the building, which are regulated by any existing zoning ordinances and which deal with the percentage of the lot which may be occupied by the building and the height at the street front, the minimum area which required yards and courts may contain for given heights, as well as any permissible setbacks, dormers or pent houses. This does not, however, include any private restrictions which may exist in certain localities.

2. **Light and Ventilation**, which in addition to any yards or courts required under the previous heading, include additional open spaces from which rooms are to receive legal light; the minimum permitted sizes of living rooms, kitchens, bathrooms and water-closets, etc.; the minimum sizes and areas of windows serving these spaces; the sizes of alcoves or alcove rooms when and if permitted, and the openings between them and legally lighted rooms; the method of ventilation for bathrooms, water-closet compartments and other spaces not in direct contact with the outer air; and the required number of air changes if mechanical ventilation is to be used. Under this heading may also be included the division of certain rooms by the use of low or dwarf partitions or such fixed equipment as may by law be permitted, such as china closets or dressers between kitchens and dining alcoves.

3. **Fire Protection**, which concerns the minimum number of exits from apartments, the minimum number of stairs, fire escapes, fire towers, horizontal exits, stair halls, elevators, elevator shafts, elevator vestibule, public halls, corridors, the minimum permitted size for each, their location; the method of separating them from the living portions of the building and from each other. Also any required standpipe and sprinkler lines, their tanks, hose, hose racks, pumps and any lot line windows and doors or those windows and doors which may be on yards or courts of less than certain specified dimensions.

4. **Sanitation**, which deals with the minimum number of water-closet and bathroom accommodations required, plumbing fixtures, soil, waste and vent lines, water supply lines, heating apparatus, etc.; also the permitted uses for certain portions of residence buildings for other than residence purposes, as well as the privacy of rooms and bathrooms from other rooms.

All of the foregoing requirements are to be met in both the fireproof and the semi-fireproof types of buildings, although they vary for each type of building to a considerable extent.

This, then, completes the plans for examination. An office that is properly equipped to handle this type of work may generally proceed with reasonable speed in the development of drawings to the next stage, even though the plans are in the hands of the municipal authorities. Having a good working knowledge of the laws, the examination is regarded more or less in the nature of a check. No intentional violation of law having been committed, it is fairly safe to proceed with the completion of drawings for estimating.

**DRAWINGS FOR ESTIMATING.** It is at this point that accuracy in the previous stages of the work is of material benefit. The tracing paper drawings which were used for filing are as a rule somewhat abused, due to re-study, changes and corrections, due to structural or mechanical conditions, and are likely to be somewhat out of scale. Estimating plans must be accurately drawn in order to bring out all those conditions which ordinarily constitute extras if not properly shown. As these drawings form the basis of the contract, they must be complete and accurate for their purpose.

If it is the intention to issue the drawings at stated intervals for estimating by various trades, one system is employed. On the other hand, if the project is slated to be sent out for general contract bids, another method must be followed.

**SUBCONTRACT METHOD.** If the former is the method decided upon, the project is scheduled as hereinbefore stated, substituting the chronological order of trades as they would be employed on the work; for example, the data required for foundations, masonry, steel, concrete and concrete floors, together with sufficient other incidental information in connection with these trades to avoid extras, are shown and the drawings issued. Other trades follow in their proper sequence until the final drawings are ready for the complete structure.

**GENERAL CONTRACT DRAWINGS.** In the case of a general contract, the drawings are
Fig. 1. Drawing Schedule Showing Dates of Work on Drawings. Two Weeks Are Here Allotted to the Set for Filing with the Building Department, and Three Weeks More for Completion of the Contract Drawings

withheld until all trades are properly covered with sufficient data to present a complete picture by implication, if not actually shown. Specification and schedules of finishes are rough-drafted and gone over by the squad leader and the specification man. Here again a great deal of time may be saved by having a complete specification file. Where sufficient data are available from other buildings of like characteristics, a specification may be taken bodily, and by employing a system of insertions and corrections or cutting out and pasting in revised paragraphs, a specification can be developed very quickly for checking with the owner's requirements.

**CHANGES.** As changes usually involve considerable expense in the drafting room, a constant check must be maintained over all drawings. Where structural or mechanical information is not forthcoming at the proper time, revisions of the drawings to incorporate the delayed data are bound to occur. This delays the work, tends to demoralize the draftsmen, who quickly lose interest, and increases the chance for errors. Sufficient larger scale details should be worked out and the information transmitted to the consultants. Span-drels, cornices, and exterior details must be drawn for the structural men; special methods for running piping, or minimum clearances for the passage of duct work must be passed on to the mechanical engineers. Unless this is done they must either assume a solution or delay the work until properly informed, both inefficient practices.

Coordination of all the elements involved in the proper conduct of an operation is the secret of successful handling of commercial work. Consider what one day's delay on the part of the consultants, due to lack of information, may mean to an architect who has a group of men delegated to a project. He may force the work to go on regardless of the consequences, resulting in perhaps two or three days of changing to suit the final condition, with the chance of errors of omission or commission creeping in.

**DETAILS OF ESTIMATING DRAWINGS.** Estimating plans are considered as such only when all the points governing the trades involved are covered. Checking lists should be employed and all discrepancies noted on a sheet, and as each correction is made, crossed off the list. By this method the chances of a slip-up are quite remote. For estimating purposes the drawings need not be completely dimensioned; equipment need be merely indicated, and even the correct location or swing of doors, definite position of lighting, radiation or plumbing if not far off from its final location need not be shown. Furred spaces, and indication of materials and finishes and structural requirements are of course imperative for a complete estimating plan. Small-scale studies of interior arrangements are of great benefit and generally expedite the figuring of an estimate and minimize the number of questions to be answered.
regarding them. These are useful to the architect who, as a rule, shelves the project during its early stages of construction and remembers it only when the call comes for details, at which time a small-scale idea will go a long way toward refreshing his memory.

CHECKING. When the plans have been issued for estimating purposes the man in charge will coordinate all branches of work and settle on a definite policy of completion. The plans are checked for general dimensions in order that the framing may also be checked for position. Spandrel beams are checked for masonry, window or door clearances; interior framing is placed with regard to shaft and hatch clearances, with proper fireproofing allowance. Other framing is studied for symmetry and spacing. When this has been located on the typical floors, a re-check is made to establish beam levels and clearances to allow for horizontal pipe or duct runs. Notations of changes are made as desired on either structural or mechanical plans. Familiarity with a project will permit a checker to bear in mind the intent of the architectural plans and be guided accordingly in his corrections. It is unnecessary to fully complete the checking for an entire project at one time. While other sheets are in progress of checking, those bearing notations may be returned to the engineers for correction. In this manner all those interested may be furnished with sufficient information to keep the project moving. Additional corrections are bound to occur, but these can quickly be picked up and the changes made without delay. This procedure is followed until all scale drawings are complete. The plans then receive a final check against the specifications, and the necessary corrections to the former and addenda to the latter are made. The construction plans are now complete.

DETAILING. No work can be carried along very far without details. Even though a portion of the work would not be affected for a considerable length of time, it is advisable to detail it while the draftsmen still have the “feel” of the work. Those details peculiar to each project are likely to become hazy if this important work is shelved until actually needed for construction. Furthermore, large-scale drawings bring to light numerous defects in plan or design which may easily be remedied by a revision issued before that portion of the work is reached. If some details are worked out in conjunction with shop drawings of work previously detailed, the entire project may be correlated and the amount of drawing considerably reduced.

SHOP DRAWINGS should be checked immediately when received. They may often bring to light defects in drawings previously issued, requiring revisions to the work of other trades. A tickler system of cards may be employed to show when shop drawings governing certain trades should be in the architect’s office. This system of expediting work of subcontractors is as useful to the architect as it is to the owner or builder. An office that does considerable work may delegate a clerk to investigate the tickler file and bring these cards to the attention of those interested. Otherwise the squad leader may handle this item in conjunction with the rest of his schedules.

No project is complete in the drafting room until the last nail is driven in the building. It has never been possible to carry a project through to completion without some correspondence or telephone calls. The type of drawings and the administration of the work will be made apparent when requests for information or interpretation come through. If these are reduced to a minimum, the project’s costs and attendant overhead will show up favorably.

SUPERVISION. The supervision should be entrusted to one who has had sufficient experience to realize the necessity for adherence to the drawings, and with a mind broad enough to render decisions where variations are made necessary by conditions, always keeping in mind the legal requirements governing, and not permitting the installation of any work that will reduce clearances or constitute a hazard or a legal violation.

