



An artist's impression of the Ideal Home Exhibition now being held in the Town Hall, Bombay.

NEVER before in the whole history of mankind has the possibility of safe, inexpensive, durable building been greater than at the present time. Never before, also, has it been possible to achieve such comfortable homes, homes which are within the reach of an ever-growing public. New manufacturing methods, new techniques are being evolved, new materials used in ever more successful combinations. To fit the needs and requirements of householders, builders, and architects, a very progressive and alert young industry has arisen whose specific purpose it is to solve innumerable building problems in an ever more pleasing and

satisfactory manner, and to manufacture at prices which will appeal to more and more people. There is really no excuse, nowadays, for shoddy and unattractive building—if roofs leak or floors crack, if colour-washed walls get discoloured and require far-too-frequent treatment, if rooms are too hot or too stuffy, if the house is dingy and uncomfortable and grey, be it really on our heads. For modern methods can solve satisfactorily and cheaply all these problems and a thousand others as well. We live in an age when there is not the slightest excuse for building as our forefathers did nor for suffering the dis-

MODERN BUILDING MATERIALS AT YOUR SERVICE!

By N. N. FORRIAN.

comforts this entails; rudimentary building can no longer be condoned. It is simply a question of taking notice of what modern industry offers to the service of modern building in the way of materials.

Foundations

New materials start in a literal sense, at the very foundations of the structure. Quickly, safely, and easily, we nowadays watch foundations start to grow from below the ground on a steel or ferro-concrete frame; it is no longer necessary to dig deep trenches in order to reach solid earth, then laboriously to build up a masonry foundation wall from perhaps twenty feet or more below ground level. Instead, piles are sunk; that is, vertical members of steel or ferro-concrete reach down to good soil and serve the same purpose within the earth as pillars do above—they support the whole structure. There is hardly a soil, however treacherous, which cannot be made in some manner to serve the purpose of building upon it: we can even nowadays build on bogs. And it is these steel and ferro-concrete foundation methods which permit structures of practically any height to be rested on them, and as safely as if they had been embedded on solid rock. Cellars or basements, whether of one small room or stretching over a vast area, can easily and quickly be made exactly as they require to be; cool, strong, water—and damp-proof. The walls can either be of concrete or of brick or stone masonry, and, in order permanently to prevent underground dampness from seeping in, they can be made absolutely waterproof either with a special cement plaster coating for this purpose, or with one of the many forms of asphalt or bituminous felt materials.

Next, the plinth. Stone? concrete? brick? marble? The purpose of a plinth is to give the house an appearance of "resting" on something on the ground, also to prevent rain or dampness from getting within the walls and staying there. There are many suitable kinds of stones and marbles; plinths can also be made of concrete or bricks inside, and a thin facing of any of the many beautiful kinds of marble can be attached to the outside. Or if of brick it can be either suitably plastered rough or smooth with, say, a coloured cement plaster, or left in natural brick colour without any plaster; in this case it must be specially waterproofed, and a paint exists for this purpose—indeed, the whole of the outside walls can be left in natural unplastered brick and merely treated with this paint in several colours. If the plinth is a concrete one it can be either cement-plastered in colour, or constructed of special cement bricks made to resemble many forms of natural stone.

Outside walls, if they support any weight, must be strong, and again

we have the choice of the materials mentioned for plinths, in addition to which they can be made in hollow brick, in monolithic or cavity concrete, in hollow cement bricks or blocks. They can have over their entire surface a layer of marble to give an all-marble exterior, but there is also on the market at least one form of asphalt-treated felt which will give the appearance of brick, shingles, or tiles in a wide range of colour and effect. This material, which is absolutely waterproof and extremely durable, is cheap and easy to put up, and its wide range of colours makes a most attractive finish to any building. Or the walls can be plastered sheer white, rough or quite smooth, with white cement—there is no doubt that a house treated in this fashion is really most appealing and dignified, especially if a touch of colour is introduced on the roof, say, or on the doors and windows.

If the walls, however, play no part in supporting the roof or the floors above (that is, when a frame or ferro-concrete frame is the method of construction) these walls are only required to keep out the elements—sun, rain, wind, cold, heat, damp. In this case they can be either of wood, lime, or cement plaster with a stiffening of expanded metal lath, or a very rigid board of an intimate mixture of cement and asbestos which is for all practical purposes everlasting, or built up with some of the many and excellent forms of weather-resisting insulating material in sheets and boards. Such walls are cheap, rapid in erection, and keep very well. Lately, too, a new method of treating outside walls has made its appearance: that of spraying asbestos mixed with an adhesive over the whole surface of the walls. This method is quite water-proof and heat-resisting, and the surface thus made only requires paint to finish it off.

