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Floors and Flooring Material

By PETER BRUST, *Fellow, A. I. A.*

There is nothing in a building that gets harder usage than floors. Unfortunately there has not been enough information available to the public as a guide in selecting the proper materials for the service required. This article is intended to be of assistance to those charged with selecting and maintaining floors.

Floors should be durable, comfortable to walk on and easy to care for, as well as attractive in appearance. There are a large variety of materials used for floors that meet these requirements.

Because appearance is a matter of personal likes, and cost varies according to time and locality, neither of these subjects will be discussed.

The qualities of a floor that make for comfort or good appearance do not as a rule add to the durability or ease of maintenance. If the correct materials are chosen, maintenance cost can be held at a minimum. In many instances, appearance alone may justify higher installation cost, than mere utility would justify.

Classes of Floors

Floors fall into two general classes.— hard and soft. They may also be classified as monolithic and sectional.

Floors of travertine, marble, tile, terrazzo, concrete and magnesite cement are classed as hard floors, while floors of wood, rubber flooring, asphaltic tile, cork tile and linoleum are classed as soft floors.

Floors of concrete, magnesite cement, rubber flooring and linoleum may be classed as monolithic because they are made in large units having but few joints which are often a source of considerable trouble.

Floors of stone, marble, terrazzo, ceramic tile and asphaltic tile are sectional in that they are composed of a large number of small units and may be repaired if damaged without leaving evidence of having been repaired.

Hard floors are chosen for their durability and ease of maintenance and are not suitable where comfort is an important factor.

Soft floors with the exception of cork are really not soft but only slightly so. They are used because of their comfort which increases as their density is reduced. They are desirable not only because of their physical comfort, but also because they more readily absorb and maintain desirable room temperatures and act as insulators against cold structural materials under them. This is particularly true of floors built directly on the earth.

Sub-Floor Requirements

The concrete base for cork, wood tile, rubber flooring and linoleum must be dry, true and smooth. If the sub-floor is uneven, a leveling course of "Floorstone" or of asphalt mastic must be installed. Either of these materials can be installed from $\frac{3}{4}$ " thickness to a feather edge. The asphaltic leveling course is composed of emulsified asphalt, Portland cement and sand. The sub-floor should have an asphaltic priming coat before the leveling course is applied.

Cork tile, wood tile, linoleum and rubber flooring may not be laid on concrete that is placed directly on the earth because moisture penetrating the concrete from the earth will soften the bonding cement and permit the covering to loosen.

It is wise to test the concrete floor for dampness before putting on the covering. This is done by forming a ring of putty 6" in diameter 1" high on the concrete at such places that seem to have the most dampness. Place a level teaspoon of dry calcium chloride within the ring. Cover the ring with a sheet of glass to prevent outside air entering the space inside the ring. Leave it in place for 12 hours, then examine it. If the floor is damp, beads of moisture will appear on the glass and the calcium chloride will be wholly or partly dissolved. The resilient floor covering should not be laid until tests indicate that the concrete is dry.

Marble and Travertine Floors

Marble floors offer no unusual maintenance problems. They require 3" depth for their installation and periodically should be treated with a vacuum cleaner. Cleaning agents using grit, other than soap stone or talc, should not be used on polished marble. Soap and water makes the safest cleaner for these floors.

Tile Floors

Vitreous tile floors require $2\frac{1}{2}$ " thickness for their installations. If planned over wood construction, they should have waterproof paper under them and be reinforced with heavy wire netting or thin steel rods. Vitreous tile floors are water, acid and stain proof. They are made with carborundum embedded in the surface for use on inclines.

Glazed tiles should not be used for floors where there is much traffic because the glaze will wear off. Non-vitreous tile should not be used where there is much traffic because the tile will wear down and sometimes look shabby, however, if a wax surface treatment is applied the wear is materially reduced and the appearance improved. The vitreous tile needs no surfacing coating.

Terrazzo Floors

Terrazzo floors require $2\frac{1}{2}$ " thickness for their installation. They consist of marble chips embedded in concrete, ground and polished to a smooth surface. Bases and complete stairways are also made of terrazzo. Terrazzo floors shrink in drying which causes cracks. If the area is large, the cracks can only be overcome by using dividing strips $2\frac{1}{2}$ " deep and not by the ordinary 1" deep strips.

Terrazzo floors are divided into various size pane's with brass strips for decorative purposes. Various colors

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The Functions of the Architect

THE ARCHITECT is the practical visionary of our industry. His training in the fine arts and engineering, tempered by years of actual experience, has given him the happy faculty of designing for beauty and charm and for utility.