While the foregoing suggestions may be applicable to most offices in whole or in part, it must be remembered that the type of work as well as the temperaments of the individuals involved preclude the possibility of making a definite recommendation for the management of all work. Each office must have its own system built around it to fit its structure. Constant changing of system does more harm than good. Efficiency in drafting room methods can be obtained only where the employees are well trained for their particular work, whether it be planning, designing or detailing.
MECHANICAL AND ELECTRICAL EQUIPMENT

BY

HENRY J. NELSON, M.E.

OF THE OFFICE OF SCHWARTZ & GROSS, ARCHITECTS

A GREAT deal has already been written regarding the mechanical equipment and features of the office building. This article will attempt to show how the design of the mechanical and electrical installations of an apartment house and apartment hotel of ordinary size differ from the tall buildings. It might be well to keep in mind the fact that office buildings are built for a large number of persons per unit of area, whereas apartment houses and apartment hotels are built as living places for a small number of people per unit of area. Also in the latter each tenant has his individual tastes and idiosyncrasies.

The cost of the structure, the rent schedule, location of the property, type of management and other factors, all tell the engineer what type of installation to design and what the expense of the mechanical equipment can be. Of course, there is an absolute minimum below which the engineer will not attempt to equip a building, but as a general rule, he must work within a budget. His design will not necessarily be the most economical at all times, for the engineer must sacrifice economy in design to suit architectural treatment as will be illustrated later. In spite of that, all systems must be flexible and simple to operate, inasmuch as the superintendent of the building must be able to control and make minor repairs of all systems himself.

Competition in renting has forced the owners and builders to design their buildings to give more to the prospective tenant for the same rent than the next owner. The rooms given most attention in this matter should be the bathroom and kitchen, where, for a small increase in building costs, the owner achieves a noticeable effect.

BATHROOM

In the apartment hotel one finds bathrooms of moderate size with medium priced plumbing fixtures of sturdy construction and good wearing qualities, for this type of tenant will give hard usage. Here, everything is very simple, like the hotel bathroom, with the necessary bathtub with shower over, lavatory and water-closet. Colored fixtures are not usually installed as these apartments may be used by a great many people for short periods and the expense is unwarranted.

Since the passing of the Multiple Dwellings Law, in New York, it is possible to have secondary interior bathrooms in apartment houses, and the engineer is now required to provide adequate ventilation for these rooms. This is accomplished by connecting each bathroom to a large fan by duct work, the fan located at the roof level. Great care must be taken that the system will operate without noise. To this end, the engineer must design a balanced system with low velocities. Grilles are placed in each bathroom connection with louvers for control.

In the better class apartment house, we find color being used extensively, usually only upon request of the tenant, as otherwise renting troubles will start, because the color selected for a given apartment may not be to the tenant’s liking. Bathrooms should be designed so that they are as noiseless as possible. The engineer may help in this respect by arranging his fixtures in such a manner that local noises are confined, and by reducing the velocity of the water.

PLUMBING

In the best apartment houses the materials which go into a plumbing system proper are of the best qualities. The best pipe is generally used throughout for both hot and cold water systems, galvanized wrought iron is used for vent lines; all soil, waste, drainage, sewers and leaders 3 inches and over are constructed of extra heavy cast iron pipe with bell and spigot joints and similar fittings; all such piping smaller than 3 inches is usually galvanized steel pipe with galvanized recessed drainage fittings. All vent piping is standard galvanized steel pipe with galvanized recessed drainage fittings. All vent piping is standard galvanized steel pipe with galvanized cast iron fittings, except where extra heavy cast iron pipe is permitted.

KITCHENS

The kitchen is sometimes ventilated by an electric kitchen fan mounted either in the window or in the wall. This fan not only eliminates all cooking odors but relieves stuffiness.

The electric requirements for a kitchen are varied. Provision must be made for refrigeration, cooking, dishwashers, toasters, heaters, beaters, and electrical appliances of all sorts. This is essential in the larger apartments where a great deal of entertaining is done. Such equipment frequently requires heavier wiring as well as more convenience outlets.

KITCHENETTES

As a general rule, kitchenettes are ventilated through a duct system similar to that for interior bathrooms, with a fan located at the roof of the building, and this system eliminates all cooking
odors, so that the one-room apartment may appear as a living room of a large apartment. Lighting, in the kitchenette, is provided generally by a drop light, and adequate provision must be made for cooking, either by power electric outlets or by gas.

HEATING

The greatest heating problem arises in studio apartments, especially if the studios are one and a half stories high. Here one side of the room is glass in its entirety, requiring a great deal of heat with no place to put the radiation. In such cases the convection type of radiator is often the solution.

Usually the walls are recessed to receive these radiators and the radiators finish flush with the wall. Where there is a set-back roof and doors as well as windows open onto it, radiators are placed under the step leading to the set-back roof or set in an unimportant room adjacent with grilles to allow hot air to enter.

LAUNDRY

Nearly all apartment houses and apartment hotels have provisions for laundering located in the cellar. A combination sink and wash tray in the kitchen is used by the tenant mostly in cases of emergency, and the main laundering is done in the cellar, where porcelain wash tubs are arranged in batteries, with gas burners for boiling between each pair of tubs, and wringers and other modern equipment are provided. A separate room should be provided as a drying room and another as an ironing room.

In the drying room metal drying racks should be installed, usually one for every three or four apartments, arranged in file. The clothes are dried either by gas burners or steam coils located under the racks. A lock is provided on each rack so that clothes may be safely left.

In the ironing room, ironing boards of the same number as drying racks should be installed. The boards must be of very sturdy construction completely covered and ready to use. Boards are arranged, systematically so that ample space is provided for all paraphernalia. A typical laundry layout for a large apartment house is shown.

Electric layout for the laundry is simple, washroom and drying room requiring but ceiling outlets for general illumination. The ironing room has a convenience outlet at each board for the electric iron and a drop light fixture over each board, or general lighting.

The ventilation of the laundry is a serious problem and it is advisable to get as many windows in this space as possible. An exhaust system of ventilation should be installed to rid the laundry of excessive heat and laundry odors. In the better type apartment house this exhaust system is frequently installed in conjunction with the ventilating system for the first floor, service rooms and servants’ quarters. In the cheaper type apartment house free air exhaust fans are installed in the laundry windows and air circulated from other parts of the cellar. In such cases where even this expense is not warranted, a 6-inch galvanized vent is provided from the dryers to the outside air and an 18-inch copper vent from the wash and ironing rooms.

The electric system for multi-family homes usually requires a transformer vault to change the high tension alternating current to low.

![The Layout of a Complete Laundry Room of a Large Apartment House. Schwartz & Gross, Architects](image-url)
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Kewanee, Ill.
He Took Up the Draftsman's Pencil to Battle Constipation

The daily output of a lathe operator drops. A child grows listless and inattentive as the school day drags into afternoon. An office worker slumps idly at his desk, neglecting the work before him.

The boundless energy that drove a business genius to the top rung of the ladder, slips silently away, leaving only a dull clod of a mind and body.

Yet doctors tell us that constipation is really nothing but a habit—or rather the lack of one. It is a chronic disorder, of millions, induced by irregular evacuation during youth.

The Clow Soldier of Sanitation took up the draftsman's pencil to fight this enemy of modern man and industry.

His first attack was for the coming generation.

His first attack was for the coming generation.

His first attack was for the coming generation.
It resulted in a closet bowl, efficiently designed to make evacuation easier and more certain for school children.

For many years careless designers had been inflicting high bowls upon children in school toilet rooms.

The seat of the Clow Bowl was lowered, 2 inches closer to the floor. The position of the child is natural, with knees high and stomach muscles relaxed. Thus by making evacuation easier, regularity is made more of a habit.

Following this first bowl have come others on the same idea to help grown-ups in all walks of life.

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The Clow Soldier of Sanitation is a specialist on the sanitary problems of sanitation that confront every builder of a school, hospital, industrial plant or other public building. At his finger tips is the accrued experience of Clow's 55 years of experience—just the complete line of figures to meet every mass plumbing need. Call him in. This is Frank O. Tinthoff, Peoria, Ill.—Southern Illinois Territory.

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Architects Adopt This Positive Method of Insuring Great Facades

The Cowing Joint is installed in the columns and weight carrying mullions at a mortar course. Its purpose is to relieve pressure thrown on the facing material by compression of steel, temperature changes, vibration and wind stresses. Experience has proved that these severe stresses, unless relieved, will crush and break the stone, terra cotta or marble.

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See "SWEETS" Catalogue

COWING Pressure Relieving JOINT
Patented September 1, 1925

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Many things have changed since Mr. Jones' youth. Even Doorways are not what they used to be—for Standing Trim is now no longer necessary. A comparatively new method eliminates the need—a method new in principle, but proven on countless important installations.

