THE EDISON CONCRETE HOUSE.

Although Mr. Edison has left his mark upon more different developments of the world's progress than perhaps any other living scientist, and is now past the age at which the majority are most productive, he is now giving most of his time to an invention which he himself considers the greatest thing he has ever done.

The name of Edison is associated in the popular mind principally with electricity, the wide range of the inventor's improvements in telegraphy, telephony, and lighting being principally concerned with ingenious cajoling of that mysterious fluid; but his present work is as far removed from delicate electrical devices as monolithic masonry. Even more widely known than his electrical devices are Mr. Edison's inventions of which the principal use is the amusement of the people, the phonograph and the kinetoscope, the former of which, considered by itself apart from its commercial or industrial value, remains perhaps the most wonderful machine of all; but Mr. Edison now goes on from the amusement and recreation of the masses to the amelioration of their material surroundings, and thereby to increasing their self-respect. This, as Mr. Edison says, is surely worth doing, and in its intended effect in the betterment of mankind is truly more a philanthropic than a commercial undertaking.

The ultimate object of the present invention is no less than the provision of a means whereby individual workingmen's homes—artistic, comfortable, sanitary, and not monotonously uniform—may be turned out in such quantity and so cheaply that their rent, including car fare to and from the tenant's work, will not exceed, say, nine dollars a month. Mr. Edison hopes thereby to depopulate the swarming tenements of congested cities, and provide their occupants with surroundings morally, mentally, and physically more healthful.

Reinforced concrete is the material adopted; and by Mr. Edison's method, after the erection of suitable molds, an entire house, including walls, floors, roof, molding, cornices, bath and laundry tubs, is "poured" at one operation, much as one might squeeze paint out of a compressible tube and leave it to set.

Rumors of this intention have been in the air for some time, and have been received with more or less incredulity or derision by the technical press, but experiments upon a practical scale have now reached a stage of progress at which Mr. Edison is confident of ultimate success, and permits the present authentic description.

Mr. Edison's first intention was to build a two-family house, and considerable work was done in preparation of the molds, but the designs submitted by architects he had employed did not prove adaptable to the system, and it was found that there was a growing demand for single houses. Mr. Edison therefore set his own engineers, Messrs. H. J. Harms and G. E. Small, to work exclusively upon the development of the concrete house plans, with the result that under their direction an extraordinarily adaptable set of molds has been produced.

The completed "form" for a single house may require as many as five hundred different sectional molds of cast iron bolted together, but the latter are so designed that a dozen houses in a row may be built on the same cellar plan, the first floor molds being disposable in several different ways, and the second floor molds likewise, so that no two houses of the dozen need be alike, thus avoiding monotonous uniformity of appearance.

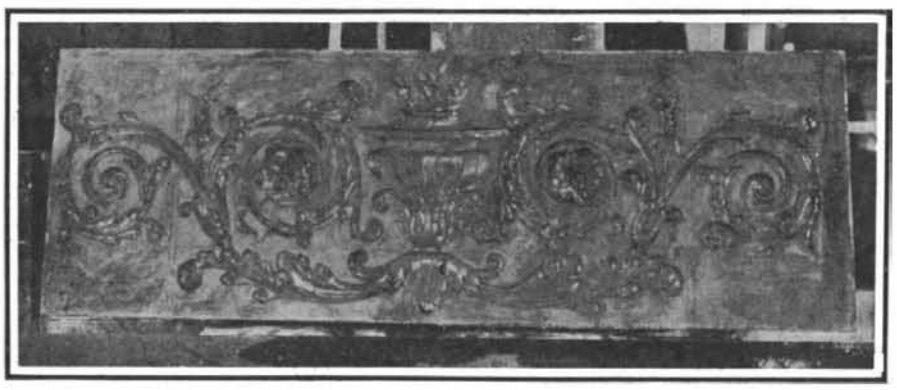
The typical house shown in our illustration has a floor plan 25 x 30 feet, intended to be built on lots 40 x 60. The front porch is 8 feet and the back 3 feet wide. On the first floor is a living room 14 x 23 x 9½ feet high, and a kitchen 14 x 20 x 9½ at the back. From the corner of the living room a staircase leads to the second floor, containing two roomy bedrooms and a bathroom 7½ x 7½ x 8 feet. The third floor contains two large low attic rooms, but each room has large windows, providing an abundance of light and fresh air. A cellar 7½ feet high extends under the whole house, containing boiler, wash tubs, coal bins, etc.