Specialized as he is, with only his professional services to offer clients, he has the advantages of the specialist. First, he can design better and more economically than can any one else, and, second, his professional attitude toward his client and his work guarantees a service which is objective and frank on the one hand and dignified and thorough on the other.

The architect is a product of our industrial civilization. In the early days designing and planning was a function of the builder. But as our business relationships became more complex, this function was delegated to men specializing in the field.

Outlined below are the economic functions which the architect performs.

PLANNING AND DESIGNING: The planning and designing of buildings involves arduous hours spent in consultation with the owner, in patient study of the needs which the building must meet and how best they can be met. A thorough study of the engineering and architectural problems is equally imperative. The plan slowly materializes through the process of preliminary sketches and perspectives and when completed on the drafting boards, becomes the guide for directing the men engaged in the job of building.

SPECIFYING: Blueprints alone are not a sufficient guide in building. They indicate the dimensions, locations and shapes of the elements used. But for determining the qualities of materials, and in defining the quality of workmanship and the legal relationships between the owner, the contractor and the subcontractors, the specifications are indispensable. The specification writer's knowledge of materials and methods, and his access to his architectural files insure the owner the best in time-tried materials and methods.

Supervising and Inspecting

So that the building will be built to the plans and specifications, the architect's field men inspect the job as it progresses. This includes inspection of the materials as they arrive, inspection of many materials during fabrication at the factory and supervision over workmanship on the job.

Highlighting government activity in the building business last month, as it has for many months past, is activity of the Public Works Administration. That organization last month:

1. Called to Washington its seven regional directors and their staffs, for a two-day "chalk-talk" on the best methods of getting every last one of the 6,361 approved non-federal PWA projects under way by January 1, 1939, the legal deadline.

2. Proclaimed that 2,466 non-federal projects with an estimated construction cost of \$648,000,000 (40 per cent of the entire non-federal program) were already under way (Nov. 6); that 1,058 federal projects were

USHA

Celebrating the first anniversary of the United States Housing Authority, Administrator Straus took time out last month to review the first year's work. For a yearling, the record seemed impressive: A year ago there existed 46 local housing authorities (agencies for putting into effect locally the provisions of the United States Housing Act); this year there are 215. Funds have been set aside for slum-clearance projects for 142 local housing authorities; last year no allocations had been made. Represented among the 142 are authorities in 27 states, Washington, D. C., Hawaii, and Puerto Rico.

Shelter rentals have been placed in the reach of the lowest income groups, ranging from \$21 per month in New York City to \$8 per month in the Southwest. Cost limitations established by law have been met on projects on the way and under way. Most important, Administrator Straus was cheered by the fact that slum-clearance and rehousing have, during the past year, been accepted as permanent rather than emergency measures in the nation's economy.

Other events in USHA's record of the past month include:

1. Presidential approval of loan contracts committing USHA to loans of \$62,000,000 for housing projects in 19 cities. Projects planned will provide over 12,000 dwelling units. To date loan contracts for a total of \$265,000,000 have been approved.

2. Awarding of construction contracts on the third, fourth, and fifth USHA housing projects—a \$12,000,000 project for New York City, "Queensbridge"; a \$714,000 project for Austin, Tex.; and a \$1,140,000 project for Jacksonville, Fla. Now under way are the first two projects in USHA's program, "Red Hook" in New York City, and "Lakeview" in Buffalo, N. Y. Construction costs on the three projects made the Administrator proud as a peacock, were far below the maximum allowed by law.

3. Announced a definite "land policy" in regard to cost of land for USHA housing projects: "The USHA will lend up to \$1.50 per square foot for low-rental housing projects . . . and in cases where the local authority believes that it is wise and sound policy to pay higher prices for land, the USHA will bear part of the excess cost." Tentative plan is that USHA will bear one-third of the excess cost above \$1.50 per square foot, the locality two-thirds.

PWA

under way (Nov. 1); that 15 non-federal projects with an estimated value of \$872,972 had already been completed (Nov. 1).

3. Continued to make allocations for construction projects, bringing the total of approved projects to 7,413 to cost an estimated \$1,641,066,263. The amount is a mere \$266,000,000 short of the total value of construction on which PWA is authorized to loan or grant money.

4. Cooperated with other government agencies in rehabilitation of property in storm-stricken eastern states by allotting \$8,750,000 for replacement or repair of storm-damaged structures.

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Ask Licensing Law for Home Builders

Claim Pennsylvania Act Will Help Protect Builder

Final steps to place on the statute books of the State of Pennsylvania a law licensing residential building contractors are now being taken. Organizations backing the move are principally the Home Builders' Association of Allegheny County (Pittsburgh) and the Home Builders' Association of Philadelphia and Suburbs. Other building organizations and exchanges in other parts of the State are said to be cooperating in the endeavor to pass the law at the 1939 session of the Pennsylvania legislature.