The Kalman Steel Buck (with or without integral Jamb) permits the clean, simple lines of marble slab construction without thickening the plaster for returns. A perfect bond is provided with the other elements of the wall structure, resulting in unity of action, and eliminating plaster cracks. A definite ground and termination for plaster is obtained.

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these things are important to you

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Above is a detail showing a corner of the sills of the second floor, a third stud behind the two rivets, forms a strong 4 x 4 corner post. Note the rigidity of this construction, secured with the simple tools illustrated.

Aijaiii on the srnldfliwr. Wili.wdion.s are annvmlilvil lir.il oikI Ihrii rai.iril itilo pimlinti. The rabies .tlinini in the framing of the fir.sl floor are irintl bradtiij, an added a.s.iiirnitre of per­fect riijiilii.

Above it a detail nhoieinij a corner of the .tills of the second floor, a third .ttiiil behind the tiro risible, fnrnis ii strong x 4 corner post. Note the riijiilii of this i-on.tfruction, secured ifith the .tintpie tools illustrated.

"*y  A stronger frame easier to erect . . . .

LOOK at the illustrations on this page. Notice the simplicity with which the joints of this copper-bearing steel framing are made secure. Look at the simple tools with which the framing can be erected quickly, easily. Remember that MacMar Steel Framing is fabricated to fit the plans exactly, and then think how erection is simplified by the elimination of cutting and trimming of framing materials on the job. These are some of the advantages of MacMar Steel Framing.

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SAVES STEEL with STEEL!

17-Point Holorib Roof Deck

1 A copper-bearing steel roof deck, combined with sufficient insulation to prevent condensation.
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Fenestra Holorib Steel Roof Deck—plus insulation—plus waterproofing—weighs LESS than 5 pounds per square foot.

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Fenestra Holorib is now a part of the Detroit Steel Products Company; sold through country-wide Fenestra Holorib representatives and backed by the oldest and largest steel window manufacturer in America. Immediate shipments are available. Engineering and designing service for the asking without obligation. Telephone the nearest Holorib or Fenestra representative or write for literature to:

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Specially built models for small kitchens. The CONOVER requires no more floor space than same sized kitchen sink without the dishwasher feature. Large movable drainboard gives greater efficiency than average sink drainboard. Takes trap at ordinary height and is interchangeable with regular kitchen sink. Does away with unsightly pipes and allows plenty of room for under-sink radiators that are so essential in the modern small kitchen.

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In Chicago, the 1530 North State Parkway Apartments are being wired throughout with Hazard insulated wires and cables. The demonstrated economy of using materials of known reliability convinced the builders that Hazard Wire really is the cheapest in the end.

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They studied the situation carefully with "ES" Engineers and installed an "ES" Automatic Dispatching System. Their fourteen cars operate at regular intervals giving fast, efficient service.

This service is greatly facilitated by "ES" Electric Door Operators, because of their ease of control, safety and smooth action.

Improved elevator service in old buildings is almost invariably possible. A scheduling system and automatically operated doors may be your solution. But whatever it is, "ES" can help you find it. There is no obligation incurred by calling on "ES" for a survey of your conditions. Our nearest branch office is at your service.

"ES" Equipment in the Daily News Building, New York City, includes:

- Electric Elevator Door Operators
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The MINWAX method of Finishing Floors and Trim

By this method, proved in over 25 years of use, lustrous finishes, equal to the old hand rubbed finishes, are quickly and easily secured.

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Description: Flat finish is a complete preservative finish in natural and stain colors. It is the basic material in the MINWAX Method of wood finishing. Flat finish is a combination of certain refined oils and mineral waxes. Applied as a saturating coat on the natural wood, it penetrates rapidly, filling the wood fibers with its tough, mineral gum and produces a surface with a soft, velvety sheen and texture. It is produced in clear, or natural, and in a series of attractive stain colors. Developed from MINWAX Clear Waterproofing, it is highly preservative and suitable for inside or outside work and differs from all other methods of wood finishing by placing the finish inside the wood instead of on the surface. This not only avoids slipperness on floors, but brings out all the natural texture and quality of the wood, instead of covering it up. The material is simple and easy to apply and economical to use.

Uses: A preservative, protective treatment for maple floors and a complete architectural finish for floors and trim. In schools, stores, industrial plants, etc., it seals, stainproofs and preserves the beauty waxed floors and the complete finish inside the wood instead of on the surface. This not only avoids slipperness on floors, but brings out all the natural texture and quality of the wood, instead of covering it up. The material is simple and easy to apply and economical to use.

Specifications: Wood shall be clean, dry and well sanded, free from all size, oil, shellac, varnish or other finish. Apply two coats of Flat Finish, color as selected, with a brush, wiping each coat to remove surplus in not less than 2, or more than 6 hours. Do not apply when material is chilled and thick. In cold weather Flat Finish must be warmed until limpid before applying. Residential floors should be polished with a weighted brush or electric polisher after second coat has cured for 4 or 5 days and carefully protected with paper or sawdust. Fillers are not necessary with Flat Finish. If desired apply after first coat cured handling in usual way, or add (5 or 6 lbs. per gal.) to first coat wiping as soon as it begins to "flat out."

Where high polish is desired use MINWAX Finishing Wax (Paste) (see below), but allow second coat of Flat Finish to cure and harden at least ten days before waxing.

Covering Capacity: Hard woods 600 to 800 sq. ft., soft woods 500 to 700 sq. ft. per gallon per coat.

Colors: No. 9 Natural, No. 11 Light Oak, No. 12 Dark Oak, No. 13 Walnut, No. 716 Dark Walnut, No. 750 Jacobean, No. 15 Green, No. 16 Mahogany.

Note:—Stain colors are not recommended for maple floors—use No. 9 Natural.

Cost Installed: On maple floors, from 2 to 3 cts. per sq. ft. on residential floors 3 to 5 cts. per sq. ft. both exclusive of sanding. On trim cost depends on condition, but a saving is generally possible through the use of Flat Finish.

**QUICK-DRYING FLAT FINISH**

Description: Developed to meet the need for a quick drying material having the fundamental advantages of the MINWAX Method of Wood Finishing. Developed from Flat Finish, it differs in only one way; it carries the preservative binding gums deeply into the wood, is made in the same stain colors, but it does not carry wax. Waxing must be done separately, using Paste Wax.

Uses: For all wood and concrete surfaces, especially for obtaining a high polish over Flat Finish and Colored Concrete Floor Finish.

Specifications: Apply in thin, even coats with a cloth and allow to dry at least 30 minutes. Polish with cloth, weighted brush or electric polisher.

Cost Installed: On floor surfaces, wood or concrete, wax and polishing usually add about 1 per cent per sq. ft.
MAKE STORE-TOURING EASY

UPPER Floors of Department Stores can today be given their full value by the proper number, grouping and design of Elevators, Escalators and Gravity Package Conveyors.

Adequate store transportation is a scientific problem which we can help you solve.

OTIS ELEVATOR COMPANY
OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD
Your building ten years from now...

Ten years from now the outside will look the same, you say—but how about the inside? How about the rents, and the cleaning service costs?

These are questions which the Spencer Central Cleaning System answers in a profitable way.

Even before the building is opened this System begins a lifetime of efficient cleaning work. It removes all dirt and dust the day it arrives. It cuts the costs of cleaning and keeps all parts of the building clean and serviceable every day.

Bare floors and concrete, linoleum and rugs—any surface is quickly cleaned with quick strokes of the light and efficient vacuum tools.

If you do not have our special series of Bulletins for Architects we will be glad to send you a set for your files.

THE SPENCER TURBINE COMPANY
Hartford, Connecticut

SPENCER CENTRAL CLEANING SYSTEM
The New HAVEMEYER Steel Joist

HERRON HILL HIGH SCHOOL, Pittsburgh, Pa.
James Steen & Sons, Architects.


SACRED HEART PARISH SCHOOL, West Reading, Pa., Jacoby & Everett, Allentown, Pa., Architects, Wyominging Development Co., Wyominging, Pa., Contractor.


The new HAVEMEYER Steel Joist is made with a specially rolled "Twin-tee" steel section for top and bottom chords. The chords provide a flat bearing surface which adds materially to the lateral stiffness of the joist and simplifies the placing of lath for the finished floor or ceiling. Altogether the HAVEMEYER Steel Joist is a rigid electrically welded unit capable of the utmost strength proportionate to its weight.

for all types of light-occupancy buildings

Combining fire safety with minimum weight and simplified installation, the New HAVEMEYER Steel Joist meets a need long-recognized in the construction of fireproof floors and roofs for all types of light-occupancy buildings... For Schools, Hospitals, Sanitariums, Churches, Apartment houses, Hotels, Residences, etc., the HAVEMEYER Steel Joist is ideal. Its use is recommended wherever the utmost in economy, fire-safety and speed of erection are imperative.