All the moldings and decorations are cast in the concrete, and not *appliqué* as hitherto in concrete work. Our illustration shows a typical piece of decoration with the mold from which it was cast, such decoration molds being, of course, changeable with each of a row of houses built.

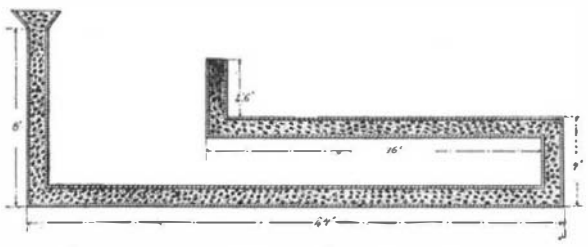
The inside walls require no plaster finish, the special mixture used leaving a perfectly smooth surface, which can be tinted as desired. Only the doors and window frames and the pipes for water, gas, or electric light wires are of wood or metal, making the house not only water-proof and vermin-proof, but practically fire-proof, reducing if not eliminating insurance cost.

The foundation and cellar floor should be laid some days before the weight of the molds is put upon them. The latter are then assembled complete from cellar to roof, and the special concrete is conveyed from large mixers into a distributing tank at the top of the house, whence it flows to every nook and crevice of the molds by gravity until the form is full and the concrete overflows at the top.

Specimen mural decoration cast in concrete.



Mold from which it is cast.

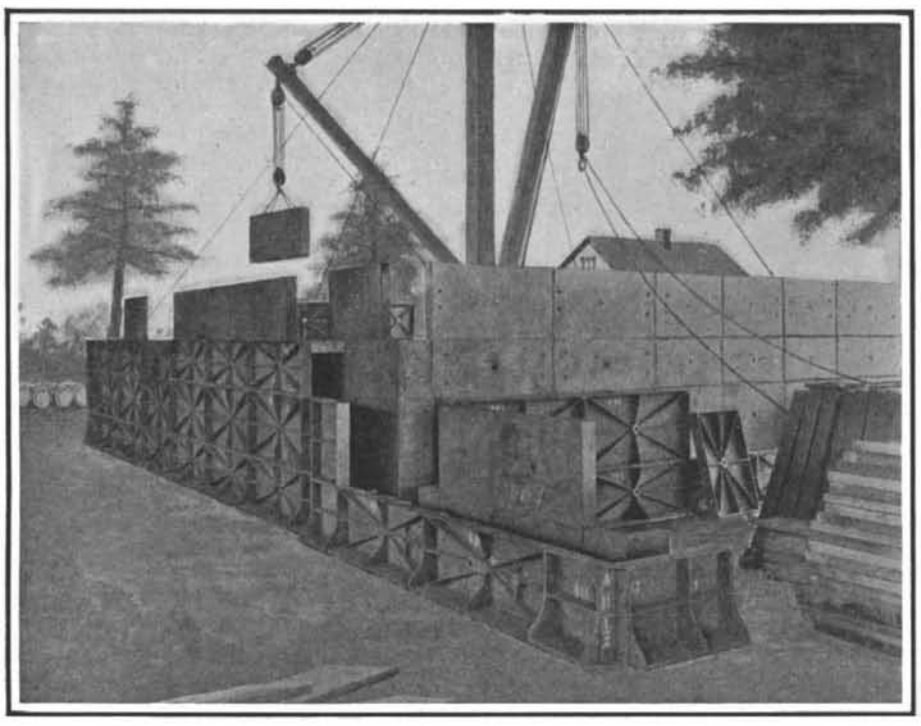


Result of test of gravity flow of concrete.

