URING the last hundred and fifty years
a great change has taken place in architecture. This change has nothing to do with
the questions of superficial esthetics that agi-
tated the architectural world: the quarrels
between the classicists and the medievalists
or between the traditionalists and the mod-
ernists are all meaningless in terms of it. I
refer to the process whereby manufacture has
step by step taken the place of the art of
building, and all the minor processes of con-
struction have shifted from the job itself to
the factory.

How far this process has gone everyone is
aware who has watched the composition of a
building, and who knows how suddenly the
whole work would stop if the architect were
forced to design or specify with any com-
pleteness the hundred different parts, materi-
als, and fixtures he draws from Sweet’s
Catalog. But what are the implications of
this process? What results must it have on
the status of the architect and the place of
architecture in civilization? What further
developments may we look forward to on the
present paths: what alternatives suggest
themselves?

Some of these questions can be answered:
others will lead us to push beyond the cur-
rent premises upon which the discussion of
mass production and architecture is based.

II

By an ironic accident, the first use of fabri-
cated parts in a building seems to have been
ornamental: the plaster mouldings of the
eighteenth century were introduced before
the Franklin stove: but the age of invention
ushered in a whole series of technical devices
designed to increase the comfort or the effi-
ciency of the dwelling house, and along with
these improvements went a shift from hand-
icraft to machine production. There are
country districts in the United States where,
until a few years ago, the kitchen sink would
have been made of sheet zinc fitted over a
box made by the carpenter, or where the ice-
box might have been constructed in the same
way. In the main, however, the shift was
steady and inexorable: steam-heating, gas-
lighting, electricity, baths, toilets, refrigerators,
to say nothing of radio-connections and
garages, have all led to the industrialization
of architecture. Plaster, jig-saw, and cast-iron
ornament, the first spontaneous gifts of
industrialism, all happily diminished; but
the technical improvements remained and
multiplied.

In the great run of modern building,
except in part the country homes of the rich,
mass-manufacture has taken the place of
local handicraft. The latter has remained in
two places: the construction of the physical
shell itself, and the assemblage of the indi-
vidual parts.

Now, this change was coincident with the
withdrawal of the architect from the grand
body of building during the early industrial
period. The new factories and bridges and
railroad stations were largely the work of
engineers, while the great mass of private
dwellings became the province of the specu-
lative jerry-builder who, with a few stereo-
typed plans, created the dingy purlieus of all
our large cities. The radical change that had
taken place passed almost unnoticed, until
during the last fifteen or twenty years the
architect was called in to design small houses
for industrial villages. He was then confront-
ed with two brute facts: if he designed hous-
es for industrial workers in the fashion that
he did for the upper middle classes, it turned
out that the costs were so high that only the
middle classes could afford to live in them:
that was the fate, for example, of Forest
Hills, L. I. On the other hand, when he
accepted the price limitations laid down by
the industrial corporation, or, as in Europe,
the municipal housing scheme, he suddenly
discovered that he was no longer a free man.
Every variation he wished to introduce which departed from current practice was prohibitive in cost: his design was in fact little more than a composition of standardized patterns and manufactured articles. The elements were no longer under the architect’s control; for the carpenter on the job could not construct a kitchen cabinet as well or as cheaply as the factory, nor had he spent so much time in finding out exactly what compartments and divisions the housewife preferred. As for windows, doors, bathroom equipment, the architect either had to accept them as they came from the factory, or he had to do without them altogether.