Write for new booklet "Havemeyer Steel Joist."

Concrete Steel Co.

2 PARK AVENUE - - NEW YORK CITY
Shamrock V
...greatest of an illustrious line of racing sailcraft

WHEN the SHAMROCK V slid gracefully down the ways, in Southampton, England, one of the greatest racing sailcraft of all time was born to the world...a contender worthy of the name.

In these costly craft materials of construction are all-important, along with balanced design. Seventeen hundred pounds of blue annealed Armco INGOT IRON was used in the centreboard casing to oppose the menace of salt corrosion in this vital part of the SHAMROCK’S hull.

THE AMERICAN ROLLING MILL COMPANY
Executive Offices, Middletown, Ohio
Export: The ARMCO International Corporation

"BE SURE IT’S MADE OF ARMCO INGOT IRON"
O RENDER quiet, unobtrusive and always pleasing service to its thousands of daily guests is a task in The Stevens Hotel that demands the most modern equipment to support the large staff of employees. In the prompt execution of routine and special service the G&G Atlas Pneumatic Dispatch System plays an important role.

Guests are registering and checking out in a continual procession. Meals are served and charged. Telephone calls, valet service and laundry charges must be transferred to guest accounts immediately. Hotel executives, department chiefs and floor clerks must be linked together for the exchange of written messages, orders and other forms.

Banks, hotels, hospitals, newspapers, libraries, mail-order houses, retailers, wholesalers, factories and large offices of all kinds use G&G Atlas Pneumatic Dispatch Tubes for speedily (30 feet per second) distributing mail, telegrams, inter-office papers and lightweight articles among scattered departments. "Mechanical Messengers are faster and more dependable than human messengers."

Catalog in Sweet's Arch't. Cat., 1930 Ed. pp. 41113-15
Catalog in Specification Data, 1930 Ed. pp. 232-233

G&G ATLAS SYSTEMS, Inc.
544 West Broadway
New York
407 Dominion Bank Bldg., Toronto
Critical Builders choose G-E WIRING SYSTEM

501 Madison Ave. Building
New York, N. Y.

General Builder
Gresham Construction Co.

Architects
Robert D. Kohn
Frank E. Vitolo

Electrical Engineer
Eadie, Freund & Campbell

Electrical Contractor
Fischback & Moore, Inc.

All of New York City

It's new, modern as today's newspaper... but 501 Madison Avenue Building is no lavish product of a construction boom. Critical, hard-headed discrimination went into the selection of design, materials, equipment. And General Electric Wiring System was chosen!

It is chosen every day by architects, builders, contractors everywhere because it helps attract and hold good tenants by providing complete electric service... because its high-grade materials assure owners that wiring will be free from trouble and expense; that it will add definite property value.

The General Electric Wiring System is soundly economical for any type of building—tiny cottage or giant tower of commerce.

GENERAL ELECTRIC WIRING SYSTEM

MERCHANDISE DEPARTMENT • GENERAL ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT
Built for kitchen duty

... this lifetime sink

of MONEL METAL

The custom-made Monel Metal sink illustrated is a splendid example of the advantages of this silvery Nickel alloy in kitchen sink construction. With its washing and rinsing bowls, its corrugated drain-boards, all of satin finish, heavy gauge Monel Metal, it represents the utmost in sink attractiveness, convenience and durability.

Heavy gauge Monel Metal is customarily specified for kitchen sinks because it combines modern beauty and ready cleanability with rugged wear-resistance. Strong as steel, with no coating to chip or wear off, it resists the denting and abrasion encountered in hard kitchen service. It can never rust—and it defies the corrosive attacks of food juices and cleaning compounds. A Monel Metal sink can be kept spick and span with minimum cleaning effort.

Because its crisp, silvery beauty is so perfectly in keeping with modern trends in kitchen design and appointment, leading architects are now specifying heavy gauge, satin finish Monel Metal kitchen sinks for many of the finest residences they plan. Let us send you complete information on household uses for Monel Metal.

Write for New Booklet, “Planning the Modern Kitchen”.

Monel Metal
Selected List of Manufacturers' Publications
FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the
building industry. They may be had without charge unless otherwise noted, by applying on your business stationery to The
Architectural Forum, 521 Fifth Ave, New York, or the manufacturer direct, in which case kindly mention this publication.

ACOUSTICS
R. Guastavino Co., 40 Court Street, Boston.
Guastavino plaster. Brochure, 6 pp., 8½ x 11 ins. Guastavino as Related to Architectural Acoustics. Booklet 10 pp., 8½
x 11 ins. Illustrated.
Johns-Manville Corporation, New York.
Sound Absorbing Treatment in Banks and Offices. Booklet, 18 pp., 8½ x 11 ins. Illustrated.

ASH HOISTS
Gilles & Geoghegan, Inc., 544 West Broadway, New York.
G & G Telescopic Hoist catalog, 8½ x 11 A. I. A. Standard Classification 301l, contains complete descriptions, method of select-
ing correct model to fit the building's needs, scaled drawings showing space requirements and specifications.
ASH HOISTS—TELESCOPIC
Gilles & Geoghegan, Inc., 544 West Broadway, New York.
G & G Telescopic Hoist catalog, 8½ x 11 A. I. A. Standard Classification 301l, contains complete descriptions, method of select-
ing correct model to fit the building’s needs, scaled drawings showing space requirements and specifications.

BRICK
General Catalog 36 pp., 8½ x 11 ins. Illustrated.
Baldwin Bros. Folder, 8 pp., 3 x 8 ins. Illustrated.

CABINET WORK
Henry Klein & Co., 21 Grand Street, Elmhurst, L. I., N. Y.
Designing Period Mouldings in Ornamented Wood. Brochure, 28 pp., 8½ x 11 ins. Illustrated.
Elgin Office for the Banker and Broker. Folder, 4 pp., 8½ x 11 ins. Illustrated.
Luxurious Office Partitions in Mahogany and Quartered Oak. Folder, 4 pp., 8½ x 11 ins. Illustrated.

CARPET
"Seemingly Seamless Carpets." Booklet, 8 pp., 8½ x 11 ins. Illustrated.

CEMENT
Ceramic Company, The, Mankato, Minn.
A Remarkable Combination of Quality and Economy. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Important data on valuable
material.
Louisville Cement Co., 315 Guthrie St., Louisville, Ky.
BRICKMEN for Perfect Mortar. Self-filing handbook, 8½ x 11 ins. 16 pp. Illustrated. Contains complete technical descrip-
tion of Brickmend for brick, tile and stone masonry, specifications, data and tests.
Modena Portland Cement Co., 1002 Engineers' Building, Cleveland.
Modena Gray Portland Cement. Catalog, 30 pp., 8½ x 11 ins. Illustrated.
Concrete Masonry Construction. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Deals with various forms of construction.
Town and Country Houses of Concrete Masonry. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
Facts About Concrete Building Tiles. Brochure, 16 pp., 8½ x 11 ins. Illustrated.
The Key to Fire Safety Homes. Booklet, 30 pp., 8½ x 11 ins. Illustrated.
Design and Control of Concrete Mixers. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Portland Cement Stucco. Booklet, 64 pp., 8½ x 11 ins. Illustrated.
Concrete in Architecture. Bound Volume, 60 pp., 8½ x 11 ins. Illustrated. An excellent work, giving views of exteriors and interiors.

CENTRAL CLEANING SYSTEMS
The Spencer Turbine Co., Hartford, Conn.
Modern Cleaning Methods for Hotels, Schools, Theatres and Industry.

CHURCH EQUIPMENT
John Van Rang Co., Cincinnati.
Practical Planning for Church Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CLUB EQUIPMENT
John Van Rang Co., Cincinnati.
Practical Planning for Club Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CONCRETE BUILDING MATERIALS
Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Modern Concrete Reinforcement. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CONSTRUCTION, FIREPROOF

CONSTRUCTION, STONE AND TERRA COTTA
Cowing Pressure Relieving Joint Company, 100 North Wells St., Chicago, Ill.
Pressure Relieving Joint for Buildings of Stone, Terra Cotta or Marble. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Deals with
preventing cracks, spalls and breaks.

DAMPPROOFING
Minwax Company, Inc., 11 West 42nd St., New York.
Complete Index of all Minwax Products. Folder, 6 pp., 8½ x 11 ins. Illustrated. Complete description and detailed specifications.
Toch Brothers, New York, Chicago, Los Angeles.
Handbook of R. L. W. Protective Products. Booklet, 40 pp., 4½ x 7½ ins.

DOORS
David Lupton’s Sons Company, Philadelphia.
Lupton Commercial Steel Doors. Folder, 8½ x 11 ins. Illustrated.
Lupton Steel Industrial Doors, Brochure, 8 pp., 8½ x 11 ins. Illustrated. Details and specifications.