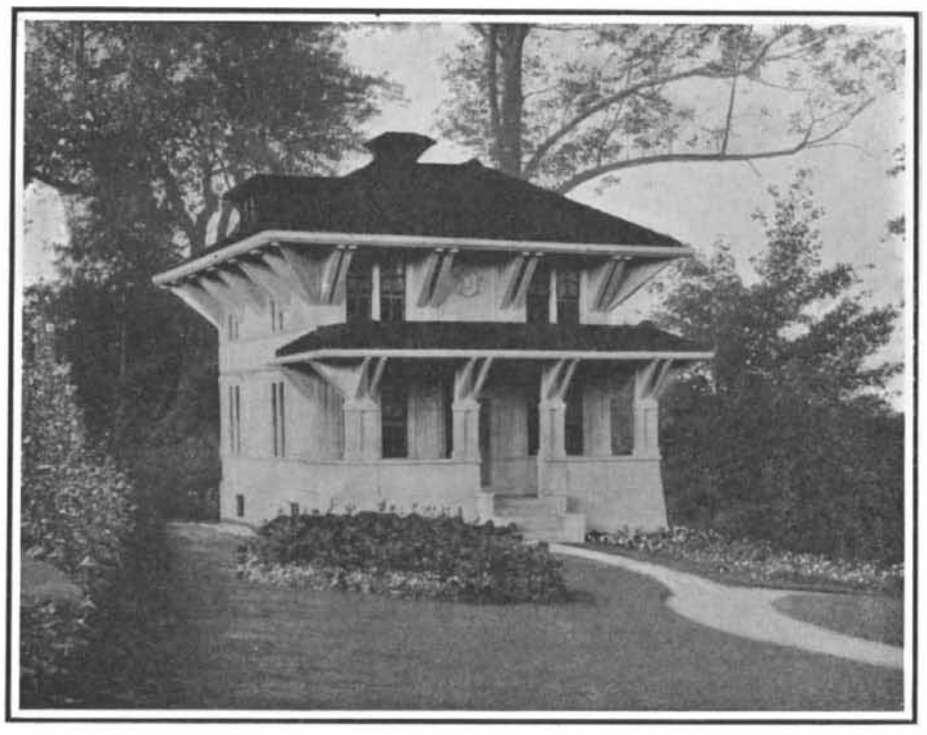
The mixture used is much more liquid than usual concrete, in order to obtain free flow, in spite of which there is no segregation of the material or settlement of the heavier aggregate. One of our illustrations shows a wooden form or conduit of only 4 inches square section, which has been completely filled with concrete poured only a bucketful at a time into the highest end. The concrete flowed down 8 feet, horizontally 24 feet, up 4 feet, horizontally again 16 feet, and then up over 2 feet to within a foot of where it entered, entirely by gravity, and, on the board at one side of the form being removed when the concrete had set, showed almost perfect uniformity of the material. This is a much more extreme test of fluidity than the material would be subjected to in the pouring of a house from the top. This result is obtained by the mixture with the concrete of a special colloid, which for the present is Mr. Edison's secret.

The latter thinks it will be possible to assemble the molds complete in four days, to fill the form with concrete in six hours, and, after allowing six days for setting, to remove the molds in another four days. A complete set of molds would therefore be occupied for fourteen days in the building of one house, or would be available for about 21 houses in a year; but owing to the interchangeability of parts, Mr. Edison estimates that with six complete sets of molds, 144 houses may be built in a year.

The greatest care is taken to make all the mold sections interchangeable, a special machine having been designed to plane them uniformly, and all bolt holes in their flanges being drilled to templet. Such are the finish of the molds and the nature of the colloid concrete, that there is absolutely no adherence of the latter to the former. The marks of the joints between the molds are rarely traceable on the finished wall, and the molds may be used over and over again indefinitely. With the present use of wood for forms, it is almost impossible to use the latter over again, owing to breakage and adhesion, and it is cost of the wood that renders the expense of monolithic concrete dwellings prohibitive.



Assembling the cast-iron molds of the "form."
Showing form of cellar walls and extension for front stoop.