Final draft of the measure is now being discussed. It will probably be presented to the legislators as the Residential Builders' Registration Law. The proposed legislation provides in its broader aspects for the licensing of home builders, the only factors having to do with home building in the State not now subject to registration. Architects, realty dealers, plumbing contractors, and other trades are now licensed. Any competent builder could easily secure a license, it is claimed, and the license would be suspended or revoked only because of improper practices.

A Protection Measure

According to the Pittsburgh Home Builders, the reason for their sponsorship of the law is to provide protection to the home buying public against unscrupulous builders and promoters and to protect legitimate builders from fraudulent or incompetent competition.

The executive secretary of the Philadelphia Association states this reason for the registration proposal: "to keep the residential construction market, which we have revived, for the people who began it—responsible home builders with sound reputation, good financial standing, and high competence in building."

In Virginia on the first of next year the new State Contractors' Registration Law goes into effect. (BUILDING, April 15, page 13). The Law briefly provides that all general contractors bidding or contracting private construction jobs costing \$20,000 or more shall register with the State Registration Board. Registration for the first year will cost \$30; renewal fees will be \$15 annually.

Contractors whose principal offices were located within the State on July 1, 1938, will be able to obtain a registration certificate without examination. Other general contractors will be examined by the Board in order to determine their qualifications as to financial responsibility, ability, or character. Registration certificates of contractors may be revoked by the Board for fraud or deceit in obtaining registration; for gross negligence, incompetence or misconduct in the practice of the profession; or for willful violation of any provision of the Act.

California to Revise

In California, where a contractors licensing law has been in effect for nine years, there has been formulated by the Building Contractors' Association of Southern California suggested revisions in the existing statute. The proposed revisions call for compulsory classification and examination of applicants for contractors' licenses, for credit investigation of all applicants, for an increase in the licensing Board to 10 members, for an

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Architects Like Lost Sheep

By WILLIAM H. GOMPERT, A.I.A.

"All we, like lost sheep, have gone astray. We have followed too much the devices and desires of our own hearts and there is no health in us."

This suppliant prayer may well be intoned by the architectural profession, with the further confession in all humility that "There is no leadership among us!"

The present tragic conditions have been visited upon the profession due to practices which have been permitted to creep in during the last decade. No other business or profession has set up so many self-inflicted barriers which militate against its own best interest, as has this honored profession of the leader in the fine arts. Let's look at the record!

1. Methods have been proposed and used by the profession itself, limiting the architect to only partial services.

2. In New York City a jury consisting of three or four members of the profession select a list of men eminently qualified to do work for the City authorities. In some instances this jury is not in a position to judge its fellow-practitioners properly. And isn't it a poor idea anyhow, for architects to pass on the experience and standing of their brothers in arms?

3. Competitions are advocated which require the best talent of the profession to spend thousands of their own dollars and much of their own valuable time so that one out of many competitors can secure a commission which will perhaps not represent the amount spent by all the entrants. The balance of the competitors get heart-aches and old pieces of bristol board for future impractical competitions.

4. A study is being made of the specialization of architects. This we deplore, for we believe a thoroughly trained architect can plan and design a building of any type, and with the very possible chance that the final result may prove more satisfactory than when done by a specialist. It is to my mind quite ridiculous to place such obstacles in the way of the members of our profession.

5. After long, consistent and earnest efforts by the profession for the past fifty years to establish a minimum rate of compensation, recognized by the public and the courts, lower rates of remuneration are now being arranged which set a bad example and which deprive the architect of the full and proper reward for his services.

These are a few instances which are sapping the vitality of the architectural profession. All of this portends further disaster and clearly indicates that the old profession needs a Moses to lead it out of the wilderness, a Moses of vision and of intellect, one who can direct the fortunes of the profession into higher planes.

(Continued from page 4)

increase in the number of inspectors, and for restricting eligibility for registration to citizens of California.

The Cleveland Builders' Exchange reports that construction interests in that city are planning to offer to the Ohio legislature a bill similar to the California law providing for contractor licensing. Admitting the proposed law may be of some advantage to the industry, the Exchange nevertheless warns that it "can be made into a political racket."

Over the Drafting Table

With GUTH

The school house competition is a matter of history by now. It is interesting to mull over some of the facts leading up to it. During the last week of the competition, five possible combinations were picked up here and there around the city, and strange as it may seem, they all revolved around Plunkett, Grassold, and Clas, in different order. Never a word about the Oldsters. Yes, the Youngsters put it over the Oldsters in this competition.