DOORS AND TRIM, METAL
The American Brass Company, Waterbury, Conn.
Anconia Architectural Bronze Extruded Shapes. Brochure, 180 pp., 8½ x 11 ins., illustrating and describing more than
2,000 standard bronze shapes of cornices, jambs casings, mouldings, etc.
William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Tubular Steel Doors. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

The Kawneer Company, Niles, Michigan.
Details sheet, 8½ x 11 ins., with A.M. File No. featuring Heavy Welded Bronze Doors.

William Bayley Co., Aurora, Ill.
Fire-Doors and Hardware. Booklet, 8½ x 11 ins., 64 pp. Illustrated. Describes entire line of tin-clad and corrugated fire
doors, complete with automatic closers, track hangers and all the latest equipment—all approved and labeled by Underwriters‘
Laboratories.

Truscon Steel Company, Youngstown, Ohio.
Copper Alloy Steel Doors. Catalog 120. Booklet, 48 pp., 8½ x 11 ins. Illustrated.

DOORS, SOUNDPROOF
Irving Hamlin, Evanston, Ill.
The Evanston Soundproof Door. Folder, 8 pp., 8½ x 11 ins. Illustrated. Deals with a valuable type of door.

DRAINAGE FITTINGS
Josam Mfg Co., Michigan City, Ind.
Josam New Sew Tooth-Root Drain. Folder, 4 pp., 8½ x 11 ins. Illustrated.

REQUEST FOR CATALOGS
To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manu-
facturer and send coupon to The Architectural Forum, 521 Fifth Avenue, New York.
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 175

DUMBWAITERS
Sedgewick Machine Works, 351 West 55th St., New York, N. Y.

ELECTRICAL EQUIPMENT

ELEVATORS
Swalwick Machine Works, 151 West 15th St., New York, N. Y.

ESCALATORS

FIREPROOFING—Continued
Concrete Steel Company, 2 Park Avenue, New York, N. Y.

Make the Facing Bear Its Share. Folder, 85p. x 11 ins. Illustrated.
Face Tile Walls. Folder, 85p. x 11 ins. Illustrated.
Meeting Every Need. Folder, 85p. x 11 ins. Illustrated.
Natico Vetical. Folder, 85p. x 11 ins. Illustrated.
Natico Double Shell Load Bearing Tile. Folder, 85p. x 11 ins. Illustrated.

FLOODLIGHTING
National Terra Cotta Company, 200 Park Avenue, New York, N. Y.

FLOOR HARDENERS (CHEMICAL)

FLOORS—STRUCTURAL
Concrete Steel Company, 202 Park Avenue, New York, N. Y.

Truscon Steel Co., Youngstown, Ohio.

Structural Gypsum Corporation, Linden, N. J.

Service Sheet No. 3. Specifications and Details of Design and Construction for Gypsum Pre-Cast Floors and Ceilings. Folder, 85p. x 11 ins. Illustrated.

FLOORING

Armstrong Cork Co. (Flooring Division), Lancaster, Pa.
Linoleum Layer's Handbook. 5 x 7 ins., 36 pp. Instructions for laying linoleum layers and other information in learning most satisfactory methods of laying and taking care of linoleum.
Reducing Floors to Good Taste. Booklet, 6 x 9 ins., 48 pp. Illustrated in color. Explains use of linoleum for offices, stores, etc., with reproductions in color of suitable patterns, also specifications and instructions for laying.
Detailed Instructions for Cutting and Laying Linoleum. Brochure, 40 pp., 71/2 x 11 ins. Illustrated.
Comparison of Tests. Folder, 85p. x 11 ins. Illustrated.

Cassilied Oak Flooring, Memphis, Tenn.
Style in Oak Floors. Booklet, 16 pp., 6 x 9 ins. Illustrated.
Congoleum-Nairn, Inc., 195 Belgrave Drive, Kearny, N. J.
Facts you should know about Resilient Floors. A series of booklets on floors for (1) schools, (2) hospitals, (3) offices, (4) stores, (5) libraries, (6) churches, (7) clubs and lodges, (8) apartments and hotels. Illustrated.
Sealex Treadlite Ties. Two booklets, 8 and 11 pp. Illustrated.
A JENNINGS Suction Sump Pump is always accessible. Pump, driving motor and controls are located on the floor above the sump. Only the suction pipe is submerged. A Jennings can be inspected or taken apart for cleaning without going into the pit. Unscrewing a few bolts and lifting off the pump head gives instant access to the interior.

Jennings Suction Sump Pumps are furnished in a series of sizes with capacities to meet all of the usual requirements. Write for Bulletin 97.

THE NASH ENGINEERING CO., 12 WILSON ROAD, SOUTH NORWALK, CONN.
SELECTED LIST OF MANUFACTURERS’ PUBLICATIONS—Continued from page 176

FLOORING—Continued
Rubber Flooring Monthly publications, 81/4 x 11 ins. Illustrated. Giving data on flooring for many types.
Pardee Tiles. Round Volume, 48 pp., 81/4 x 11 ins. Illustrated.
Structural Gypsum Corporation, South Braintree, Mass.

Structural Gypsum Corporation, Linden, N. J.

FURNITURE
American Seating Co., 14 E. Jackson Blvd., Chicago, Ill.
Art Ecclesiastical Booklet, 6 x 9 ins., 48 pp. Illustrations of church fittings in carved wood.
Kittinger Co., 1893 Elmwood Ave., Buffalo, N. Y.
Kittinger Club & Hotel Furniture. Booklet, 20 pp., 81/4 x 11 ins. Illustrated. Deals with line of furniture for hotels, clubs, institutions, schools, etc.

GARAGES
Ramp Buildings Corporation, 21 East 40th St., New York, N. Y.
Buildings for Profitable Operation. Booklet, 81/2 x 11 ins. 16 pp. Illustrated. Discusses the need for modern mid-city, parking garages, and describes the D’Humy Motoramp system of design, on the basis of its superior space economy and features of operating convenience. Gives cost analyses of garages of different sizes, and calculates probable earnings.
Garage Design Data. Series of informal bulletins issued in loose-leaf form, complete with order blanks and order cards.

GLASS CONSTRUCTION
Adamsom Flat Glass Co., Clarksburg, W. Va.
Quality and Dependability. Folder, 2 pp., 81/4 x 11 ins. Illustrated. Data in the company’s product.
Libbey-Owens Sheet Glass Co., Toledo, Ohio.
Flat Glass. Brochure, 12 pp., 81/4 x 11 ins. Illustrated. History of manufacture of flat, clear, sheet glass.

GREENHOUSES
King Construction Company, North Tonawanda, N. Y.
Heat Controlled With the Touch of a Finger. Booklet, 46 pp., 51/2 x 81/2 ins. Illustrated. Describes the popular “K-Hum” Motor Lift system of heating, on the basis of its superior space economy and features of operating convenience. Gives cost analyses of greenhouses of different sizes, and calculates probable earnings.

GYPSUM
Structural Gypsum Corporation, Linden, N. J.

HARDWARE—Continued
Hardware for the Home. Booklet, 24 pp., 31/2 x 6 ins. Deals with residence hardware.
Door Closer Equipment. Brochure, 16 pp., 31/2 x 6 ins. Data on a valuable detail.

American Radiator Company, The, 40 West 40th St., N. Y. C.
Ideal Builders for Oil Burning. Catalog 50 x $76 ins. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.
Corto—The Radiator Classic. Brochure, 51/2 x 81/2 ins., 16 pp. Illustrated. Describes a central all-on-one-floor heating plant with radiators of small size, easy to handle, and capable of heating entire house.
How Shall I Heat My Home? Brochure, 16 pp., 51/2 x 81/2 ins. Illustrated. Full data on heating and hot water supply.

HEATING EQUIPMENT
American Blower Co., 604 Russell St., Detroit, Mich.
Heating and Ventilating Utilities. A binder containing a large number of valuable publications, each 81/2 x 11 ins., on these important subjects.

American Radiator Company, The, 40 West 40th St., N. Y. C.
Ideal Builders for Oil Burning. Catalog 50 x $76 ins. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.
Corto—The Radiator Classic. Brochure, 51/2 x 81/2 ins., 16 pp. Illustrated. Describes a central all-on-one-floor heating plant with radiators of small size, easy to handle, and capable of heating entire house.
How Shall I Heat My Home? Brochure, 16 pp., 51/2 x 81/2 ins. Illustrated. Full data on heating and hot water supply.

Bryant Heater & Mfg., Co., 1735 St. Clair Ave., Cleveland, Ohio.

James B. Clow & Sons, 534 S. Franklin St., Chicago, Ill.