While on this subject, three remarkable specialties which modern methods make possible should be mentioned: we refer to the all-concrete, the all-steel, and the all-wooden house. We have used the terms "modern" and "remarkable" advisedly, for it is not merely the erection of such houses which is now made possible but their erection with all the success which really sound building demands; not merely the elements themselves must be kept out successfully but other problems too must be solved; not merely sun, wind, and rain, but heat and to a certain extent light and sound must not enter or reverberate within: the house must further be made proof against ants, dry-rot, damp, and of course fire—in some cases in India it must even be capable of withstanding earthquakes. Is further evidence needed that modern materials are remarkable when it is stated that all this has been achieved and, furthermore, at astoundingly low cost?

Roofs

But to our muttens—or, in this case, roofs. If these are pitched, there is a wide choice of very attractive tiles, and these are obtainable in various shades and colours; in real wooden shingles; in a very wide choice of many-coloured bituminous felt roofing materials which are durable and hard-wearing; in asbestos and cement roofing sheets. There are differences in price, in life and durability, in the attention and repairs they may necessitate; but the advantage is all on the side of the more modern materials. Flat roofs, now that the difficulties of cracking through heat and of leaking have been successfully overcome, can be made in a variety of ways. They are usually made in large slabs supported on a steel or ferro-concrete beam system, and these slabs can be made in cement or baked hollow bricks or blocks and suitably reinforced, in sheer monolithic ferro-concrete reinforced, for rapidity and convenience of erection, with special steel fabric for this special purpose; finally floors can be made of strengthened steel sheets. In order to be sound—, water—, and heat-proof, and so that these flat roofs (or floors) are finished off, tiles, or coloured cement may be used, and, to ensure absolute security against leaks, they may have a layer of

asphalted roofing material in between the solid or structural part of the roof and the finished surface upon which one treads. Sufficiently pitched roofs permit the use of rooms or space immediately below the roof itself and above the storey downstairs; flat roofs can be used as full open terraces with the possibility of subsequently adding one more storey to the house—take your choice!

Partitioning

The outside clothing of the house is up; what about the interior? Internal walls very often support no weight at all and are merely partitions between the rooms. In this case they can be made of plaster with a metal core, of light hollow bricks, of hollow cement bricks, of light breeze (i.e. ash-residue, etc.) concrete blocks, or one of the many forms of insulating sheets, some of which require to be plastered and look like ordinary walls, others of which are painted and merely serve to separate or partition. Cement

can also be mixed with rice husks to make a feather-light insulating wall material. And as for the forms of treating internal walls or partitions, their name is legion and it is beyond the possibility of this article to mention them all, but they can be classified roughly as insulating, insulating and decorative, and purely decorative. Those of the first category are often made of such materials as sugar-cane, cocconut fibre, hemp, saw-dust, wood-shavings, straw, sand, cement, asbestos, ash, and numerous other natural materials; they are bound together with special adhesive cements and are pressed or compressed to a greater or less extent; in addition to having more or less sound—and heat-proofing properties, they are usually rendered waterproof, white-ant and fire-proof, and non-warping (for some of them are very thin sheets). Another form of heat-insulating material is aluminium foil on the back of a strengthened paper. Some of them require a coat of paint, others (and this brings us to the second category) acquire a facing in their manufacture, often decorative and colourful, sometimes matt and sometimes with a high gloss, which renders them capable of being used with advantage in many schemes of interior decoration, quite apart from the other valuable properties which they possess.

Enormous Choice

In the decorative category alone, in the innumerable ways of treating walls for modern decoration, the

householder, the architect, or decorator has a truly enormous choice. Suitably plastered, walls can be painted in washable distemper or in oil; they can be tiled; papers in a large and ever growing range of delightful papers; they can be decoratively plastered in many novel ways in colour; they can be panelled in beautiful woods from the ends of the earth; with highly decorative glass or mirror panels; or in composition panels in colour; they can be spray-painted in colours or in metals, cellulosed, enamelled, gold or silver-leafed; or walls can be covered with a special range of textile materials in various weaves, patterns or shades; and finally paper-thin layers of real wood are also used to "paper" the walls, all giving their natural glory of tones, grain, and texture which only wood possesses.