Typical house cast in one piece.

THE EDISON CONCRETE HOUSE

Another great cause served by Mr. Edison's system is therefore that of conservation of natural resources, any extensive use of concrete with wood forms causing an actual waste of wood, and materially assisting the much-talked-of depletion of forest reserves.

One complete set of molds will cost about $25,000, and the accessory machinery for mixing, conveying, etc., another $15,000, so that a large capital will be required to build houses in this way; but this Mr. Edison considers an advantage, taking home building out of the hands of irresponsible "jerry" builders looking only toward the quick sale or rental of a house.

Mr. Edison thinks that the cost of such a house as that described will be about $1,200, including materials, labor, interest on plant, complete ready for occupancy with plumbing, heating, and lighting fittings. This prime cost not merely makes low rentals possible, but places the ownership of a home, at least upon the instalment plan, within the reach of any thrifty workman.

The Alteration of the Colors of Flowers by Cultivation.

BY PROF. F. HILDEBRAND.

In general, all the flowers of the same species, in the wild state, have the same color. For example, all plants of crowfoot or buttercup and dandelion have yellow flowers. In a few species, different colors are found. For example, the flowers of the milkwort (*Polygala vulgaris*) may be blue, violet, red, or white. Much greater variation is shown by cultivated plants. In these the variation of color of the flowers appeared long ago, but in recent years, many new colors have been produced which had either not hitherto been observed, or which, if they did appear occasionally, were not selected for preservation and development. The floriculturists of the present day carefully observe and endeavor to fix every new shade, even if it is not particularly beautiful, for the desideratum is novelty, and there is no telling what will please the popular taste. But in these attempts to obtain new colors in flowers, the propagator is entirely dependent upon the innate predisposition of the particular species with which he is working. He can by no means obtain every desired color. In the following sketch will be mentioned, first, a few cases of species in which a color has been obtained, which was formerly considered impossible. Some other examples will be adduced to show that in certain species a great many new colors and shades, but not all colors, have been obtained. Finally, a few other cases will be quoted in which the flowers of a species have shown little or no variation in color during many years of cultivation.

A species of primrose (*Primula acaulis*) in the wild state, always has lemon yellow flowers which vary only slightly in tint. Cultivation has produced both lighter and darker shades but, until recently, no color but yellow. Hence it was the more surprising when, a few years ago, a pure blue variety was produced, which has since retained its general color but has developed all shades, from the palest sky-blue to the deep blue of the corn-flower. The Chinese primrose (*Primula sinensis*), when cultivated in the garden, bore until recently only red and white flowers. In this species, also, other colors have lately been produced, not only violet but also blue, though not so pure a blue as that of the species first mentioned. Another example is offered by the gladiolus, which formerly bore only white and red flowers but has recently developed a blue-flowering variety. A case of a somewhat different character is presented by the asters, which have long shown a great variety of colors, but in which recently a great many new shades have been produced, including some which would not at one time have been considered beautiful, for example, copper-color.

Very numerous, on the other hand, are the species which have long shown great variation in color and have recently developed many new shades, with the exception of blue. Especially conspicuous in this connection is the dahlia, which is now found in every color except blue, although many propagators are making earnest efforts to produce a blue dahlia, which would bring great profit to its originator. A blue carnation would be equally valuable but it has not yet been produced, although the colors of carnations have lately been enriched by many new shades. The new varieties of canna also show great diversity of color, including almost pure white and a beautiful light pink, but a blue canna has not yet appeared. In the begonia not only blue is lacking, but also all shades from red to violet. Finally, we may mention the variety of poppy called the Shirley, which is greatly admired for its play of color. Here, however, the colors range only from white to rose and vermilion. Blue and violet colors are completely wanting and so is yellow, which is very common in the begonia.

Other species which have recently produced many new tones, with the exception of blue, include: Pelargonium, Scahosa, Calceolaria, Antirrhinum, Mirabilis Jalapa (Four O'clock or Marvel of Peru), hollyhocks, immortelles, and some species of Phlox and Godetia. The Gilliflowers, Wallflowers, and Balsams belong in the same category, for the varieties of these three flowers which are described as blue in seedsmen's catalogues are not pure blue, but violet.