C. A. Dunham Company, 450 East Ohio St., Chicago, Ill.
Dunham Return Heating System. Bulletin 109, 8 x 11 ins. Illustrated. Covers the use of heating apparatus of this kind.

The Dalton Sylphon Company, Knoxville, Tenn.
Sylphon Temperature Regulators. Illustrated brochures, 81/2 x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments. Sylphon Heating specialties. Catalogue No. 200, 192 pp., 51/2 x 81/2 ins. Important data on heating.

Grinnell Company, Providence, R. I.
Grinnell Improves Superior Heating Trap. Folder, 4 pp., 81/2 x 11 ins. Illustrated.

Hoffman Specialty Company, Inc., 25 West 40th St., New York, N. Y.
Heat Controlled With the Touch of a Finger. Booklet, 40 pp., 51/2 x 81/2 ins. Illustrated. A brochure on a space-saving radiator of beauty and high efficiency.
How to Lock Out Air, the Heat Thief. Brochure, 48 pp., 5 x 71/4 ins. Illustrated.

Jenette Manufacturing Company, 556 West Monroe Street, Chicago.

REQUEST FOR CATALOGS
To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to The Architectural Forum, 521 Fifth Avenue, New York.

Name
Business
Address
We present to you our New Catalog

The Sarco Company were pioneers in the manufacture of thermostatic heating devices. Because of their inherent correctness of design and demonstrated efficiency, Sarco Vacuum and Vapor Heating Systems are installed in many hundreds of the finest buildings in the country.

When installed and operated according to directions, Sarco specialities assure heating systems of utmost simplicity, high efficiency, and trouble-free durability. They deserve your complete confidence.

Our new catalog illustrates and describes Sarco Radiator Traps, Packless Inlet Valves, Packless Radiator Valves, Air Eliminators, Alternating Receivers, Combination Float and Thermostatic Traps, Strainers and Temperature Regulators. It also shows diagrams of typical vacuum heating systems.

Any architect, engineer or contractor can obtain a copy of this interesting catalog 40-AK on request, without obligation.

SARCO COMPANY, INC.
183 Madison Avenue
New York, N. Y.
SELECTED LIST OF MANUFACTURERS‘ PUBLICATIONS—Continued

HEATING EQUIPMENT—Continued

- S. T. Johnson Co., Oakland, Calif.
- Johnson Oil Burners. Booklet, 9 pp., 8½ x 11 ins. Illustrated.
- Bulletin No. 4A. Brochure, 8 pp., 8½ x 11 ins. Illustrated.
- Data on different kinds of oil-burning apparatus.
- Describes Johnson Oil Burners with Type Automatic Control.
- Kewannee Boiler Corporation, Kewannee, 11.
- Showing installations of Kewannee boilers, water heaters, radiators, etc.
- Catalog No. 78, 6 x 9 ins. Illustrated. Describes Kewannee Fire-box Boilers with specifications and setting plans.
- Catalog No. 79, 6 x 9 ins. Illustrated. Describes Kewannee power boilers and smokeless tubular boilers with specifications.
- McQuay Radiator Corporation, 35 East Wacker Drive, Chicago, Ill.
- McQuay Radiator Corporation, 35 East Wacker Drive, Chicago, 111.
- Catalog No. 78, 6 x 9 ins. Illustrated. Describes Kewanee Fire-box Boilers with specifications and setting plans.
- Catalog No. 79, 6 x 9 ins. Illustrated. Describes Kewanee power boilers and smokeless tubular boilers with specifications.
- Prometheus Electric Corporation, 360 West 13th St., New York. 11.
- Prometheus Electric Corporation, 360 West 13th St., New York.
- Describes construction and operation of the Jennings Return Line Vacuum Heating Pump for 2000 and 3000 square feet equivalent direct radiation.
- Describes in detail the Unit Type Motor Driven Jennings Condensation Pump.
- National Radiator Corporation, Johnstown, Pa.
- The Crimson Flame. Folder, 6 pp., 4½ x 7 ins. Illustrated.
- Contento Brings Contentment to Your Home. Folder, 12 pp., 8½ x 11 ins. Illustrated.
- National Jacketed Boiler. Folder, 4 pp., 8½ x 11 ins. Illustrated.
- National Super-Smokeless Boiler. Folder, 4 pp., 8½ x 11 ins. Illustrated.
- Arno, the National Radiator Sizes and Ratings. Booklet, 16 pp., 5 x 7½ ins. Illustrated.
- Promenoch Electric Corporation, 360 West 13th St., New York.
- Electric Heating Specialties. Booklet, 24 pages, 8½ x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.
- Rome Brass Radiator Corporation, 1 East 42nd Street, New York.
- Proof of the Pudding. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Describes principle and design of Rome Radiator with specifications for steam, hot water, and radiator heating systems.
- Rome Brass Radiator Corporation, (AUL-Brass Heater Division) 1 East 42nd Street, New York.
- Sarco Company, Inc., 385 Madison Ave., New York City, N. Y.
- Steam Heating Specialties. Booklet, 6 pp., 6 x 9 ins. Illustrated.
- Data on Sarco Packless Supply Valves and Radiator Traps contained temperatures for water softening service tanks.
- Spencer Heater Co., Williamsport, Pa.
- Catalog, 20 pp., 6 x 9 ins. Illustrated. Complete line of magazine feed cast iron sectional and steel tubular heaters. Specifications, prices, and data for steam, vapor or hot water.
- The Sarco-Norman, Brochure, 24 pp., 6 x 9¼ ins. Illustrated in color. Magazine feed heaters for steam, vapor and hot water heating.

REQUEST FOR CATALOGS

To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 525 Fifth Avenue, New York.
Eighty Telephone Buildings Have Dialed Armstrong's Corkboard

for perfect connection to top-floor comfort and permanent fuel economy

---

Left—The entire roof area of the Mountain States Tel. & Tel. Co. building, Denver, is insulated with Armstrong's Corkboard; top-floor offices are comfortable in any kind of weather. Architect—Wm. N. Bowman Co., Denver.

Below—On the roof of Mountain States Tel. & Tel. Co. building, Denver; insulation contractor—Western Eterlite Roofing Co., Denver.

Below—Armstrong's Corkboard insulates the Southwestern Bell Telephone Co. roof, Kansas City, Mo. Architect—Holt, Price & Barnes, Kansas City; associate architect—L. R. Temlin, St. Louis.


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Some of the 80

Here is a partial list of the telephone buildings that have insured top-floor comfort and fuel economy with Armstrong's Corkboard Insulation on the roof.

New York Telephone Co., N. Y. C. — (3 buildings)
Portland Telephone Building, Portland, Me.
Telephone Exchange Building, Boston, Mass.
New England Tel. & Tel. Co., Boston, Mass.—(Stadium Exchange)
Bell Telephone Bldg., Athens, Ga.
So. Western Bell Telephone Bldg., St. Louis, Mo.
Indiana Bell Tel. Co., Marion, Ind.
Cumberland Tel. Co., Louisville, Ky.
So. Western Bell Telephone Bldg., Amarillo, Texas
Bell Tel. Co., Montreal, Canada
Wisconsin Tel. Co., Kenosha, Wis.
Southern Bell Tel. & Tel. Co., Chattanooga, Tenn.
Southern Bell Tel. & Tel. Co., Savannah, Ga.
So. Western Bell Tel. Co., Dallas, Texas
Bell Tel. Co., Philadelphia, Pa.—
(8 buildings)
So. Western Bell Telephone Bldg., Oklahoma City, Okla.
Southern Bell Telephone Bldg., Greensboro, N. C.
Northwestern Bell Tel. Co., Minneapolis, Minn.
Southern Bell Telephone Co., LaPlace, La.
New England Tel. & Tel. Co., Dover, N. H.
Michigan Bell Tel. Co., Detroit, Mich.—(4 buildings)
Ohio Bell Tel. Co., Columbus, Ohio
(2 buildings)

Armstrong's Corkboard Insulation
for the roof of every building
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 180

INSULATION—Continued

The Cork-lined House Makes a Comfortable Home. 5 x 7 ins. 32 pp. Illustrated.

Armstrong’s Corkboard. Insulation for Walls and Roofs of Building. 5 1/2 x 11 ins., 96 x 116 ins. Illustrated and describes use of insulation for structural purposes.

Cork Import Corporation, 34 West 4th Street, New York.

Novol Cork Company. Insulating Cold Pipes, Coolers and Tanks. Folder 8 1/2 x 11 ins. Illustrated.

Novol Corkboard Insulation. Folder 8 1/2 x 11 ins. Illustrated.

Structural Gypsum Corporation, Linden, N. J. Heat Insulation Value of Gypsum. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated, by Charles L. Norton, of M. I. T.