Floors are finished off in cement either plain or treated with a special cement paint, or in the new coloured cements themselves, with tiles in a large range of colours and shades, in marble of various hues, veining and textures, in glass bricks and panels, in various wood floorings and parquettings (not forgetting inexpensive ply-wood parqueting) in linoleum or rubber in many colours and patterns. It is impossible to overestimate the value in appearance and decoration, impressiveness and dignity, of a really good floor; it can turn a repulsive, dingy room into an attrac-

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tion. This is an aspect of building which is often overlooked or skimmed, but a well-finished floor should always be provided for; far more so perhaps than any other part, a good floor is of permanent value to the attractiveness of a house.

From the floor we can turn our eyes to the ceiling. Either the underside of the floor above is merely plastered, or one of the many insulating materials are used against sound and heat or both. But whether ceilings are full or hollow (that is, with an air-space or cavity along their full expanse) they are of primary importance to the ultimate comfort of the rooms and of the house as a whole, and it is wise to treat them with insulating materials. Especially in public rooms, in large offices, cinemas, halls, etc. does the ceiling play an important acoustic part: to reduce sound in a room, start at the ceiling.

Doors And Windows

And now we can turn our attention outwards—through doors and windows. Windows nowadays are more and more being made of metal, and for many excellent reasons; metal does not warp but stays "put" from the moment the frame is placed in the wall right through its long life to its ultimate end—a lifetime of trouble-free service. Further, the metal parts are much thinner than their wooden equivalents, and this permits more air circulation per given area, a visibility less interrupted by thick wooden parts; it is possible, also, to do many things with metal windows which are not feasible with wood such as; folding casements, vertical or horizontal sliding, vertical or horizontal pivot openings. Metal windows can also easily be divided into various sections each of which can be opened up at will, or be fully opened out of the way and out of sight; when shut, they are also permanently leak-proof and drought-proof. Glass for windows can now be had in various shades to give a pleasant light in the room and to prevent excessive glare. It can also be milk-glass, opaque in various colours, sand-blown, corrugated, tinted, translucent, and of many other kinds as well. To fit the curves of modern buildings, too, curved windows and curved glass to suit are also readily obtainable. Lately some new forms of glass have made their appearance; we refer to glass building bricks and blocks, unbreakable glass, and glass which does not permit heat to pass through. Glass, furthermore, has for many years been used as an insulator against sound.

Doors can be made in full wood, or wooden frames with plywood panelling, or in panels of imitation wood or insulating boards. If in steel, doors can either be in steel panelling, or partly in steel and partly in, say, tinted glass or glass in any other of its attractive forms; this makes an extremely smart, clean door. Few things can smarten up a house more than good doors

and windows, when care and discrimination are shown; sloppy and messy ones ruin the finished appearance completely. It should not be forgotten that many outside openings require some shading against the fierce rays of the sun, and for this purpose there are shutters, venetian blinds, or folding canvas shades in bright and attractive colours, and these together with the proper treatment of the doors and windows themselves add greatly to the finished impression that a house imparts.

Colour and finish, too, make all the difference to the appearance of all building materials and therefore of the house itself. The life and service of a house is greatly added to when suitable coats of protective paints, varnishes etc. are applied to the materials. For metals there are rust-proof paints, aluminium paints, and special paints for corrugated iron roofs; for wood there are weather-resisting paints for the outside which are non-fading, non-blistering, non-cracking, and also treatments to render wood fire-proof, ant-proof, and rot-proof; for the treatment of wood in the interiors there are many new and beautiful paints, lacquers, enamels, and celluloses, in matt or glossy finish; finally for cement, stone, or brick there are special water-proofing and extremely hard-wearing paints. While on this subject we may add that a new chemical treatment has just been announced which can be used on all textile materials; its value lies in this, that it is water-repellant as opposed to water-proof—that is, a material impregnated with it very simply does not permit water to be absorbed or passed through the material. There is undoubtedly a great future for this treatment in the building industry alone.

Fittings

But we must not forget that no house is nowadays complete unless it has a number of fittings contained within the traditional "four walls and a roof": water, gas, electricity, drains must be contemplated. "State your needs", says industry, "and we will solve them all". Thus there are copper, lead, steel, cast-iron pipes and drains, conduits made of earthenware, cement, asbestos, and cement; there are special needs for them all, some are more durable and expensive, some less, some more easy to erect, some are impervious to specific chemicals; it is a matter of choosing which will best fit a particular purpose.

Decidedly all these new materials have wrought a revolution in modern building methods, from steel or ferro-concrete foundations right down to the last chromium-plated screw or dab of washable protective paint. Houses are no longer as they used to be: they can be made better and more comfortable. No, there is no excuse at all if we do not thoroughly investigate our modern building methods.