III

Needless to say, this revolutionary change had come about without any genuine renovation in design, and without any attempt to overcome the difficulties that the increase of manufactured articles brought with it. The chief of these difficulties, as Mr. Henry Wright was perhaps the first to point out, was that the building proper, without being cheaper in its own right, accounted for only forty-five to sixty per cent of the total cost, whereas a hundred years before it had represented, with its decoration and ornament, about ninety per cent of the total cost. Some accommodation to this condition was made; but the adjustment was a blind and fumbling
In a word, building has shrunk, manufacture has expanded. One cannot suppose that this process will stop short at the shell. Apart from the fact that this has already been partly conquered—as yet, however, with no appreciable saving—in the mail-order wooden house, or in the sheet-iron garage, who doubts that the manufacturers of steel, aluminum or asbestos blocks, if not the large-scale motor manufacturers, looking for a new outlet for a market glutted with cars, will finally produce a light transportable shell, whose sections will be set up easily by unskilled labor? It would not be difficult to describe such a house: indeed, Mr. Buckminster Fuller in Chicago, and the Brothers Rasch in Germany have already gone a step beyond this. The chief difference

one: now it came as jerry-building, a general cheapening of materials and workmanship, again it came as smaller rooms or fewer rooms per family, or finally, it came as an abandonment of handicraft on the remaining parts of the building, and the increase of ready-made equipment. Decoration had not so much vanished by itself, for lack of artistic talent, still less because of any doctrinaire prejudice against it: it had rather been absorbed, or at all events transformed into mechanical fixtures. The new costs of finance, mechanical fixtures, utilities, had to be met at some point in the design. Short of a proportional rise in the real income of wage-earners, there was no way of cementing the old requirements and the new in a single building.

THE ARCHITECT'S ATTEMPT TO INDIVIDUALIZE AN INDUSTRIAL VILLAGE: FOREST HILLS
An attempt that failed. The cost of spaciousness and individual design was too high for workers and the houses are now occupied by the middle classes. To the rear is seen the invasion of the jerry-building that must serve the poorer man who wishes to live in a “free-standing” house.
between the factory-manufactured house and the current product of the jerry-builder in Flatbush or West Philadelphia would be that in the first case the design would possibly bear some living relation to the elements out of which it is composed. The mass-house would probably be placed on a platform, if not on a pedestal, in order to provide garage space and avoid the expensive cellar; the plans would be standardized; the pipes and fittings and fixtures would be integral with the walls and ceilings, joined together by a turn of the wrench; and the use of light insulating materials would both facilitate transportation and permit the design of large windows which would otherwise, in cold weather, make a great drain on the heating system.

What would be the advantages of the completely manufactured house? There are many potential ones. First of all, the mass-house, like the motor car, will be able to call to its design and construction a corps of experts, sanitary engineers, heating engineers, hygienists, to say nothing of professors of domestic science, who will have their minds focussed, not upon solving indifferently an indeterminate number of problems, but upon getting a perfect solution for a fixed and limited problem. These research workers will have the opportunity to deal with fundamental mechanical and biological facts, without the distraction of attempting to compose these facts into a traditional frame, conceived when industry and family life were on an entirely different basis, and when the inventions of the last century were still but vague grandiose dreams in the minds of Utopians like Leonardo and Johann Andreas.

The introduction of this council of experts would undoubtedly hasten the rationalization of the modern house. A dozen standard plans, with all minor deviations ruled out, would probably take the place of the competitive chaos that provides our more traditional forms of monotony and squalor, or, as in the well-to-do suburb, of standardized “variety” and fake elegance. No one would be able to pretend that individuality and personality are achieved by meaningless departures on the drafting board from standard dimensions: once the mechanical requirements were granted, an equally mechanical solution would follow. The charm of good building, the charm due to the carpenter’s or the mason’s feeling for his material and site, would disappear; but as compensation there would be the austere clarity of good machinery; and since this charm is already a sentimental memory in most of our building, it is an illusion rather than a reality that would be destroyed. Undoubtedly the result would be “hard”; but such hardness is surely preferable to the spurious “softness” of imitation half-timbers, imitation slates, and imitation fires; and it would constitute a real improvement over the actual quarters in which a great part of the population now live.