JOISTS

Concrete Steel Company, 2 Park Avenue, New York, N. Y. Havemeyer Steel Joint. The Joint with the Twin-Tee Chords. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.

Modern Concrete Reinforcement. Brochure, 32 pp., 8 1/2 x 11 ins. Illustrated.

Standard Practice for Placing Havemeyer Reinforcement in Columns, Beams and Slabs. Data sheets, 8 1/2 x 11 ins. Illustrated.

KITCHEN EQUIPMENT

The International Nickel Company, 62 Wall St., New York, N. Y. Hotkote. Modern Counter Applications of Monel Metal. Booklet, 8 1/2 x 11 ins., 32 pp. Illustrated. Gives types of equipment in which Monel Metal is used, with service data and sources of equipment.

Prometheus Electric Corporation, 300 West 13th St., New York. Electric Kitchens. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.


Practical Planning for School Food Service. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.


Practical Planning for Hospital Food Service. Brochure, 62 pp., 8 1/2 x 11 ins. Illustrated.

LABORATORY EQUIPMENT

Alberene Stone Co., 153 West 23rd Street, New York City. Booklet, 8 1/2 x 11 ins., 26 pp. Stone for laboratory equipment, show cards, panel, stair treads, etc.


LANTERNS


LATH, METAL AND REINFORCING

Concrete Steel Company, 2 Park Avenue, New York, N. Y. Havemeyer Building Products, Booklet, 40 pp., 8 1/2 x 11 ins. Illustrated.


Milor Metal Ceiling Catalog. Booklet, 208 pp., 8 1/2 x 11 ins. Illustrated. Data on metal ceiling and wall construction.


Steeltek for Floors. Booklet, 24 pp., 8 1/2 x 11 ins. Illustrated.

Combined reinforcing and form for concrete or gypsum floors and roofs.

Steeltek Data Sheet No. 1. Folder, 8 pp., 8 1/2 x 11 ins. Illustrated. Steeltek for Floors on steel joists with round top chords.

Steeltek Data Sheet No. 2. Folder, 8 pp., 8 1/2 x 11 ins. Illustrated. Steeltek for Floors on steel joists with flat top ranges.

Steeltek Data Sheet No. 3. Folder, 8 pp., 8 1/2 x 11 ins. Illustrated. Steeltek for headers on wood joists.


REQUEST FOR CATALOGS

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SELECTED LIST OF MANUFACTURERS’ PUBLICATIONS—Continued from page 182

METALS

Aluminum Company of America, Pittsburgh.
Architectural Aluminum. Brochure, 40 pp., 81/2 x 11 ins. Illustrated.

Central Alloy Steel Corporation, Massillon, Ohio.
Sheet Iron Primer. Booklet, 44 pp., 51/4 x 71/4 ins. Illustrated.
The International Nickel Company, 67 Wall St., New York, N. Y.


Harriman-Sanders Company, 2051 Elton Ave., Chicago, Ill.

Column Catalog, 75/8 x 10 ins., 48 pp. Illustrated. Contains prices on columns from 6 to 36 ins. diameter, various designs and illustrations of columns and installations. The Perfora Catalog, 75/8 x 10 ins., 64 pp. Illustrated. Contains illustrations of perfora lattices, garden furniture in wood and cement, garden accessories.
Klein & Wanzer, Inc., Henry St. 12th St., New York, N. Y.

Two Drywood Intumescent. Folder, 4 pp., 61/4 x 9 ins. Illustrated. Use of moulding for paneling walls.

Klein & Wanzer, Inc., Henry St. 12th St., New York, N. Y.

A New Style in Interior Decoration. Folder, 4 pp., 61/4 x 9 ins. Illustrated. Use of moulding with intumescent woodwork.

Klein & Wanzer, Inc., Henry St. 12th St., New York, N. Y.

Drywood Period Mouldings in Ornamental Wood. Booklet, 28 pp., 81/2 x 11 ins. Illustrated.

How Drywood Period Mouldings in Ornamental Wood Set a New Style in Interior Decoration. Folder.

Roddis Lumber and Veneer Co., Marshfield, Wis.

Roddis Doors. Brochure, 16 pp., 81/2 x 11 ins. Illustrated. Complete list of doors for various types of buildings.

Roddis Doors. Catalog G. Booklet, 184 pp., 55/8 x 11 ins. Complete covers the subject of doors for interior use.


How to Paint Concrete and Masonry Surfaces." Booklet, 16 pp., 81/2 x 11 ins. Illustrated.

Minwax Company, Inc., 11 West 42nd St., New York.

Color Card. 35/8 x 5 ins. Illustrates in color the ten shades in their line. These colors are manufactured.


Paints, Stains, Varnishes and Wood Finishes

Madora Paints Co., Clinton, N. Y.

Madora Mortar Colors. Folder, 85/8 x 11 ins., 4 pp. Illustrated. In brief, gives general information concerning Clinton Mortar Colors with specific instructions for using them.

Color Card. 35/8 x 5 ins. Illustrates in color the ten shades in their line. These colors are manufactured.

Circle A. Products Corporation, New Castle, Ind.

Circle A. Partitions Sectional and Moveable. Brochure. Illustrated. 85/8 x 11 ins., 32 pp. Full data regarding an important point of partitions, along with Erection Instructions for a wide variety of partitions. The most complete line of track and hangers for all styles of sliding, parallel, accordion and flush-door partitions.

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Seton Hill College uses 24" NOVOID CORKBOARD INSULATION

In the new gymnasium of Seton Hill College, Greensburg, Pa., the roof is insulated with double-width (24") Novoid Corkboard, 1½" thick. The cork was laid on the flanges of the tee-bar purlins and nailed to the precast gypsum slabs on top of the cork.

Used in this way, Novoid Corkboard not only provides permanent protection against heat, cold and condensation of moisture, but it also has a tendency to deaden objectionable sounds.

Full information regarding the use of Novoid Corkboard for the insulation of roofs will be sent, with samples, on request. Cork Import Corporation, 345 West 40th Street, New York City, N.Y.

The 6" x 2¼" trimmings from the full-size sheets of Novoid Corkboard were used to insulate around the dormers.

The rich, brown color of Novoid Corkboard makes a pleasing decorative treatment when left exposed. The surface may also be painted if desired.

Novoid Corkboard Insulation

THE CLOSE-STRUCTURED CORKBOARD
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 184

PLASTER—Continued
Interior Walls-Everlasting. Brochure, 20 pp., 8½ x 11 ins. Illustrated. Describes origin of Keene's Cement and views of buildings in which it is used.

PLUMBING EQUIPMENT
Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill. Catalog M, 9¼ x 12 ins., 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.
Imperial Brass Mfg. Co., 120 W. Harrison St., Chicago, Ill. Watrous Patent Flush Valves, Inexpert Water Closets. Liquid Fount Fixtures, etc. 8½ x 11 ins., 136 pp. loose-leaf catalog, showing roughing-in measurements, etc.

PNEUMATIC TUBE SYSTEMS

PUMPS
Kewanee Private Utilities Co., 422 Franklin St., Kewanee, Ill. 4 pp., 8½ x 11 ins. Data Sheet showing schematic diagrams for hotel, bank, factory and wholesale buildings, table of sizes, space requirements and preliminary layout steps. A. I. A. 1934.

Nash Engineering Company, South Norwalk, Conn. Bulletin 52. Brochure, 6 pp., 10½ x 7¼ ins. Illustrated in color. Devoted to Jennings Standard Centrifugal Pumps for house service, heating city water pressure to supply top stories, for circulating warm water, etc.


REFRIGERATION
The Fulton Syphon Company, Knoxville, Tenn. Temperature Control of Refrigeration Systems. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Deals with cold storage, chilling of water, etc.

REFRIGERATED CONCRETE—See also Construction, Concrete
Concrete Steel Company, 2 Park Avenue, New York, N. Y. Modern Concrete Reinforcement. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

Truscon Steel Company, Youngstown, Ohio. Shearing Stresses in Reinforced Concrete Beams. Booklet, 8½ x 11 ins.

RESTAURANT EQUIPMENT

ROOFING
Federal Cement Tile Co., 608 S. Dearborn Street, Chicago.
Catalog and Roof Standards. Booklet, 36 pp., 8½ x 11 ins. Illustrated. Describes Featherweight Concrete Insulating Roof Slabs, including complete data, weights and dimensions, specifications and detail drawings. Also includes complete information on Featherweight Nailing Concrete Roof Slabs for use with ornamental slate or copper covering. The catalog is profusely illustrated and contains also a partial list of users.
Examples of Theaters and Theater Roofs. Brochure, 16 pp., 8½ x 11 ins. Illustrated. Contains views of theaters designed by some of the country's leading architects.
Federal Interlocking Tile and Glass Tile. 4 pp., 8½ x 11 ins. Illustrated. Describes complete roof or precast concrete slabs requiring no composition covering.