And what do they do in their spare time? Yes, what do they do when they play. Here is the set-up. Brust, flower garden; Hengels collects stamps, Napoleona; Eschweiler, Jr., has four boys, 'nuf said; DeGelleke builds martin houses; Philipp raises flowers, mostly zinnias; Papenthien plays with ROTC; Hunt is a photographic hound; Valentine paints in water color; Kirchhoff just works and works; Herbst bowls and golfs in season; Kloppenberg collects antiques;—And so time marches on.

Candid Biographies:

Harry Bogner . . . Curley Hairs to his wife and his intimates . . . Harry to his friends . . . polished off at Penn. U . . . dignified and suave . . . looks like an impresario . . . dotes on spaghetti and soups . . . abhors meat dishes . . . served in trenches over seas . . . makes hobby of art matters . . . is prexy of Art Institute . . . can design like sixty, especially country houses . . . loves beautiful objects . . . regardless of whether muscles of a Sharkey or a good looking woman . . . Such is Harry Bogner and such is life.

New Housing Plan

The Home Owners' Loan Corporation refinanced a million homes for owners in the depth of the depression. The Federal Housing Administration has been moderately successful in enticing private capital to enter the rental housing field with projects for families able to pay rentals of \$10 per room per month or more. The United States Housing Authority has made a fair start toward rehousing at least some of those of the nation's slum dwellers whose incomes permit rentals of not more than \$5 per room per month. The work of these governmental agencies the President last month inspected, found that there still remained a large group of families whose incomes limited monthly payments for rent or home purchase to from \$5 to \$10 per room. For these, not much was being done.

And the President proposed to do something. He had conferred with government officials as to the feasibility of a plan whereby small investors, the families with \$50 to \$5,000 seeking investment, would be induced to invest in housing if suitable machinery existed for such investment. Proceeds of the investments would be used for building homes to cost in the neighborhood of \$3,000 for the income group able to afford \$5 to \$10 per room per month rentals. Interest at 3 or 3½ per cent would offer a return greater than that offered on savings deposits.

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(Continued from page 5)

Says B. and L.'s Ready

Quick to offer a solution to the President's problem was Morton Bodfish, executive vice-president of the

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United States Building and Loan League. "No new machinery is needed," said Mr. Bodfish, "to get small investors to advance funds for low-cost home construction. It already exists in the form of building and loan associations, which pay a return of $3\frac{1}{4}$ to $3\frac{1}{2}$ per cent on deposits ranging from \$20 to \$25 and up." He urged that in any plan such as the President had hinted at, the B. and L.'s be seriously considered.

Also on the heels of the President's announcement of his embryo plan came news that the Federal Housing Administration, through Gerard B. Lambert, prominent business man who some months ago became special adviser to the FHA, was working on a plan for supplying housing to persons in the lower income groups. The Lambert plan differed in several points from the President's, main difference being that it envisaged the investment of capital on the part of large investors instead of small, and the issuance of tax-exempt securities, a step the President's plan precluded.

Reprint from November "Building"

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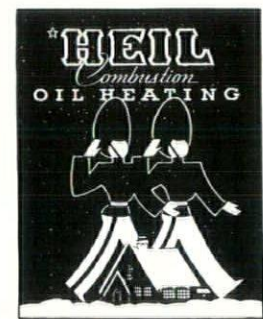
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(Continued from page 2)

may be developed in different panels. Chips of both domestic and foreign marbles are used, the latter are more expensive thus it is wise to select patterns that can be developed with domestic marbles. Terrazzo floors have 15 to 20% of concrete exposed on their surface between the marble chips which will wear and dust, therefore the floors should have a hardening treatment.

Concrete Floors

Concrete floors are hard but porous. They are suitable only where there is practically no traffic because they wear rapidly causing very annoying dust. It is possible to make dense concrete floors that will wear well but the care and effort required to do so makes the cost prohibitive. The average concrete floor can be given a surface treating that will harden it to retard the wear of heavy traffic.

There are many hardening, or pore filling treatments on the market, a simple and satisfactory method consists of 2 coats of silicate of soda (water glass) solution with a 10 day drying period between coats. 30 Baume silicate of soda may be purchased at any drug store. It should be mixed with 3 parts of water poured over the floor and mopped out evenly. If the soda is less concentrated than 30 Baume, add less water to it. The floor may be used as soon as it is dry and hard.

The above treatment will harden the floor ready for any good floor paint. However, there is no floor paint made that will not wear off under heavy traffic, therefore the paint must be renewed from time to time as it wears off.