ALL THIS FOR A SINGLE CUSTOM-BUILT HOUSE
1917: The pride of the architect lay in giving every house, and every possible part of every house, its individual decorative treatment, specially full-sized and specially made. The effort was directed at what was very accurately named “enrichment.” (House of Mr. James Wilsoy, Aymar Embury II, Architect.)
There is no need to go here into the various technical improvements that may be possible in the mass-house. It is enough to assume that such matters as artificial cooling and heating, the removal of dust, and the utilization of sunlight would receive competent attention, and it is even possible that entirely untried methods, such as the heating of walls by electric grids, or complete insulation from outside air would be tested, if not incorporated in the mass-house. Such dwellings would represent a real advance from the standpoint of hygiene and constructive soundness; and since a good part of our population needs to be re-housed, its present quarters being unsanitary, crowded, vile, ugly, and entirely out of key with the best features in the modern environment, the mass-house holds out, on the surface, very attractive promises. Does the architect shrink from the prospect? He had better not. As a profession he has permitted something far worse than the scientifically designed mass-house, namely the unscientific one of the jerry-builder, to appear; and since he has shown as yet no capacity to face or master the real problem of housing, he cannot in all conscience turn away from this spectacle.

IV

Let us grant, then, the mechanical advantages of the mass-house; and along with this its practicability. We must now ask another question: to what extent would the mass-production of such houses be a solution of the housing problem, and how far would this form of manufacture meet all the needs that are involved in the dwelling house and its communal setting? Those who talk about the benefits of mass-production have been a little misled, I think, by the spectacular success of this method in creating cheap motor cars; and I believe they have not sufficiently taken into account some of its correlative defects. Let us consider a few of these.

First of all: the great attraction of the manufactured house is the promise not only of efficiency but of cheapness, due to the competitive production of houses in large quantities. It is doubtful if this will prove to be a great element in reducing the cost of housing. The reason is simple. The shell of the building is not the largest element in the cost; the cost of money, the rent of land, the cost of utilities, including streets, mains, sewers and sewage disposal plants, are among the major items on the bill. The two new spots where mass production would take the place of present methods, namely, in the shell itself, and in the assemblage of the parts, offer only a minor field for reductions. To cut the cost of the shell in half is to lower the cost of the house a bare ten per cent. The New York State Housing and Regional Planning Commission has shown that the lowering of the interest rate one per cent would effect as great a reduction; and the lowering of it to the level justified by the safety and durability of housing investments.
would reduce the costs far more drastically
than the most ingenious cheese-paring on
the structure.

Moreover, with respect to the other parts of
the house, the fixtures, the mechanical appa-
ratus, the finish, it remains true that while
slight economies are possible through further
standardization, a good part of these items is
already produced by mass-methods—and
most of the possible economies have been
wrung out. Novelties in plan or design, such
as those suggested in the Dymaxion house,
should not obscure the fact that the great
change in the shell is only a little change in
the building as a whole. For lack of proper
cost accounting our experimental architects
have been butting their heads against this
solid wall for years; but there is no reason
why they should continue. Land, manufac-
tured utilities, site-improvements, and
finance call for a greater share of the cost
than the “building” and labor. Mass produc-
tion will not remedy this. To use cesspools
instead of sewers, artesian wells instead of a
communal water system, and cheap farming
land instead of urban land, as some of the
advocates of the manufactured house have
suggested, is merely to camouflagethe prob-
lem: and it is more than a little naive: for
such expedients are temporary dodges,
which may occasionally be favored by a
sandy soil or inaccessibility to traffic, but
they cannot count for two pins in any com-
prehensive and universal solution of the
housing problem. There are many districts
where an artesian well would cost as much as
the house itself; and except in a communist
society there are no spots on the earth where
the Law of Rent is not operative—so that
any large movement towards the open land,
such as is now taking place fifty miles from
New York, is immediately recorded in a con-
version of farmland into building lots, with a
swift rise in price. In short: the manufactured
house cannot escape its proper site costs and
its communal responsibilities.