Italian Promenade Floor Tile. Folder, 2 pp., 8½ x 11 ins. Illustrated. Floor tiling adapted from that of Ravanna Palace.
Mission Tile. Leaflet, 8½ x 11 ins. Illustrated. Tile such as are used in Italy and Southern California.
Georgian Tile. Leaflet, 8½ x 11 ins. Illustrated. Tiling as used in old English and French farmhouses.
Ludowici-Celadon Company, 120 S. Michigan Ave., Chicago, Ill. "Ancient" Tapered Mission Tiles. Leaflet, 8½ x 11 ins., 4 pp. Illustrated. For architects who desire something out of the ordinary this leaflet has been prepared. Describes briefly the "Ancient" Tapered Mission Tiles, hand-made with full corners and designed to be applied with irregular exposures.

Milor Sheet Metal Handbook. Brochure, 128 pp., 8½ x 11 ins. Illustrated. Deals with rain-carrying equipment, etc.

Structural Gypsum Corporation, Lincon, N. J. Relative Effectiveness of Various Types of Roofing Construction in Preventing Condensation of the Under Surface. Folder, 4 pp., 8¼ x 11 ins. Important data on the subject.

Gypsum Pre-cast Fireproof Roofs. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Information regarding a valuable type of roofing.

SCHOOL EQUIPMENT

SEWAGE DISPOSAL
Kewanee Private Utilities Co., 422 Franklin St., Kewanee, Ill. Specification Sheets, 74½ x 10½ ins., 40 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.


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SELECTED LIST OF MANUFACTURERS’ PUBLICATIONS—Continued from page 186

TELEPHONE SERVICE ARRANGEMENTS
All Bell Telephone Companies. Apply nearest Business Office, or American Telephone and Telegraph Company, 155 Broadway, New York.

Planning for Home Telephone Conveniences. Booklet, 52 pp., 8 1/2 x 11 inches. Illustrated.


TERRA COTTA
National Terra Cotta Society, 19 West 44th St., New York, N. Y.


TIMBREL TILE VAULTS
R. Goerzinger Co., 40 Court Street, Boston.
Timberl Arch Construction. Booklet, 8 pp., 8 1/2 x 11 ins.

TILE, HOLLOW


TILE, STRUCTURAL CLAY

Natco. Vitrite Bulletin No. 104. 40 pp., 8 1/2 x 11 ins. Illustrated. Shows color charts, sizes and shapes, actual installations, etc.
Natco Unbacker Tile Bulletin. 85 x 11 ins. 4 pp. Illustrated.

TILES

Flintcraft Ties, Unglazed. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Details of patterns in full color. Ask for Form A-322.
Faience Tiles for Bathrooms. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Ask for Form A-301.
Flintcraft Files. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Machine-made floor or wall tile. Ask for Form A-301.

Hanley Quarry Tile. Folder, 4 pp., 5 x 8 ins. Illustrated.
P. E. Pounds. Booklet, 48 pp., 8 1/2 x 11 ins. Illustrated.

TRUSSES
McKown Bros. Company, 323 South Keeler Avenue, Chicago.

Truth in Architecture. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Deals with use of trusses of wood.
Factory Built Bowspring Trusses. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.
Timber Trusses. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.

VALVES
Cranco Co., 836 S. Michigan Ave., Chicago, Ill.

No. 51. General Catalog. Illustrated. Describes the complete line of the company. Ask for Form A-301.
C. A. Dunham Co., 450 East Ohio St., Chicago, Ill.

The Dunham Packless Radiator Valve. Brochure, 12 pp., 8 x 11 ins. Illustrated. Data on an important type of valve.
Jenkins Brothers, 80 White Street, New York.

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Agents: British-American Laundry Machinery Co., Ltd.
Underhill St., Camden Town, London, N.W. 1, England
SELECTED LIST OF MANUFACTURERS—Continued from page 188

VENETIAN BLINDS

VENTILATION
American Blower Co., Detroit, Mich.
Duriron Company, Dayton, Ohio.
Acid-proof Exhaust Fans. Folder, 8 x 10 1/2 ins., 8 pp. Data regarding fans for ventilation of laboratory furnaces.
Specification Form for Acid-proof Exhaust Fans. Folder, 8 x 10 1/2 ins.

WATERPROOFING
Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
Minwax Company, Inc., 11 West 42nd St., New York.
Waterproofing Stadia. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Transparent Waterproofings for All Masonry Walls and Surfaces. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Data Sheet on Membrane Waterproofing. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.
Tech Brothers, New York, Chicago, Los Angeles.
Architects' Specification Data. Sheets in loose leaf binder, 8 1/2 x 11 ins., dealing with an important line of materials.

WEATHER STRIPS
Atley Company, 605 West 66th St., Chicago, Ill.
The Only Weatherstrip with a Cloth to Metal Contact. Booklet, 16 pp., 8 1/2 x 11 ins. Illustrated. Data on an important type of weather stripping.

WINDOW GLASS
Pittsburgh Plate Glass Company, Grant Building, Pittsburgh, Pa.
Duraline Window Glass. Booklet, 8 pp., 8 1/2 x 11 ins. Illustrated.

WINDOWS
William Bayley Co., 147 North Street, Springfield, Ohio.

WOOD—See also Millwork
American Walnut Mfrs. Association. Booklet, 16 pp., 5 1/2 x 8 1/2 ins. Illustrated. A very useful and interesting little booklet on the use of walnut in Fine Furniture with illustrations of pieces by the most notable furniture makers from the time of the Renaissance down to the present.
American Walnut for Interior Woodwork and Paneling. 7 x 9 ins. Illustrated. Discusses interior uses of walnut, including giving costs, specifications of a specimen room, the different figures in Walnut wood, Walnut floors, finishes, comparative tests of physical properties and the advantages of American Walnut for woodwork.

WOOD FINISH
Minwax Company, Inc., 11 West 42nd St., New York.
Minwax Flat Finish. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Deals with a penetrative, preservative stain finish giving stain and soft wax effect.

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WINDOWS, CASEMENT—Continued
Lupton Creates a Complete Casement. Folder, 8 1/2 x 11 ins. Illustrated data on a casement providing for screens, shades and draperies.
Lupton Heavy Casements. Detail Sheet No. 101, 4 pp., 8 1/2 x 11 ins. Details and specifications only.
Casement Window Hardware. Booklet, 24 pp., 8 1/2 x 11 ins. Illustrated. Shows typical installations, detail drawings, construction details, blueprints if desired. Describes AIR-way Multifold Window Hardware.
Architectural Details. Booklet, 8 1/2 x 11 ins., 36 pp. Tables of specifications and typical details of different types of construction.
List of Parts for Assembly. Booklet, 8 1/2 x 11 ins., 16 pp. Full lists of parts for different units.

WINDOW SCREENS
William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Pivoted Windows Screened. Booklet, 8 pp., 8 1/2 x 11 ins. Illustrated. Data on screening and window ventilation.
Detroit Steel Products Co., 2200 E. Grand Boulevard, Detroit.
Fenestra Screen Casements. Brochure, 16 pp., 8 1/2 x 11 ins. Illustrated.

WINDOWS, STEEL AND BRONZE
William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Steel Window Inserts. Brochure, 8 pp., 8 1/2 x 11 ins. Illustrated. Suggestions on correct use of inserts.
A Rain-shed and Ventilator of Glass and Steel. Pamphlet, 4 pp., 8 1/2 x 11 ins. DEALS WITH POOL CONTINUOUS SASH. Sawtooth Roofs, etc.
Truscon Steel Company, Youngstown, Ohio.
Drafting Room Standards. Book, 8 1/2 x 11 ins., 120 pages of mechanical drawings showing drafting room standards, specifications and construction details of Truscon Steel Windows, Steel Lintels, Steel Doors and Mechanical Operators.
Continuous Steel Windows and Mechanical Operators. Catalog 126. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.

WOOD—See also Millwork
American Walnut. Booklet 7 x 9 ins., 40 pp. Illustrated. A very useful and interesting little book on the use of walnut in Fine Furniture with illustrations of pieces by the most notable furniture makers from the time of the Renaissance down to the present.
American Walnut for Interior Woodwork and Paneling. 7 x 9 ins. Illustrated. Discusses interior uses of walnut, including giving costs, specifications of a specimen room, the different figures in Walnut wood, Walnut floors, finishes, comparative tests of physical properties and the advantages of American Walnut for woodwork.
Wood Conversion Company, Cloquet, Minn.
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