Magnesite Floors

Magnesite cement floors were common thirty years ago but are not much in use today. They are sold under various trade names, are slightly resilient, made in plain and mixed colors and may be applied over wood or concrete. If these floors are installed by expert mechanics they are very satisfactory.

Wood Floors

Wood is an ideal flooring material because it resists indentation and is used in thicknesses that make it a good insulator when used over concrete. It is installed over concrete by two methods:

- (a) Strip flooring (narrow boards) on wood joist and on nailing cleats.
- (b) Wood tile which is made into squares of wood strips held together with metal binders. They are installed the same as asphaltic tile.

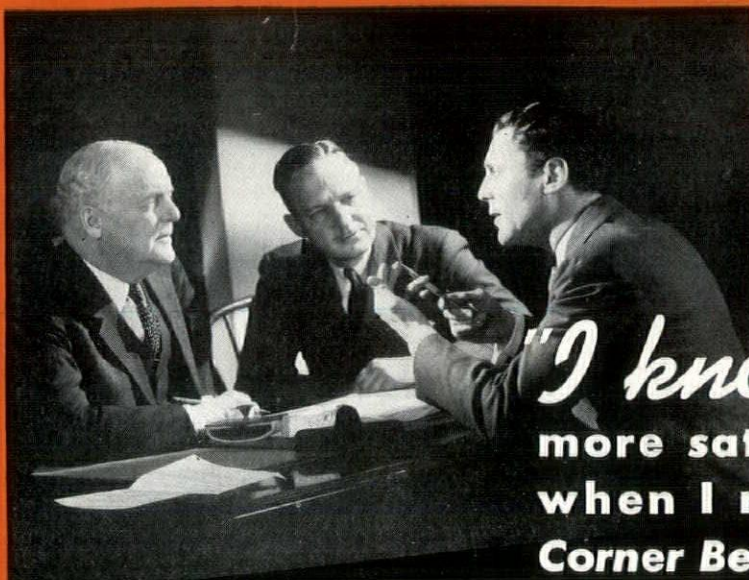
Wood is subject to expansion and contraction due to moisture changes. During the heating period in winter the sub-normal humidity in the rooms extracts the moisture from the wood which causes it to shrink. In summer, when open windows permit the humidity to return to normal and at times above, the wood then expands. Wood flooring must be kiln dried to from 6% to 10% of moisture and be protected from absorbing more moisture during the construction period. Close grained woods will expand more than open grained wood.

Wood floors over wood joist are the most common. The most important thing connected with their installation is ample nailing to prevent them squeaking. It is common to place floor lining, or sub-floors under them, which offers a floor to be walked on during the construction period and reduces the sound of footsteps on the finished floor.

Wood strip floors over concrete require nailing cleats 2" thick which must be anchored to the concrete. The space between the strips must be filled with light-weight concrete so that the spaces will not harbor vermin. Wood floors are usually laid before the concrete has properly dried. To protect the flooring against moisture, waterproof paper is placed under it. While the paper protects the flooring it may cause the nailing strips to rot by retaining the moisture.

Where a wood strip floor is laid over concrete directly on the earth, the nailers will rot within two years, but will last several years longer if they are waterproofed.

(To be continued in February issue)



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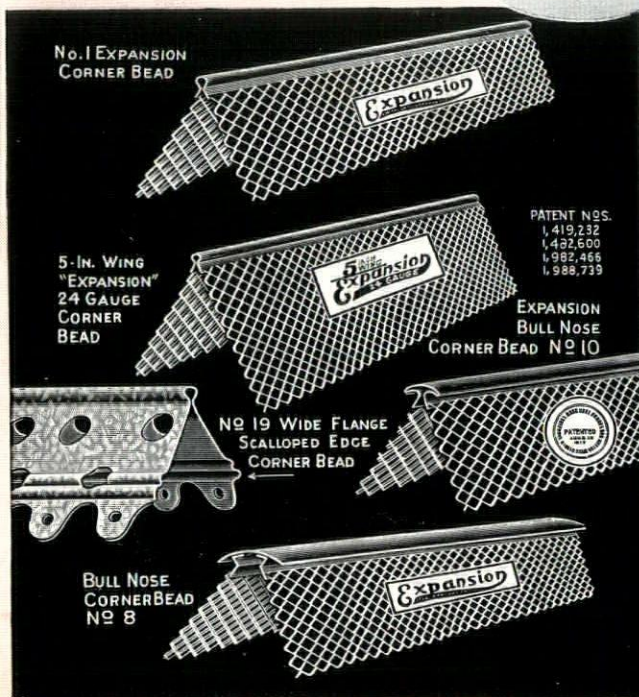
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