It should be observed, furthermore, that among species which have produced many new colors, there are some in which the color yellow is wanting. This is the case with some species of larkspur (*Delpinium ajacis* and *D. consolida*), with *Dianthus Heddewigii* and with the verbenas and Clarkias.

Finally, there are species which, notwithstanding many years of cultivation, have shown little variation in the color of their flowers or have produced only new shades but not new colors. Among these are the fuchsias, which show only various shades of red. A blue or a yellow fuchsia would be a curiosity. Another example is furnished by *Cyclamen persicum*, in which many years of cultivation have only changed the original color scheme of a dark red throat and a white or pink tip so far as to deepen the red throat to crimson and almost to violet and, on the other hand, to efface it altogether, producing a pure white flower. Quite recently, however, an approximation to a yellow has been obtained by the production of a salmon-pink cyclamen. Similar cases are furnished by the Alpine forget-me-not, in which merely the shade of the original blue color has been slightly altered by cultivation, and by the marigold (*Tagetes*), the colors of which vary only from yellow and orange to brown.

From the foregoing remarks it is evident that, although very many new colors have recently been produced by cultivation in the flowers of numerous species of plants, the production of these changes is entirely dependent upon the original predisposition to variation possessed by the plant. Without these tendencies to variation, no new color can be produced, either by the gardener or by natural selection, for if there is no variation, selection is impossible.—Translated for the SCIENTIFIC AMERICAN from Umschau.

Decreased Number of British Patent Applications During the Past Year.

Consul Albert Halstead, of Birmingham, reports as follows concerning applications for patents in the United Kingdom in 1908:

According to the report of the Comptroller-General of Patents, patent applications in the United Kingdom in 1908 numbered 28,598, a decrease of 420 from 1907; of the total 572 were from women and 1,459 from abroad, the United States furnishing 572 of that total and Germany coming second with 515.

The greatest number of applications made in 1908 were in connection with locomotion, which, the Comptroller says, was due to the continued interest in motor cars and allied subjects. A great though smaller activity was shown in connection with wheels, efforts being chiefly directed toward the provision of an easily detachable tire-carrying rim, while many applications dealt with valves for internal-combustion engines. Inventions relating to road-tarring machines, compositions for treating the surfaces of roads, and dust-collector fittings for motor cars to abate the dust nuisance showed increased interest, as did tools for the repair of automobiles on journeys. On the contrary, there was some neglect of horse-drawn and railway vehicles.

Many inventors occupied themselves with flying machines of the heavier-than-air type, especially in regard to their automatic balancing and facilities for manipulating the various rudders and planes. Again, patents in connection with the manufacture of artificial silk showed an increased activity in an industry which the Comptroller reports to be developing. It may be said that artificial silk manufactured by a new patent process is one of the new shipments from Birmingham to the United States, and apparently a growing one.

The subjects of short-base range finders and eyes, periscopes for submarine boats, automatic railway signals, and systems for giving signals in the locomotive cab, as well as a controlling apparatus for stopping trains which have reached an excessive speed, were in evidence in patent applications. Processes for the regeneration of waste rubber and the synthetic production of rubber or rubber-like products formed an interesting feature of the patents of last year. New methods of using tungsten and other refractory metals for manufacture, by working them in combination with ductile metals which are afterward removed by heating the finished article, also attracted attention, while the stropping of flexible razor blades is an indication of the way in which the idea of a safety razor, since its development in the United States, has been developed abroad.

Under a section of the patent and designs act of 1907, providing for the revocation of patents worked exclusively or mainly outside the United Kingdom, several patents have been revoked. This section of the British patent law is one that American manufacturers can not neglect without serious danger to their patent rights in the United Kingdom.

Out of the total number of patents sealed—16,284—in 1908, the following numbers were sealed to residents in foreign countries: United States, 2,819; Germany, 2,516; France, 822; Austria-Hungary, 334; Switzerland, 200; Australia, 166; Belgium, 159; Canada, 155; Sweden, 139; Italy, 134.