The second hole in the program is the fact
that mass-production brings with it the
necessity for a continuous turnover. When
mass-production is applied to objects that
wear out rapidly, like shoes or rubber tires,
the method may be socially valuable,
although the late Thorstein Veblen has
shown that some of these potential
economies are nullified by the commercial
habit of weakening the materials in order to
hasten the pace of destruction. When, how-
ever, mass methods are applied to relatively
durable goods like furniture or houses, there
is great danger that once the original market
is supplied, replacements will not have to be
made with sufficient frequency to keep the
original plant running. Our manufacturers
of furniture and motors are driven desperate-
ly to invent new fashions in order to hasten
the moment of obsolescence; beyond a cer-
tain point, technical improvements take sec-
ond place and stylistic flourishes enter. It will
be hard enough, in the depraved state of
middle class taste, to keep our mass houses
from being styled in some archaic fashion,
pseudo-Spanish or pseudo-Colonial, as the
fad of the day may be; and once mechanical
improvements bring diminishing returns this
danger will be a grave one.

*Walls (no windows) of transparent casein; inflated duraluminum floors; heat,
light, refrigeration supplied to it individually, through central mast, by Diesel
engine; water from well.
MASS-PRODUCTION APARTMENT HOUSES HUNG ON MASTS
THE BROTHERS RASCH, GERMANY
Two rows of hollow masts with a set of passages between. The ground is clear. Masts hold one another in position by system of cables; anchored by cables; floors hung on cables. Proposed in 1928

FROM ANOTHER CONTINUOUS ROW (STEEL HOUSES RESTING ON THE GROUND)
THE BROTHERS RASCH, GERMANY
There is still another defect in the manufactured house, just the opposite of the tendency to foist new style, in order to increase the turnover. One might call this the model T dilemma. Mass-production, just because it involves the utmost specialization in labor-saving machinery and the careful interlinkage of chain processes, suffers, as I have pointed out elsewhere, from rigidity, from premature standardization. When the cheapening of the cost is the main object, mass production tends to prolong the life of designs which should be refurbished. In the case of the dwelling house, the continuance of obsolete models would possibly be as serious as the rapid alterations of style; and it is hard to see how mass production can avoid either one or the other horn of this dilemma.

What, then, is the conclusion? So far as the manufactured house would base its claim upon its social value, that is, upon the possibility of lowering the cost of housing to the point where new and efficient dwellings could be afforded by the owners of Ford cars, its promises are highly dubious. Granting every possible efficiency in design or manufacture, the mass-house, without any site attachments, would still represent an expenditure of from six to ten times the amount invested in automobiles of similar grade; and this leaves us pretty much in our present dilemma. The new houses might well be better than the present ones—they could scarcely be worse. But, if better, they would not be radically cheaper, and since a new cost, a cost that is excessive in the motor industry, namely competitive salesmanship, would be introduced, the final results promise nothing for the solution of our real housing problem—the housing of the lower half of our income groups, and particularly, of our unskilled workers. The manufactured house no more faces this problem than the semi-manufactured house that we know today.

This does not mean that the processes of manufacture will not continue to invade the modern house; nor does it mean that the architect’s present position in relation to the problem is a happy one. The question is whether he is able to devise an approach to the housing problem and to house design which will bring with it all the efficiencies promised by the Brothers Rasch or by Mr. Buckminster Fuller, and which will at the same time give scope to the particular art and technique of which he is master. Is there perhaps a more radical approach to the problem of housing than the engineer and the mechanically-minded architect have conceived? I think there is; for though Mr. Fuller for example believes that he has swept aside all traditional tags in dealing with the house, and has faced its design with inexorable rigor, he has kept, with charming unconscionliness, the most traditional and sentimental tag of all, namely, the free-standing individual house. If we are thorough enough in our thinking to throw that prejudice aside, too, we may, I suspect, still find a place for the architect in modern civilization. I shall deal with the alternative to the purely mechanical solution of our problem in a second article.