Liquid Alloys of Sodium and Potassium.

Jaubert has obtained liquid alloys of sodium and potassium by treating sodium hydrate with metallic potassium, and potassium hydrate with metallic sodium. In both cases liquid alloys are formed, corresponding closely to the compounds NaK and NaK_2. The last-named alloy contains about 80 per cent of potassium.

As 23 parts of metallic sodium, which is comparatively cheap, set free 39 parts of the much more valuable potassium, this reaction may be made the basis of a practical method of producing potassium, in the form of a rich alloy.

Air must be excluded during the operation, but if this is conducted under melted commercial paraffine, the temperature cannot be raised above 400 deg. F., and the yield of alloy is diminished by reactions with the impurities of the paraffine. In the laboratory it is preferable to operate in a vacuum, the metal and alkali being placed in a strong retort of Jena glass, which is connected with an air pump and heated by an oil bath. 12 parts of potassium and 4 parts of pure and perfectly dry caustic soda yield the alloy NaK_2. The same alloy is produced when 7.4 parts of sodium are mixed with 16 parts of caustic potash containing 10 per cent of moisture, and the mixture is heated to 437 deg. F., while 5.5 parts of sodium added to 6 parts of potash and heated to 662 deg. F. yield the alloy NaK. The alloy NaK_2 is made on a larger scale at Clavaux, France, in iron retorts, provided with stirring apparatus. The product contains 77 per cent of potassium.

The Current Supplement.

The practical method of aerial photography has long been sought. Very successful results have been obtained in experiments with kites, which were recently made on French naval vessels by a system designed by Capt. Saconney. In the opening article of the current SUPPLEMENT, No. 1756, this system is described. The rapid advance of theoretical science in general, and of theoretical electricity in particular, is nearly as bewildering to the physicist and chemist, who is not investigating electrons and ions, as it is to the engineer. The old notions, we are told, are not wrong, but they must be modified in the light of recent research. A general exposition of the problem of the conduction of electricity will therefore be welcomed. Such an exposition (a cautious guide and not an immature theory) is given by Prof. J. Koenigsberger. Mr. E. F. Lake's admirable discussion on the Oxhydric Process of Cutting Metals is concluded. Interesting in the light of the recent introduction of tantalum and tungsten for lamps is Dr. C. Richard Boehm's article "The Forerunners of the Metallic Filament Incandescent Lamp." Maria Parloa's treatise on Canning and Preserving Fruit is concluded. Recent discoveries have filled up to a great extent the gaps in our knowledge of Palæolithic man. A general review of the present status of the subject is given by A. C. Haddon. Atmospheric circulation is discussed by R. F. Stupart. The first of a series of articles on Imitation Arms and Armor and how they are made is presented. Arthur Watson writes entertainingly on Conjurers of the Past, and delves up many a bit of historical magical lore. Experiments have lately been made by M. Blum with a simple apparatus designed to demonstrate the rotation of the earth on the plane of oscillation and support of a simple pendulum. The experiments are summarized by J. J. Davis and H. F. Purday.

Ancient Records of Halley's Comet.

Andrew C. D. Crommelin in an article on "The Expected Return of Halley's Comet" in Science Progress (London) gives an interesting account of the early observations of this comet which appears at intervals of about 75 years. The first definite record of this comet is from China where it was observed and fully described in 12 B. C. The various appearances from this time up to that of 1378 were more fully and accurately described in China than in Europe. Its path through the constellations was described in the Chinese records because they "imagined that the terrestrial kingdoms had their counterparts in the sky, and that comets were ambassadors between them indicating corresponding relation between the kingdoms on earth, so that valuable political information was to be gained" from this study of the heavens.

In the West the appearance of a comet was a bad omen and hence recorded, but its path was not an important feature. Josephus mentions the appearance of a comet several months before the fall of Jerusalem. This was probably Halley's comet which appeared in 66 A. D. The death of Emperor Macrinus in 218 A. D. was also preceded by a comet which was probably Halley's.